

APPENDIX E



NOTES TO CHAPTER 1:

(1) Non-academic contexts ranged from science- or discipline-oriented contexts like the National Radio Astronomy Laboratory, the National Centre for Atmospheric Research - often situated in or adjacent to universities - to more mission-oriented contexts like the National Institutes of Health, the National Aeronautics & Space Agency, and occasionally technology-oriented contexts like the Livermore Radiation Laboratory (Brooks, 1968). Some of these should be regarded as quasi-academic contexts, since it is reported that many of the federal contract research laboratories are a legal fiction; they are, in fact, owned and financed by universities/consortia of universities - and in some instances, by industry (Greenberg, 1971).

(2) The concept of federal funding had been such an anathema prior to the second world war that the National Academy of Sciences had established a National Research Fund to attract private funding for science research (Price, 1968).

(3) *Eg.* the Department of the Interior, responsible for geological research and the management of natural resources.

(4) In the USSR, for instance, basic research was primarily conducted in separate research institutes, while even in the UK and Canada universities received a smaller share of the government's total research expenditure) (Price, 1978).

(5) The concept was introduced in a statement issued by the President's Science Advisory Committee in 1960 (the Seaborg Report), which observed that there were only 15-20 centres of excellence in the US.

(6) The OECD recommended this should be done in focussed fields rather than dispersed over every field; moreover, efforts should be made to do this on a co-operative basis rather than the fragmented, sometimes competitive approach usually taken in Europe (Ben-David, 1968).

(7) *eg.* the Centre for Advanced Manufacturing Technology at Warwick University (Williams, 1985a).

(8) These included the Engineering Design Research Centre in Glasgow, the Surface Science Research Centre at Liverpool, *etc etc.*

(9) The SERC had already started this process in 1969 with the introduction of CASE studentships. In 1978 it introduced the Co-operative Grant Scheme. In 1979 the SERC and the DTI jointly introduced the Teaching Company Scheme in an effort to mimic the role played in medical disciplines by teaching hospitals (Williams, 1985a). The Integrated Graduate Development Scheme was also introduced. The SERC's Engineering Board introduced the concept of research directorates (*eg.* polymer engineering, marine technology, biotechnology, information technology *etc*); each research directorate established joint research programmes between universities and companies in which the movement of research personnel between the collaborating universities and companies was a key feature - on the basis that this should stimulate technology transfer.

One of the most ambitious collaborative funding programmes in the UK was the Alvey Programme, introduced in 1982. Under this programme universities, government laboratories and industrial companies collaborated to conduct advanced, pre-competitive research in information technology.

In the early 1980s the DTI funded applied research and development in specially targetted areas jointly with companies which banded together in "clubs". In 1988 the DTI introduced the LINK scheme, which was designed to persuade SMEs to collaborate with academia on pre-competitive projects.

(10) For instance, the EC's ESPRIT Programme where the priority was to get to know your partners before submitting research proposals.

- (11) For instance, the Research Corporation was founded in 1912, while the Battelle Memorial Institute was founded prior to the second world war, expressly to progress technology transfer where organisations generating the IP were not in a position or did not wish to assume responsibility for technology transfer themselves. MIT's Industrial Liaison Programme (a misleading name in view of subsequent developments; industrial "club" is a more appropriate descriptor) dates back to 1948 (Allen, 1984), and Queens University, Belfast, has been engaged in industrial liaison since the immediate postwar period (Joyce & Woods, 1986).
- (12) In 1980, for instance, the SERC introduced its Regional Broker scheme. Brokers were set up in each major region with the remit of concentrating on SMEs which had little or no experience of the resources which could be provided by universities, and which had neither the knowledge nor the resources to make contact on their own initiative (Bragg, 1986). In Scotland the Scottish Development Agency set up a special division to act as intermediaries in the technology transfer process (Faulkner, O'Conner *et al*, 1988). The US Research Corporation set up a UK division in the 1980s, which was subsequently taken over by 3i. Numerous small, private sector brokers were also established during this period (*eg.* Technology Brokers Ltd).
- (13) Between 1967 and 1974 the University Grants Committee (UGC) gave pump-priming assistance to university-industry collaboration schemes in the form of grants for the introduction of 11 industrial liaison offices and 10 research and consulting schemes (Williams, 1985b).
- (14) In 1992, under the DTI's Innovation Programme, partial funding was provided on a competitive basis to HEIs which did not have an "industrial unit" or which wished to strengthen their existing "industrial unit".
- (15) In Sweden industrial liaison offices were established in universities in 1969 by the National Board of Technical Development (O'hEocha & Watson, 1984). By 1987 76 per cent of West Germany's 64 universities had instituted either an industrial liaison office or some kind of technology transfer unit (Allesch, 1987).
- (16) In 1986, for instance, the DTI provided pump-priming funding for a network of regional technology centres whose remit included eliciting and disseminating information from HEIs about the services they could offer, research results *etc.*
- (17) The Royal Society's Industrial Fellowship Scheme, for instance.
- (18) MIT's Polymer Processing Lab and Cornell's Submicron Facility were early examples.
- (19) The Wolfson Technological Projects Scheme was launched in 1968. Over the years it made around £20m available to support the establishment of over 100 such centres/units in UK universities (DesForges, 1986).
- (20) In Norway, for instance, the Royal Norwegian Council for Scientific and Industrial Research set up the Central Institute for Industrial Research in 1950; this consisted of 12 institutes adjacent to the University of Oslo campus which provided a comprehensive applied research service to industry. A further 16 specialist research institutes were later founded to complement the first twelve (Sanengen, 1971).
- (21) In Sweden dedicated technology transfer offices were set up in at least four Swedish universities during the 1980s (O'hEocha & Watson, 1984).
- (22) In the 1980s, imaginative collaborative ventures entailing funding from federal and state governments, industry and universities led to the establishment of centres specifically to help transfer biotechnology from academia into industry, for instance (*eg.* Penn State Biotechnology Institute, North Carolina Biotechnology Center *etc*) (Dibner, 1985).

(23) The first innovation centre in West Germany was founded in 1983 by the Technical University of Berlin, which relinquished control of it in 1986 by which time 33 new technology-based firms had been set up there.

(24) In 1967-68 the Ministry of Technology provided funding to assist the creation of "university industrial units" at the Universities of Bangor, Leeds, Newcastle upon Tyne, Salford, Strathclyde, Swansea plus Cranfield Institute of Technology (Macrossan, 1981). By and large, these were intended to provide a practical, in-house means of converting ideas developed in these universities into marketable products.

(25) Guidelines for Exploitation (ref. P/DF/30, F/TA/49), SERC, July 1986.

NOTES TO CHAPTER 2:

(1) During the 1960s many prominent US universities eschewed defence research projects because of their condition of secrecy. MIT went so far as to divest itself of the Draper Laboratory, as Stanford had the Stanford Research Institute, because of the secret work which these institutions were prepared to undertake (Omenn, 1982).

(2) Information provided by Mr T Lemon of the Advisory Service, the Patent Office, London.

(3) It seems unlikely, where there is no guaranteed income to offset the costs, that universities with no legal rights would set up a unit dedicated to intellectual property matters. However, this is a remit which might justifiably be given to, say, a university-wide director of research. Researchers could at least be alerted to the possible consequences of exploiting their discoveries intellectually, through publication or through informal disclosure to colleagues, before filing a patent application, where appropriate. They could also be directed to sources of professional assistance.

(4) I am grateful to Dr J Pennock of the University of Liverpool's Biochemistry Department for this information.

(5) In 1965, for example, the University of Florida decided against filing a patent on the work of faculty scientist Robert Cade but gave him no formal waiver. Cade subsequently exploited his research findings by marketing "Gatorade", a highly successful high-energy drink, through a private company. By 1972 his income from royalties amounted to \$600,000 and the university sued him. After a case which dragged on for several years, he agreed to assign 20 per cent of net royalties to the university. Following this debacle, the university was forced to amend its patenting policy (Omenn, 1982).

(6) Source: The Patent Office Roadshow, Glasgow, 1990.

(7) It was this policy which enabled Stanford to apply for patents on the "gene-splitting" techniques of researchers Cohen and Boyer, whose work was supported by the NIH and the NSF. In the mid-1970s, Stanford appears to have represented the exception, rather than the rule, however.

(8) Personal communication from the President, Katherine Ku, January, 1989.

(9) Under a statute adopted in 1934, Harvard forbade its faculty to enrich themselves or the university through patenting discoveries relating to health care, unless the patent was "dedicated to the public". Harvard shared this policy with many other American universities and did not revoke it until 1974, when the university received \$23m for biomedical research from Monsanto in exchange for exclusive rights to the resulting patents.

At Columbia, this policy resulted in a significant loss of income. A microbiologist developed a powerful technique for making antibodies to steroids - a technique which is now commonly used for a variety of purposes (eg. controlling animal litter size, testing human hormonal disorders). The Dean of Columbia's Medical School refused to countenance a patent being taken out on the grounds

that it was unethical to patent biomedical material (Source: The Scientist, November 28, 1988).

(10) In this same year, for example, the UNCTAD Code on the Transfer of Technology proscribed technologies relating to food and medicine from patent protection (Evenson & Putnam, 1987) echoing the British medical establishment's views on the patenting of penicillin.

(11) I am grateful to Kathleen Terry of the University of Minnesota's Office of Patents and Licensing for providing this information.

(12) University plant breeders in the US have begun to routinely patent new breeds, motivated by the need for exclusivity. Increasingly their non-exclusive field crop releases are losing out to heavily promoted commercially-bred releases. The profit margins on certified public varieties of field crops are very small, with the result that seed retailers promote varieties introduced by the private sector, even though they are technically inferior.

(13) If the departments of education, medicine and architecture were included in the UMIST calculation, the figure dropped to 60 inventions per year. NB Norris's paper was circulated in the 1970s by the University Directors of Industrial Liaison. It was unpublished, as far as can be determined, and bears no date.

(14) Academics entrepreneurs they studied were patenting at a rate which was equivalent to around 5 inventions per academic career; one would question, however, whether extrapolation from academic entrepreneurs to academics in general is acceptable.

(15) In some disciplines, the requirements of national and supra-national organisations conflict with the requirements of the Patent Act. In the early 1980s, for example, the UK Genetic Manipulation Advisory Group demanded that research proposals and techniques be disclosed to it in advance. The Spinks Report observed that a proposed EEC directive on genetic manipulation could have the same effect (Spinks, 1980).

(16) In view of the fact that the commercialisation of innovations in biotechnology has involved considerable use of trade secrets and proprietary information (Daly, 1985), it is likely that some academics made an even bigger attitudinal leap than this.

(17) Using the PCT has the advantage of deferring individual national applications until the result of an international novelty search is known; it also enables an application to be filed in London at the last minute, if there is no time to arrange translations (Powell, 1987).

(18) Royalty income from WARF's first patent, dated 1925, totalled around \$8 million net; their second patent delivered \$4 million net. By 1975 WARF had accumulated income from 42 patents, and it is estimated that between 1928 and 1982 WARF generated \$100 million for the University of Wisconsin. Other examples include Indiana University Foundation, which received \$3 million from the discovery of stannous fluoride, the vital ingredient of "Crest" toothpaste; MIT received \$1 million per year in royalties from the patent on its magnetic-core memory, the industry standard for the first generation of computers; the drink "Gatorade" netted the University of Florida over \$0.5 million (Omenn, 1982). However, by 1989 "Gatorade" had netted the University of Florida \$9.1m, still a minimal sum compared to the \$55m received by Michigan State University for cisplatin, a cancer drug licensed to Bristol-Myers; moreover, the patent has eight years left to run and royalties are expected to continue at a rate of \$10m p.a. (Source: The Scientist, November 28, 1988).

(19) Statistics made available to Manchester Business School's Academic Front-Shop Training Programme, 1992.

(20) Spinks was apparently unaware that in the UK the provisions of the 1977 Patent Act proscribe researchers from making a personal application for a patent unless the employer formally waives his rights to the invention.

(21) Once again, I am grateful to Kathleen Terry of the University of Minnesota Office of Patents & Licensing for making all this information available.

(22) Source: Information provided by Mr C Dale, representing the BTG in its Edinburgh office.

(23) In the course of this study, the investigator came into contact with several such agencies; none of them routinely contacted UK universities, though one was in contact with a number of universities in mainland Europe.

NOTES TO CHAPTER 3:

(1) Whilst an agent would admittedly shoulder many of these burdens, a licensee makes a greater commitment to the product/process than an agent.

(2) When cardiopilin was discovered in a New York State health department laboratory, the need to control the quality of commercial preparations dictated that a process patent should be obtained. But royalties were seen as incompatible with medical ethics, even though this left no funds to off-set the cost and management of the patent. When nystatin was discovered shortly afterwards in the same laboratory, the complexities of weighing the fact that nobody would risk the necessary investment to develop bulk production without a patent against the desire to prevent private companies making undue profit from the public interest led to a more sophisticated solution. The inventors assigned their patent rights to the Research Corporation, which exploited the discovery. The resulting royalties were used to support research.

(3) This entitled the government to a non-exclusive, non-assignable, royalty-free licence to use the invention for the duration of the patent.

(4) During the course of Harvard's attempt to set up a joint venture with a faculty biology professor and venture capitalists, for example, the resulting company was widely seen as a "university company", even though Harvard's share of the equity would only have amounted to 10 per cent.

(5) The investigator made every effort to obtain a copy, but the CVCP refused to provide one and the author (J. Lowe) refused even to acknowledge requests for further information, let alone provide it.

(6) Eg. Vuman Computer Systems Ltd and Medeval Ltd at the University of Manchester.

(7) For example, Computer Applications Services was founded by Heriot-Watt University in 1969 with the possibly unique assistance of a grant from the UGC; the Institute of Offshore Engineering was founded in 1972 by Heriot-Watt with support from the Wolfson Foundation. Inmap was founded by the Wolfson Microelectronics Institute of Edinburgh and Heriot-Watt Universities with government backing.

(8) Loughborough Consultants Ltd was founded in 1969 by Loughborough University with the aid of a large bank loan guaranteed by the university (MacKenzie & Rhys-Jones, 1985).

(9) It was estimated in 1980 that a minimal research operation for a fledgling rDNA company would require \$6-7m in its first 2-3 years of operation; a more viable operation would require 20,000 sq ft, 25 PhDs at a cost over the first 2-3 years of \$10-12m. A hybridoma-based venture would be a little less expensive at \$3.5-4m for the first 3 years for a minimal operation. To set up a company developing human diagnostics products would require a minimal investment of \$18m+ over 2-3 years (details quoted in Kenney, 1986).

(10) Imperial College founded Imperial Biotechnology Ltd in 1985 with nominal capital of £1.5m and a staff of 25; the university contributed no capital at all, but has equity in recognition of its central role in the enterprise. In the same year the university founded Imperial Software Engineering with nominal capital of £0.5m and a staff of 15; in this case, the university itself put up 20 per cent of the start-up capital. At Aberdeen University the holding company AURIS attracted £0.5m from the Scottish Development Agency and £1.25m from Prutec for a number of joint ventures.

(11) Visual Machines Ltd was founded to market computerised image recognition systems by Vuman Ltd at Manchester University with investment from the American Robot Corporation and Rediffusion.

(12) Several universities have complemented their traditional investment activities with projects which are more akin to venture capital transactions. The biotechnology company Hybritech received second-round funding from the University of California and Rochester University, in a private stock offering (Kenney, 1986); Columbia has looked into the possibility of providing venture capital from its endowment and Wesleyan University provided start-up capital for the Zygo Corporation, an industrial spin-off co-founded by an ex-doctoral student (Etzkowitz, 1983).

(13) For instance, together with the Scottish Development Agency, the Universities of Glasgow and Strathclyde have jointly formed a venture capital company, Kelvin Technology Developments Ltd (KTDL). Primarily designed to support the commercialisation of research conducted in the two universities, KTDL plans to cast its net somewhat wider, providing venture capital for the exploitation of technology originating elsewhere. Liverpool University has subscribed to the CLM Unit Trust, a development capital fund designed to provide investment finance for SMEs in the region.

(14) At Columbia, interestingly, faculty entrepreneurs took the opposite view, fearing that a university company would "crowd them out" as entrepreneurs; they also felt that the university's participation in private business infringed their academic freedom (Etzkowitz, 1983).

(15) Congress recommended mechanisms such as the North Carolina Biotechnology Foundation, established by the state to exploit university research.

(16) Williams quotes the dean of Carnegie Institute of Technology: "... the bottom line is that we must maintain a research climate on our campuses that permits the full intellectual talent of our faculty to be invested in the creation of knowledge ... A highly structured, short-term pay-off climate tends to stifle the creativity which has been the hallmark of academic research".

(17) It is seldom made clear in the literature whether equity participation in start-up companies exploiting university research discoveries refers to the university buying in or simply accepting equity on a "*droit de seigneur*" basis.

(18) By 1984 the University of Bath had an equity share in at least six spin-off companies (Cerych, 1985); the University of Strasbourg holds equity in Transgene, together with the Institut Pasteur (Davis, 1981) *etc.*

NOTES TO CHAPTER 4:

(1) The particular problems which confront student entrepreneurs (technical and non-technical) have received considerable attention in both north America and the UK. Solutions to these problems have been devised and students have been actively encouraged by targeted programmes such as the Graduate Enterprise Programme to form a business after graduation. These and other programmes are increasingly being networked to Europe and Australia. Evaluation of these programmes has indicated further problems and issues which are now being addressed in turn.

(2) According to McClelland, nAch was low in Britain between 1700 and 1750, and so was the country's economic growth; in 1925, in contrast, Britain's nAch ranked 5th out of 25 countries studied, but by 1950 it had dropped sharply, ranking 26th out of 39 countries. In contrast, nAch remained considerably higher in the US following the second world war.

(3) Riggs characterised restrictive communities as "fused" and supportive communities as "diffracted"; communities which encourage entrepreneurship but leave the entrepreneur in the insecure position of depending on continued support he referred to as "prismatic". In the prismatic community, for example, the social status of entrepreneurs is low and their social and economic reward is less than optimal. Few enterprises are founded; potential entrepreneurs leave the community in pursuit of a more positive environment or switch to other activities which are approved of and supported by the community.

(4) See note (3).

(5) This is considerably shorter than the 3, 5 and 7-year contracts which are available at UK universities following the abolition of tenure.

(6) Some researchers would be very sceptical of this remark. Several studies have shown that companies started by academics - particularly manufacturing businesses - grow less fast than their non-academic counterparts, particularly if the academics remain on the staff of their university (see, for instance, Doutriaux, 1987). This has been attributed to weak business skills, among other things - by Lamont himself (Lamont, 1972a).

(7) In Sweden academics do not attain the status of faculty members - and with it job security - until they are 35 (McQueen & Wallmark, 1982a).

(8) Cooper comments on the fact that Hewlett Packard (HP), a student spin-off from Stanford, has not incubated many spin-offs, despite placing an advertisement in Scientific American announcing its interest in helping employees found companies. Significantly, perhaps, "HP" is said in the business to stand for "Happy People".

(9) Cooper generally defined this as the total number of spin-off companies during a given time period, divided by the average number of employees in the incubator organisation during the same period. To be defined as a spin-off, companies must have had at least one full-time founder who went directly from the university to the company; he excluded companies engaged solely in management consulting, software or retail services, a judgement which he would probably not make today in view of the growth of the service sector in general and computing services in particular.

(10) Etzkowitz (1983) has a more sinister explanation for this phenomenon: scientists working in these laboratories/institutes have no tenure and take their place in a marked hierarchy. They are often closer in role to scientists employed in industry than to traditional academic scientists, though few conceive of themselves that way. Many lower and middle-level scientists in these hybrid institutions have little choice in their research topics; academic freedom has no relevance to their working lives.

(11) Examples include Pickel, Tromsdorff, Hermbstaedt, Erdmann and Liebig.

(12) They omit to mention that Einstein was originally a patent officer by profession!

(13) This is a constantly recurring theme in the US. For example, Noble (1982) argued strongly that the resources and reputation of an institution like MIT have been created largely at public expense - and asked whether they were really MIT's to sell to Edwin Whitehead. Until the advent of the Whitehead Institute in December 1981, the biology department, for example, had been sustained over two decades by federal funds and contributions from philanthropic foundations and members of the public, rather than by contributions from industry.

- (14) This may explain why researchers found it so hard to identify academics who had set up companies when conducting pioneering studies of academic entrepreneurship (Roberts, 1972).
- (15) This discrepancy may be a function of job security. Roberts' studies at MIT indicate that where tenured academics had formed spin-off companies, less than 10 per cent left to become full-time businessmen; most non-tenured staff opted to leave MIT (Roberts, 1972).
- (16) Whilst graduate students have always been exploited intellectually by their supervisors (Conrad, 1982), dossiers compiled by graduate student associations at Stanford and the University of California (Davies) indicate that they are now exploiting them financially, too. They cite the case of a doctoral student whose supervisor told the company for whom he consulted of her approach to the solution of a particular problem. The company's research team used her approach to solve the problem, obliging the student to begin a new project from scratch (Kenney, 1986).
- (17) In a period still characterised by cut-backs in the level of funding, some administrators are said to be unduly influenced by the research funds which the entrepreneurs have at their disposal.
- (18) According to the Solicitor-General, Gilbert "is hardly an impartial observer in the debate over the biohazards associated with genetic engineering developments".
- (19) I am indebted to Dr C Pamplin, Editor of the UK Register of Expert Witnesses, for providing this information during the course of a telephone conversation on 20 November, 1990.
- (20) NASA invested a lot of money in traditional, formal mechanisms for the transfer of its technology to the civilian sector, like information retrieval systems, publications and dedicated "tech briefs". In the event, the level of technology transfer stimulated by the written word was negligible, whereas "a vast amount of technology was informally transferred by the movement of people" - through spin-off companies.
- (21) This resulted from the transfer of the Centre for Applied Microbiology and Research, previously the Microbiological Research Establishment at Porton Down, to the Public Health Laboratory Service in the 1970s; the Centre ceased supplying restriction enzymes.
- (22) The company, New England Biolabs, was founded in 1974 by Dr. Donald Comb and his wife; by the mid-1980s it had 22 employees and was still wholly owned by the founders.
- (23) Personal communication from Mr C Dale, representing the Edinburgh office of the BTG, dated 2 May 1989.

NOTES TO CHAPTER 5

- (1) The Prime Minister announced the Government's intention to remove the BTG's right of first refusal at a science seminar at Lancaster House in September, 1983. The announcement received widespread coverage in the press at the time.
- (2) Source: Minutes of the UDIL meeting of April 1982; the BTG operated under the aegis of the DoI.
- (3) The CVCP working party transmitted its comments on the proposed new arrangements to the DES at the end of June, 1984.
- (4) In November 1985, a representative of the CVCP reported to the Conference of Registrars & Secretaries' Forum on University Industrial/Commercial Activities that 29 universities had replied to the Kingman letter. However, only three responses were acceptable; many universities had failed to address all eleven points which the Kingman letter indicated should be addressed; others had not addressed certain points in the manner in which it was indicated that they should (Source: Minutes of the Meeting of the Forum on University Industrial/Commercial Activities, 28 November, 1985).

- (5) Reports of Government-commissioned enquiries, such as ACARD (1981) and ACARD/ABRC (1983), had encouraged broad changes of policy for a number of years, but none went into detail about how those policy objectives might be achieved.
- (6) Source: CVCP (1978).
- (7) Source: UDIL's founding constitution.
- (8) Source: "Patenting/Exploitation Procedures in "D.I.L." Universities", UDIL, September 1974.
- (9) The Working Party was chaired by the Vice-Chancellor of Hull; the Principal of Heriot-Watt, the Director of Administration at Bristol and the Secretary and Registrar of Southampton made up the other members.
- (10) The penultimate paragraph noted that the law on copyright and designs had been the subject of the Whitford Report, published in March 1977. Since it was unclear at the end of 1977 whether this would lead to new legislation, the Working Party felt unable to give any guidance in relation to computer software, books, articles *etc.*
- (11) These nine criteria, many of which were derived from the 1977 Patent Act, were as follows:
- (a) whether the invention was made in the course of his normal duties or of duties specifically assigned to him (*sic*);
 - (b) whether the circumstances were such that an invention might reasonably be expected to result from the carrying out of his duties;
 - (c) whether, because of his special responsibilities, he had a special obligation to further the interests of the university;
 - (d) the nature of his duties and the remuneration and other advantages which he derives or has derived from his position within the university;
 - (e) the effort and skill which he has devoted to making the invention;
 - (f) the extent to which the invention was made jointly by him with any other person and the effort and skill which such other person has devoted to the invention;
 - (g) the extent of the advice and assistance contributed by any other member of the university who is not a joint inventor of the invention;
 - (h) the contribution made by the university to the making, developing and working of the invention by the provision of advice, facilities and other assistance and by its managerial skill and activities;
 - (i) the extent of the return and other benefits derived from the invention.
- (12) I am indebted to Dr. Jeremy Phillips, Research Fellow at the Intellectual Property Law Unit, Queen Mary College, for this information.
- (13) "Intellectual Property Rights and Innovation" (Cmnd. 9117), HMSO.
- (14) Source: Chitty on Contracts, 24th edition, specific contracts paragraph 3558.
- (15) Source: Letter to Secretaries of Local Associations headed "Patents and Inventions" (ref. LA/2512), AUT, November 1984.
- (16) Source: The Exploitation of Research Council Funded Inventions (ref. LA/2690), AUT, July 1985.
- (17) Source: Letter from the Assistant General Secretary of the AUT to Sir John Kingman, 11 July 1985.
- (18) Source: Letter from the Secretary of the SERC to the Assistant General Secretary of the AUT (ref. F/TA/49), 31 July 1985.

(19) There is no evidence that the AUT was called upon to elucidate, or that the points made in this letter were taken into account when formulating the new arrangements to come into effect following the removal of the BTG's right of first refusal.

(20) Source: Letter to Secretaries of Local Associations headed "The Exploitation of Research Council Funded Inventions" from the Assistant General Secretary and Convenor of the IPR Working Party (ref. LA/2690), AUT, July 1985.

(21) Source: "The Exploitation of Research Council Funded Inventions: Five Principles" (ref. LA/2690a), AUT, July 1985.

(22) Source: The Exploitation of Research Council Funded Inventions (ref. LA/2690b), AUT, July 1985

(23) Source: The AUT's response (ref. CS/285) to the Green Paper "Intellectual Property Rights and Innovation" (Cmnd. 9117), submitted via the TUC in July 1984.

(24) Source: Minutes of the IPR Working Party meeting, 23 April 1985.

(25) The University in question was Birmingham (Source: Minutes of the IPR Working Party meeting, 26 September 1985).

(26) Minutes of the IPR Working Party meeting of 26 September 1985 state "... it was agreed that AUT should not harp too much on the ownership issue but more argue along the lines that if SERC and the Government really wanted people to go ahead, the incentives must be given to them. This was the whole point of the new policy".

(27) Source: Minutes of the IPR Working Party meeting of 26 September, 1985.

(28) The AUT had already decided that the increasing use of university-owned companies presented a new range of problems for its members and sought talks with the CVCP about it (Source: Minutes of the IPR Working Party meeting of 18 July, 1984).

(29) Source: Minutes of the IPR Working Party meeting of 26 September, 1985.

(30) Source: "Five Principles", circulated by the AUT to local associations together with LA/2690, July 1985.

(31) In mid-1981 the ILO of Edinburgh University paid a visit to DG XXIII to discuss the possibility of the EC funding the training of technology transfer intermediaries (Source: Minutes of the autumn meeting of UDIL, October 1981). By spring 1982 he had become chairman of a committee examining the training needs of such intermediaries (Source: Minutes of the spring meeting of UDIL, April 1982). In due course, an association of European technology transfer intermediaries was established under the aegis of the OECD.

(32) The Working Party on IP was composed of the UDIL members of Sheffield, Bradford and Warwick universities, plus UMIST and University College/Wales; it was chaired by the UDIL member for Birmingham (Source: Minutes of the spring UDIL meeting, April 1985).

(33) Source: Minutes of the autumn UDIL meeting, September 1982.

(34) Source: Minutes of UDIL's autumn meeting, April 1985.

(35) Source: Letter from the Registrar of Warwick University to fellow Registrars, dated 15 June, 1984 (ref. MLS/sfe).

(36) Source: Minutes of the meeting of the CRS' Forum on University Industrial/Commercial Activities, 20 September, 1984.

- (37) Source: Minutes of the meeting of the CRS' Forum on University Industrial/Commercial Activities, 14 March, 1985.
- (38) Source: Minutes of the meeting of the CRS' Forum on University Industrial/Commercial Activities Registrars & Secretaries, 20 September, 1985.
- (39) Source: Minutes of the meeting of the CRS' Forum on University Industrial/Commercial Activities, 9 May, 1985.
- (40) Source: Minutes of the meeting of the CRS' Forum on University Industrial/Commercial Activities, 14 March, 1985.
- (41) Source: Minutes of the meeting of the CRS' Forum on University Industrial/Commercial Activities, 14 March, 1985.
- (42) Source: Minutes of a Special Meeting of the CRS' Forum on University Industrial/Commercial Activities, 20 September, 1985.
- (43) At the end of the 1960s, for instance, the CVCP had co-operated with the CBI in a study of contemporary university/industry relations, culminating in the publication of the Docksey Report (CBI, 1970). In November 1981, the CVCP had organised a major conference on universities and industrial collaboration and published a booklet entitled "Universities and Industry".
- (44) Chaired by the Chairman of the CVCP, ACI members included a number of "senior industrialists", such as Sir Austin Bide and Lord Caldecote.
- (45) Exploitation of Inventions, Office Note (ref. VC/84/73) 29 June, 1984.
- (46) Exploitation of Inventions, Office Note (ref. VC/84/89), 18 September, 1984.
- (47) "A Review of Academic/Industrial Co-operation", presented to the Advisory Committee on Industry by Dr. J. D. Burnett in June 1985.
- (48) The paper indicated, for example, that long-range and fundamental research had a high risk of failure, from the point of view of knowledge and ideas which might be commercially exploitable. Moreover, even if such IP emerged, exploitation might take as long as 20 years in some cases. Short-range research, on the other hand, has a lower risk of failure, and commercial exploitation might be expected within 2-10 years.
- (49) "University-Based Companies and Science Parks" (ref. VC/87/83), CVCP, June 1987.
- (50) A 5-page document concluded that universities would not be liable to lose their charitable status provided any commercial or trading activities were peripheral to their teaching and research activities. It indicated that universities could reduce any tax liability arising out of regular trading in competition with other traders by establishing limited liability companies; the Memorandum of Association should include amongst its purposes the making of covenanted contributions to charity - *ie.* back to the university. The document warned universities that although wholly-owned companies which got into financial difficulties were legally liable to do no more than pay back share-capital, morally, they would be under considerable pressure to pay up, in order to protect their "good name". Finally, it alerted universities to the fact that if they appointed members of staff as non-executive directors, these members of staff cannot contract out of the duties imposed on company directors if the company gets into difficulties; it drew universities' attention to the provisions of the 1985 Companies Act (sections 630 and 727) and the Insolvency Bill which was then going through Parliament (Source: University Companies: Copy of a Paper Prepared by Alsop Stevens Bateson Lane-Smith, Legal Advisors to the Committee, Regarding 'Universities, University Companies, Charitable Status and Tax' (ref. I5/7/1, P/dp), 22 May, 1985).

(51) The group consisted of the Vice-Chancellors of Aston, Sheffield, Wales, Nottingham and Sussex, the Principal of Stirling, the Provost of University College and a member of the Registry of Cambridge University; it was chaired by the Vice-Chancellor of Manchester University (Source: Exploitation of Inventions: Note to Members of the Committee's Group (ref. R9/9/4), 21 May, 1985).

(52) The 4-page note observed that while the Research Councils wished the rights and responsibilities for exploitation to rest firmly with the institution in receipt of the grant, the Government was encouraging universities to give researchers the fullest opportunity and scope to assume responsibility for exploiting their discoveries; the position of the DES appeared to be somewhere inbetween these two extremes - viz. that universities would give researchers the right of first refusal to exploit their discoveries "within the framework of the university's agreed arrangements".

(53) The 4-page note to the advisory group observed that the DES was in favour of "hard but fair bargains with companies" but against wide variations in practice.

(54) I am indebted to Michael Powell, Senior Administrative Officer of the CVCP and a member of the Exploitation Scrutiny Group, for this information.

(55) More recently, the Cabinet Office, the PCFC and the CDP have also been given representation on the ESG.

(56) I am indebted to Michael Powell, Senior Administrative Officer of the CVCP and a member of the Exploitation Scrutiny Group, for this information.

(57) The NRDC was originally created by an Act of Parliament expressly to exploit "inventions" arising from publicly-funded research. In 1950, those Research Councils which existed at the time voluntarily agreed to observe the provisions of Treasury Circular 5/1950, according to which they, too, would offer the NRDC first refusal on any "inventions" arising out of research which they funded (Source: Notes to Editors, DES Press Notice 112/85, "New Opportunities for Exploiting Research", 14 May 1985).

(58) I am indebted to Colin Dale, representative of the BTG in Edinburgh, for this information.

(59) See, for example, the pamphlet "SERC Research Grants", 1984, p29, GC13(i).

(60) Once again, I am indebted to Colin Dale, representative of the BTG in Edinburgh, for this information.

(61) "The Exploitation of Research Council Funded Inventions", written answer given by Sir Keith Joseph, Secretary of State for Education and Science, in the House of Commons on 14 May, 1985, recorded in the House of Commons Official Report: Parliamentary Debates (Hansard), vol. 79 no. 116, cols. 97-100 (reproduced in full in Appendix A).

(62) "Intellectual Property Rights and Innovation" (Cmnd. 9117), HMSO, 1984.

(63) I am indebted to Dr. Roland Whaite of the Patent Office's publicity section for this information.

(64) Source: Letter from C. S. Richenberg, Head of Publicity at the Patent Office, to ILOs in 57 universities, 22 July 1985.

(65) The Secretary of the ESG is Mrs. M. Veal, who is also Head of the Research Grants Section within the Finance Division of the SERC.

(66) "Guidelines for Exploitation" (ref. P/DF/30, F/TA/49), SERC, July 1986.

(67) Letter from the Finance Division of the SERC to Registrars, Secretaries and Administrators at Universities, Polytechnics and other similar institutions (ref. F/TA/49, F/GA/91), 2 September 1986.

(68) Source: Exploitation of Inventions: Office Note, (ref. VC/85/117), 14 November 1985.

(69) Source: Exploitation of Inventions: Office Note, (ref. N/86/26), 14 February 1986.

(70) Detailed notes of this talk were later circulated to university administrators under the heading "Conference of University Administrators: Seminar on Commercial Exploitation of Research, University of Durham, 11 October 1990".

(71) Source: Exploitation of Inventions: Office Note on Developments (ref. VC/86/93), 17 July, 1986.

(72) Performance Indicators in Universities: A Second Statement by the Joint CVCP/UGC Working Group (ref. VC/87/78), 1 July 1987.

(73) See: The Foreword to the 1990 edition of "University Management Statistics and Performance Indicators in the UK", issued by the CVCP/UGC Performance Indicators Committee, October 1990.

(74) I am indebted to Michael Powell, Senior Administrative Officer, CVCP, for this information (Source: private communication, 6 February, 1991, ref. R9/19/4).

(75) "University-Based Companies and Science Parks" (ref. VC/87/83), CVCP, June 1987.

(76) See, for instance, the Minutes of the Forum on University Industrial/Commercial Activities' meeting of 9 January, 1987, which record that "disappointment in varying but strong terms was expressed that the report had, in fact, not turned out to be the manual of assistance in establishing and managing science parks, companies *etc* which ... the Forum had had in mind as desirable ..."

(77) A copy of the report was sent to members in December 1988 with a request for comments by the end of February 1989 (Source: Note to Vice-Chancellors & Principals (refs. I5/8/2, R9/17/2, N/88/159), 5 December 1988).

(78) A copy of the report was sent to members in March 1989, together with a resume of the CVCP's views and a request for comments by mid-April. The accompanying circular noted that the CBI, the Chartered Institute of Patent Agents, the UGC, the PCFC, the Advisory Council on Science & Technology and the Standing Advisory Committee on Industrial Property were also being asked by the DTI to comment (Source: Note to Vice-Chancellors & Principals (refs. R9/17/2, N/89/41), 3 March 1989).

(79) The workshop "Patenting and the Strategic Use of IP" took place at UDIL's spring meeting in April, 1986, and was attended by 35 ILOs (Source: Agenda).

(80) Source: "The Role and Functions of UDIL and University Industrial Liaison Services", draft dated 12 March 1986, presented to the UDIL meeting of April 1986 for consideration.

(81) Source: Agenda of the UDIL meeting of September 1986.

(82) "Report on University Intellectual Property: Its Management and Commercial Exploitation", UDIL, 1988.

(83) "University Intellectual Property: Its Management and Commercial Exploitation", part 2: "Examples of Current Practice", UDIL, 1989.

(84) Source: Agenda of the UDIL meeting of April 1986.

(86) For instance, York University hosted one of the Yorkshire "Patent Roadshows" during 1989/90.

(87) Source: Minutes of the spring UDIL meeting, April 1989.

(88) The first two which were aimed at HEIs were: "Policy & Strategy for Higher Education" and "Organisation & Management in Higher Education".

(89) "University Links with Industry", Draft Report, National Audit Office, 1989.

(90) Computer software became available as a commodity separate from hardware from 1969, as a result of IBM's decision to "unbundle" the two

(91) Source: SERC Research Grants, 1984, p29, GC13(i).

(92) Source: Minutes of the autumn UDIL meeting, September 1984.

(93) Source: Exploitation of Inventions: Office Note, (ref. VC/85/117), 14 November 1985.

(94) Some of the 38 - we have no indication of how many - offered only an interim indication that they wished to assume the rights to and responsibilities for exploitation. Others had registered their policies and procedures with the ESG by this time, however; in due course the ESG contacted several of these to follow up or clarify particular issues (Source: Exploitation of Inventions: Office Note, (ref. VC/85/117), 14 November 1985). In the end the ESG did not hold its first meeting to formally decide which replies passed muster until 1 July 1986; that meeting dealt with every complete response which had been received by 30 June 1986 (Source: Exploitation of Inventions: Office Note on Developments (ref. VC/86/93), 17 July 1986).

(95) Source: Minutes of the meeting of the AUT's IPR Working Party, 18 July, 1984.

(96) Although the creator of a work is generally deemed to be the first owner of the copyright in it, section 5(b) of the Copyright Act of 1911 and section 4(4) of the 1956 Copyright Act both carved out exceptions for works created within the employer-employee relationship - and for certain types of commissioned works. In these situations, the first owner of the copyright was the employer/commissioner of works. Section 11 of the 1988 Copyright, Designs and Patent Act confirmed that the employer is the first owner of works created by employees in the "course of employment" but removed the right of commissioning parties to first ownership of copyright in the resulting works.

The 1988 Act does not define "course of employment"; nor did the two previous Acts define what they meant by works created under a "contract of services". Legal precedent suggests that direct employer control over the creation of the work by the employee is not required; rather, the test is whether the organisation could be said to exercise control over the work of the person. However, such control cannot be regarded as the sole determining factor; other factors which may be of importance are such matters as whether the person provides his own equipment, whether he hires his own helpers, what degree of financial risk he takes, what degree of responsibility for investment and management he has and whether and how far he as an opportunity of profiting from sound management in the performance of his task. (Source: Wilkof, 1991). In practice, this may mean that in some instances, the employer-employee relationship may not be held to exist where academics are concerned.

(97) In the UK and Europe, material protectable by copyright is deemed to be covered by copyright automatically, whether or not the copyright sign is employed; in the United States, this is not the case.

(98) The new design right is primarily concerned with protecting three-dimensional, useful articles; previously these attracted copyright protection on the basis of two dimensional drawings.

(99) I am indebted to the Trade Marks Registry for confirming that universities may apply for trade marks, provided they are a legal entity. By definition, a legal entity can be an individual, a company or a partnership. In Scotland the partnership itself is the legal entity. In the rest of Britain, it is the sum of the partners which constitutes the legal entity. UK universities are not only allowed to apply for Trade Marks - several already have (Source: private correspondence with the Trade Marks Registry, London, 31 January, 1991).

(100) Under section 215(3) of the Copyright, Designs and Patent Act of 1988, an unregistered design created by an employee cannot be the subject of a contrary agreement by the parties; that is to say, an agreement between a university and its employees which stated that employees were the first owner of an unregistered design would be illegal. An employee may become the subsequent owner, if the university formally assigns its rights.

In contrast, section 11 of the 1988 Act allows for a contrary agreement; that is to say, even if an employer-employee relationship exists, the parties can, by agreement, provide that the employee and not the employer is the first owner of the copyright in his work (Source: Wilkof, 1991).

(101) Source: "Exploitation of Research Council Funded Inventions: Position of Research Council Funded Institutions as at September 1989", CVCP.

(102) Source: Exploitation of Inventions: Office Note, (ref. VC/85/117), CVCP, 14 November 1985.

(103) Source: Exploitation of Inventions: Office Note, (ref. N/86/26), 14 February 1986.

(104) Source: "Guidelines for Exploitation" (ref. P/DF/30, F/TA/49), SERC, July 1986.

(105) The Exploitation of Research Council Funded Inventions (ref. LA/2690b), AUT, July 1985.

(106) "Guidelines for Exploitation" (ref. P/DF/30, F/TA/49), SERC, July 1986.

(107) For instance, on a net income of £30,000, the SERC's "typical" formula would give £24,000 to the inventor; one of the AUT's commended formulae would yield the inventor £19,500 and the other £22,500 on the gross income. On a net income of £500,000, the SERC's formula would give £259,000 to the inventor; one of the AUT's commended formulae would yield the inventor £189,833 and the other £262,500 on the gross income.

(108) The terms of the 1977 Patent Act do not oblige employers to give employee inventors a direct financial reward, such as a share of the profits derived from their invention; employers are free to reward such employees "in kind", by giving them extra holiday time, for example.

(109) I am indebted to Dr. Jeremy Phillips, Research Fellow at the Intellectual Property Law Unit, Queen Mary College, for this information.

(110) In paragraph 3 the DES statement read: "... to increase the incentive for researchers and their establishments by enabling them and the work they do to benefit from increased exploitation; ... to see and share in the benefits of exploitation both for their own establishments and more widely in the national interest". Paragraph 6 added: "... with a commensurate share in the benefits; ... because public funds are involved, the university should share in royalties". There was no further reference to the rewards which academics could expect for inventions successfully exploited.

(111) Source: Personal, confidential notes circulated to members by UDIL's Deputy Chairman in March, 1979, following a meeting of ILOs from universities and polytechnics with representatives of the SRC to discuss its proposed regional brokerage scheme.

(112) Source: Minutes of UDIL's autumn meeting, October 1981.

(113) Source: "The Role and Functions of UDIL and University Industrial Liaison Services", draft dated 12 March 1986, presented to the UDIL meeting of April 1986 for consideration.

(114) Source: Minutes of UDIL's autumn meeting, October 1981. In July 1982, UDIL did indeed meet with the CVCP - and the DoI, the DES and the SERC - at the offices of the BTG to discuss university/industry collaboration.

(115) This letter was occasioned by the fact that the New Technology Group, newly created by Lord Mottistone, had been making separate approaches to ILOs, Vice-Chancellors and academics.

(116) Source: Newsletter from the Chairman of UDIL to members, February 1984.

(117) Source: the Minutes of UDIL's spring meeting, April 1985.

(118) A letter from the Secretary General of the CVCP to the Deputy Chairman of UDIL, summarising a meeting between the two, recorded his "understanding of the way forward". It stated: "As you know, our particular concern was that the UDIL group should not in any way be establishing a constitutional position which sets itself apart from and independent of the universities collectively" (Source: Letter from the Secretary General of the CVCP, to the Deputy Chairman of UDIL (ref. I5/8/1), 25 July 1985).

(119) UDIL may have learned from this the value of liaising with university-related organisations. It was agreed in 1985 that CRS and UDIL would keep each other informed about future agenda items. In 1986 UDIL made contact with the Conference of University Administrators and the Finance Officers' Conference. Moreover, from September 1985 it became customary for UDIL meetings to devote part of the agenda to reports on its relations with an ever-growing variety of organisations, including a wide range of technology transfer brokers/agencies. Curiously, there is no indication that UDIL has ever made - or even thought of making - contact with the AUT.

NOTES TO CHAPTER 6:

(1) Operational similarities have increased markedly during the course of the 20th century, for instance: in the period after the second world war, every UK university became almost totally dependent on the recurrent Treasury grant for its income; with the exception of the private University of Buckingham, every UK university is still largely dependent on this annual grant. During the 1980s that dependence led to every one being obliged to conform largely to the views of the UGC/UFC in relation to subject reviews, the viability of departments (as measured by numbers of UGC/UFC-funded academic staff), the research performance of departments (as measured by the two research selectivity exercises) *etc.*

(2) While size is now determined to a large extent by the UGC/UFC, universities founded before the early 20th century were free initially to determine their own size, constrained only by market forces and the scale of their endowment.

(3) *eg.* Allison, 1971.

(4) In her previous incarnation the investigator spent over ten years interviewing an extremely diverse range of informants in the course of her work as journalist, writer and freelance researcher.

(5) This was, of course, before the scrapping of the binary divide.

(6) Source: UGC University Statistics 1984/85, volume 3: Finance, Universities Statistical Record, September 1986.

(7) In the early 1980s the Advisory Board for the Research Councils (ABRC) recommended that universities should be divided into the following three types:

Type R: offering undergraduate and postgraduate teaching and substantial research activity across the range of fields (known colloquially as "research universities");

Type X: offering teaching across a broad range of fields and substantial research activity in particular fields, in some cases in collaboration with others (known colloquially as "mixed universities");

Type T: offering undergraduate and MSc teaching with associated scholarship and research activity but without advanced research activities (known colloquially as "teaching universities") (Source: ABRC, 1987)

(8) In the event, all the universities selected had been authorised by the Research Councils to assume the rights and responsibilities previously enjoyed by the BTG *vis-a-vis* the exploitation of IP. In April 1990 the CVCP made the relevant information available to the investigator. It transpired that the only universities wishing to continue dealing with the BTG were the Universities of Aberdeen and East Anglia, plus the Open University. Six London colleges/schools also wished to pursue this strategy. Four institutions had not responded to the letter from the Chairman of the SERC, two (including the London School of Economics) were still considering their position and three institutions' proposals were still being considered.

I am indebted to Mr A M A Powell, Senior Administrative Officer of the CVCP, for providing this information.

(9) The UK's archetypal ancient universities are, of course, Oxford and Cambridge, founded around the late 12th and early 13th centuries respectively. Four of Scotland's universities - St. Andrews, Glasgow, Aberdeen and Edinburgh - are indisputably ancient, too, having been founded in 1450, 1451, 1494 and 1583 respectively (Silver & Teague, 1970). Prior to the Act of Union in 1707, the foundation of universities in Scotland was not inhibited by the English tradition that a centre of scholarship could only be called a university if it was granted a royal charter. The next universities to be granted a royal charter - St. David's, Lampeter (1822), King's College, London (1829), Durham (1832) and the University of London (1836) - are not generally classed as "ancient". However, there is a common thread linking universities which were regarded for the purposes of this study as "ancient": with the notable exception of Edinburgh, which was founded following Acts of the Town Council, all of these universities were founded upon the initiative of or under the patronage of the established church **. Indeed, apart from breaking with tradition by dispensing with religious tests, still imposed at Oxford and Cambridge, Durham University was consciously modelled on Oxbridge, both philosophically and organisationally, in terms of a collegiate system (Beloff, 1968). Moreover, for many years Durham preserved a form of government peculiar to Oxford and Cambridge, long after those two institutions had been forcibly reformed (Green, 1969). For these reasons, Durham University was classified as "ancient" for the purposes of this study.

** Oxford's patron was the Bishop of Lincoln, while Cambridge's was the Bishop of Ely. St. Andrews acquired the patronage of Bishop Wardlaw, while Glasgow was founded by Bishop Turnbull and Aberdeen by Bishop Elphinstone. Several attempts to found a university at Durham failed, but success was finally achieved when the last Prince Bishop of Durham and the chapter of Durham Cathedral took the initiative. St. David's College, Lampeter, was founded by Bishop Burgess. In contrast, University College, London, was founded - like many civic universities - due to the efforts of dissenters, secularists and radicals (Green, 1969). King's College, London, was founded by supporters of the established church - ranging from three archbishops, seven bishops and 88 clergymen to the Duke of Wellington and like-minded lay people (Green, 1969) - as a reaction to the creation of University College. However, it was not long before both institutions became part of the University of London, commonly regarded as a civic institution.

(10) There appears to be no uniformly accepted definition of what constitutes a small, medium-sized or large university. For the purposes of this study, therefore, an arbitrary definition was employed. It was couched in terms of student FTEs, in view of the fact that during the 1980s the UGC consistently used student FTEs as the main basis for calculating the size of the recurrent

Treasury grant and other resource-related data, as does the UFC. Furthermore, the definition was based on student FTEs for 1984/85, since this was the session in which universities were asked to outline their policy with regard to the identification, evaluation, protection and exploitation of IP.

(11) The source for the results of the first research selectivity exercise was "The Strengths and Weaknesses", Times Higher Education Supplement, 30 May, 1986. The source for the results of the second research selectivity exercise was "Countdown to Excellence", Times Higher Education Supplement, 1 September, 1989.

(12) The exclusion of the federal universities ruled out the participation of any Welsh university; since Storey's Regional Index did not encompass Northern Ireland, those universities were also excluded.

(13) There was no obvious way of guaranteeing anonymity to unique functionaries such as registrars/secretaries or industrial liaison officers and this was made clear at the outset.

(14) Since the Questionnaires were highly structured, employing "either/or" options where it was felt to be appropriate, no informant was asked the complete set of questions listed in the Questionnaires. However, if spontaneous, supplementary questions are taken into account, informants responding to Questionnaires A-C answered many more questions than this.

(15) The investigator spent over ten years soliciting co-operation and conducting interviews by telephone in the course of her work as journalist, writer and freelance researcher.

(16) Notwithstanding a typing speed of 70 words per minute.

NOTES TO CHAPTER 7

(1) However, all University officers and unestablished research workers are required to sign an undertaking when they accept an offer of a Research Council grant or an offer of appointment supported by such a grant. The undertaking states that they will consult the Wolfson Cambridge Industrial Unit regarding the possibility of exploiting their invention before disclosing it and, if requested, assign their rights in such IP to the University's nominee in return for an "equitable share" of the proceeds. The nominee is usually Lynxvale Ltd, a company wholly-owned by the Chancellor, Masters and Scholars of the University of Cambridge, which covenants its profits to the University (Source: Cambridge University Reporter, 18 March 1987, p440). Thus, IP arising out of Research Council-funded projects is assigned by the University to the inventor/creator, who is subsequently obliged to assign it to Lynxvale Ltd. By this means, Cambridge tries to fulfil the responsibilities it assumed in October 1985 when it, too, received authorisation from the Research Councils.

Apparently, other categories of staff are not obliged to assign rights to IP which they generated to Lynxvale Ltd; for them, use of the University's company is on an entirely voluntary basis.

(2) Although the 1988 Copyright, Designs and Patent Act provides for first ownership of copyright to reside automatically with the employer where work subject to copyright was created in the course of employment, section 11 permits a contrary agreement. That is to say, even if an employer-employee relationship exists, the two parties can, by agreement, provide for the employee, not the employer, to be first owner of the copyright. This agreement need not be in writing, although the burden on the employee of proving an oral agreement argues in favour of there being a written agreement.

(3) Under the terms of the 1977 Patent Act, where it can be demonstrated that an invention was made by an employee in the course of his duties, first ownership resides automatically with the employer. Although the 1977 Patent Act came into force in 1978, some universities did not immediately exercise those rights.

(4) The word "yield" is not a *bona fide* term in intellectual property law. It is a convenient word which covers two different legal situations: if they do not want the rights which the 1977 Act confers upon them, employers can either "waive" their rights in inventions or they can "assign" them.

They can, as a matter of policy, *waive* their rights in favour of the employee as soon as they are notified of an invention. In order to do this, they need to reach a collective agreement with their employees; this agreement might be embodied in the contract of employment, an agreement with the union *etc.* In this situation, the employee becomes the first owner of his invention (or joint first owner, depending on the nature of the waiver), notwithstanding the 1977 Act.

Alternatively employers can, as a matter of policy, *assign* their rights to the employee(s) in question. In this situation, the employer accepts that he is the first owner, but immediately makes the employee(s) the second owner(s).

(5) Liverpool does not seem to have asserted first ownership of computer software in the same, formal way that it set about asserting first ownership of employee inventions; certainly, it cannot trace a date upon which it did so. Strathclyde did not assert first ownership of either type of IP by means of a formal decision or a formal procedure.

(6) Quoted from the Final Report, Working Party on Costing, Price & Income Targets for Schools, Hull University, 1990, and the Intellectual Property Regulations, York University, 1990.

(7) Quoted from the Code of Practice Relating to Intellectual Property, City University, 3 July, 1989.

(8) Quoted from the Commercial Policy Statements (Research Contracts & Consultancies, Intellectual Property), Glasgow University, September 1989.

(9) Quoted from the Standard Terms & Conditions of Appointment to Lectureships in Durham [University], (ref. T.3.1). The Standard Terms & Conditions for Research Assistants (ref. T.7.1) contain the same clauses.

(10) Quoted from the Standing Orders of Council Governing the Appointment of Full-Time Members of the Non-Professorial Academic Staff, Bristol University, March 1989.

(11) Quoted from Strathclyde's staff handbook (draft, 1990 edition).

(12) Quoted from Liverpool's staff handbook (1990 edition).

(13) As note (4) explained, there are two mechanisms which employers can use to yield their rights to IP. The policies of the participating universities are seldom couched in terms which make it clear which mechanism is employed. This is something which can sometimes be resolved only by an expert in IP law examining policy statements, contracts of employment, union agreements, domestic regulations of the university *etc.*

(14) By attempting to assert first ownership of copyright in works specifically commissioned by the University, York may well be in breach of the provisions of the Copyright, Designs and Patent Act of 1988. In principle, first ownership of copyright resides with the creator of the work. Previous Copyright Acts allowed three exceptions to this basic principle - work created within the employer-employee relationship, work created by journalists and work specifically commissioned from a third party. The 1988 Act removed two of these exceptions, leaving only the employer-employee relationship as the exception to the basic principle.

(15) Under the terms of the 1988 Copyright, Designs and Patent Act, first ownership of the new design right resides automatically with the employer where an unregistered design was created in the course of employment. Unlike the copyright provisions, which permit a contrary agreement favouring either the employee - or the employer, in the case of work created outside the employer-employee relationship, an unregistered design cannot be the subject of a contrary agreement by the parties. That is to say, if an employer wishes an employee to acquire sole/joint rights to his unregistered design, it must assign those rights to the researcher, who becomes second owner.

The implications of this law for academic employees are as opaque as the implications of the 1977 Patent Act, in so far as section 215 (2) states that "the commissioning party" of such a design is the first owner of the design right. This throws up questions about whether a university could be said to have commissioned a design from its employees, questions which are parallel to those about an academic's duty to invent.

(16) Unlike the other Acts dealing with IP law, neither the Registered Designs Act of 1949 nor the amendments to that Act provided for by the 1988 Copyright, Designs and Patent Act make any reference to the employer-employee relationship. Ownership of IP covered by registered designs is vested in the commissioning party. Where academics are concerned, once again this throws up questions about whether a university could be said to have commissioned such IP from its employees.

(17) In practice, Durham does not exercise any rights it might have to ownership of books, lectures, articles *etc*; this appears to be the result of a tacit rather than an explicit waiver, however.

(18) Since 1985 one patent at Hull has been jointly vested in the university and the inventor. This occurred because the academic concerned took the trouble to seek out a copy of the university's policy and, having read it, insisted on it being implemented.

(19) Prior to the adoption of this policy in June 1990, the ILO tended to assign IP to third parties rather than license it, however; there is no evidence, though, that York assigned ownership to companies started by academics - either independently or in a joint venture with the university.

(20) By 1989/90, when the fieldwork was conducted, none of the participating universities had had any meaningful contact with this organisation since having signed a non-exclusive co-operation agreement; for this reason alone, the following discussion centres on the BTG.

(21) During the course of interviewing the administrator in question, a graduate student came to notify him of a device which he felt was patentable and exploitable. Within a few minutes, without, apparently, investigating in any depth either the technology involved or the likely market, the administrator pronounced that it should be offered to the BTG to exploit.

(22) The administrator concerned was relatively young and therefore unlikely to retire. Moreover, his strategy has apparently been endorsed by the ESG, which has given Durham indefinite authority to exploit IP arising out of Research Council-funded projects.

(23) A possible exception to this is the "murky" boundary between a work protected by copyright and that which is subject to the new design right; since the case law clarifying the issue is only now emerging, this may take some time to resolve (Source: Wilkof, 1991).

(24) The provisions of the 1977 Patent Act oblige an employer to reward an employee for an invention which is successfully exploited; they say nothing about rewarding employees for inventions which are successfully exploited but not patented, or patented but not exploited.

(25) Once the applicant for a patent has paid a Search Fee and filed claims which define the invention, the Patent Office examiner will conduct a search to ascertain whether the invention fulfils all the criteria. The resulting Search Report may oblige applicants to file amendments to the description of the invention and/or the claims made about it. As long as the application is not withdrawn following receipt of the Search Report, it will be published in the original/ revised form and copies will be made available to anyone who wishes to inspect or purchase the published version. This is known as the "A" publication.

(26) In order to be granted a patent, samples of cell lines must be deposited in a national cell repository. Since cell lines can be "cloned" overnight, this makes security of paramount importance. Strathclyde does not feel that it is possible to guarantee security.

(27) Judgement of this complex issue depends on a number of factors. These include whether the IP in question was created by researchers in the course of employment and, in the case of patentable IP, whether it could have been expected to have resulted from their duties. If not, first ownership of the IP would reside with the academic and these regulations/agreements would be infringing their rights. If so, it would still be relevant to ask whether universities partially waive their rights, thereby making researchers joint first owners of the IP, or whether they partially assign their rights, making researchers joint second owners. The wording of contracts and agreements *etc* is crucial in judging this issue.

(28) In Durham, the relevant authority is the Vice-Chancellor. In the other seven universities, the relevant authorities are firstly the HoD, then - provided the HoD endorses the application - the committee which deals with applications for outside work.

(29) An explicit statement to this effect was incorporated in the Final Report of the Working Party on Costing, Price and Income Targets for Schools, circulated in June 1990. This aspect of the Report's recommendations were accepted by Council in time to come into effect at the beginning of the 1990/91 session.

(30) At Glasgow, the Guidelines on Inventions, Licence Agreements, Consultancies, Research Contracts, Computer Software, Audio-Visual Materials, Publications and Outside Work, issued in 1982 and in force until September 1989, devoted paragraph 6 to "*Businesses carried on by members of staff*". Applications to do outside work were submitted on Form B; would-be academic entrepreneurs were required to give details including the registered name and address of the business and address for correspondence, the nature of the business, the names and addresses of the directors/partners, together with details of shareholding or profit-sharing ratios.

At Strathclyde, earlier editions of the staff handbook (*eg.* 1978) stated that undertaking employment via private practice and/or participation in a commercial or professional enterprise should not be undertaken until full particulars had been supplied to the Principal in writing and the Principal had duly given permission.

(31) City, for instance, tries to place limits on "exclusive" licences by geographical, sectoral and also time constraints; it tries to impose a time limit of 5-10 years after handing over a prototype, or 3 years maximum after the development work has been completed.

(32) In City's case, these "*circumstances*" could include the fact that refusing some sort of exclusivity might lead to no deal at all.

(33) Liverpool feels that since its IL office in its present incarnation is new and it is important for it to gain the confidence of the academic community, it is more important at the moment to secure some deal than no deal at all. It also feels that until every other UK university takes a strong line on limiting exclusivity, it is difficult for it to do so.

(34) Glasgow discovered, to its cost, that the clauses in the Treaty of Rome which relate to competition impose restrictions on granting licences which allow geographic exclusivity within the EC - eg. a an exclusive licence to manufacture/market a product/process in, say, France but not Germany.

(35) In the case of research paid for by industry/commerce, or jointly paid for by industry/commerce and public funds, this may have been laid down in detail in the initial research contract. This section deals with situations where there is no obligation, *ie.* chiefly with IP arising out of projects funded by the Research Councils, charities, or possibly the EC.

(36) Large up-front payments are usually gained at the expense of reduced royalty payments: the percentage due on actual sales is usually considerably lower in such circumstances.

(37) There is more than one "dimension" to this conflict of interests. Not only is the researcher torn between the interests of his research, his department, his University and his company; he may also be torn between personal financial gain - through his share of royalties based on a high percentage of sales, and the financial success of the company - which would increase as a result of royalties based on a low percentage of sales.

(38) Until recently, Kent has not been involved in any licence agreements at all; this, and also, perhaps, the fact that the person now responsible for IP is a career administrator with no experience in industry, means that Kent has no experience on which to base a general approach. York has a better record, but for years negotiations have been conducted by the individual researchers involved, with no guidance from the centre; nor does the centre appear to have debriefed them afterwards. This means that York has not harnessed its experience to form the basis of a general approach. Now, a career academic with no experience of industry is in charge of IP, but he currently delegates the right to negotiate the terms of licence/assignment agreements to the researchers.

(39) One of the most obvious difficulties would be selecting a representative sample. Reliance on universities to provide lists of potential respondents would be liable to exclude precisely those researchers who avoid coming to their institution's notice for fear of being forced to have their IP exploited in a way which they would not wish.

(40) See, *eg.* point (2) of the standard letter of authorisation sent to universities by the Chairman of the NERC on behalf of the five Research Councils (ref. F/TA/49, July 1986 *etc etc*).

(41) In 1988, Glasgow made its year-old, *ad hoc* Commercial Policy Review Group into a standing Commercial Policy Review Committee, whose members include the Vice-Principal (Industrial Liaison) and a lay member of Court; the policy-implementer is also a member.

(42) This earlier, unofficial group consisted of the Principal, the Vice-Principal (Industrial Liaison) and a number of senior officers.

(43) Kent's new Industrial & Commercial Policy Board was established in 1988. It reports to the Finance Committee and its members include the Vice-Chancellor, the Deans of Faculty, the Registrar and a lay member of Council and two other lay members, appointed by Council.

(44) Hull's Sub-Committee on Patents was established in 1983/84 and reported to the Personnel Committee. It consisted of the Personnel Officer, the Registrar, three HoDs and three other Professors, with assistance from the Financial Secretary.

(45) In 1988 the Registrar put together an informal group consisting of the newly-appointed ILO, a Professor from the Chemistry Department, the former Finance Officer, the Registrar and an ex-consultant being employed by the administration at the time.

(46) In 1989/1990 Hull's IP policy was extended by the formally constituted Working Party on Costing, Pricing and Income Targets for Schools, set up by the Policy & Resources Committee in the wake of the Hanham Report. Members included the Registrar, the Academic Registrar, the Financial Secretary, the ILO, a Pro-Vice-Chancellor, a former Dean and a current Dean.

(47) The individual in question is the University Secretary.

(48) In the mid-1980s, the Vice-Chancellor, the Registrar and several Pro-Vice-Chancellors - in their capacity as members of (the forerunner of) the senior management team - made certain policy decisions, based on a paper commissioned by the Academic Secretary; the paper in question was produced by Liverpool's then policy-implementers, who was one of the policy informants. His suggestions were duly amended and ratified by the Research Committee and Senate in turn.

(49) For instance, one or two key decisions were taken in 1984/85 by a Joint Committee of Senate and Council, comprising the Acting Vice-Chancellor, a lay member of Council, the Deans of Science and Engineering, a Professor, the Information Officer - and the Deputy Secretary, as observer. These included the decision to develop the university's relations with industry, principally with a view to increasing "soft" revenue, and to appoint an ILO to co-ordinate that development.

(50) Reporting to Senate and Council, Durham's working party consisted of the Vice-Chancellor, the Treasurer, the Deputy Secretary, two lay members of Council and roughly an equal number of academics, including an IP expert from the Law Department.

(51) York did not make its final response to the ESG until 1986/87 and City did not do so until 1988/89, but the same situation applied.

(52) The response to the Kingman letter was drafted by the following officers:

Bristol - the Committee of Deans

City - the Secretary

Durham - the Deputy Secretary, the Treasurer

Glasgow - the Vice-Principal (Industrial Liaison)

Hull - the Personnel Officer, in consultation with the Registrar, the Financial Secretary, three HoDs and three Professors

Kent - the Registrar, in consultation with the Vice-Chancellor, two Pro-Vice-Chancellors and the Academic Secretary

Liverpool - an Assistant Registrar (now Senior Assistant Registrar)

Strathclyde - the ILO, with the approval of the Joint Management Committee

York - the Finance Officer, two lay members of Court and one Professor, with assistance from at least two HoDs.

(53) As indicated in note (52), Bristol's response to the ESG was drafted by the then Committee of Deans; their names and current whereabouts did not prove easy to track down.

(54) City first committed its IP policy to paper in 1989, but this was based on custom and practice which had been evolving since the mid-late 1970s.

(55) In its reply to the Kingman letter (numbered paragraph 10), Liverpool wrote:

"The provisions of the Patent Act 1977 are interpreted by the University in accordance with the advice given by the Committee of Vice-Chancellors and Principals in the final report of the Working Party on Patents and the Commercial Exploitation of Research Results (November 1977) and are taken to apply to all types of intellectual property. The terms and conditions of employment of academic, research and technical staff thus provide that discoveries and inventions made in the course of that employment shall be the property of the University (added emphasis)."

(56) In Durham's response to the Kingman letter, paragraph 3 (v) noted:

"For exploitable work funded by public bodies such as the Research Councils, the University expects to be initial joint owner, with the inventor or inventors, of any patents [added emphasis] and to receive the collaboration of the inventor(s) in the exploitation of the discovery ..."

Paragraph 3 (x) noted:

"We are currently negotiating changes to the standard terms and conditions of academic staff designed to provide the basic framework of provisions for exploitation of work with commercial potential, viz ... assignment of interest to the University [added emphasis] ..."

Paragraph 3 (iv) noted:

"... Our own proposed revised terms and conditions of appointment contain provisions for ... staff to make over their interest in such rights to the University [added emphasis] ..."

When the SERC wrote (on behalf of the ESG) requesting further details, section (x) of Durham's follow-up letter of 25 July, 1986 noted:

"... an addition to terms and conditions of appointment which contained a general duty to ... assign the individual's interest to Council (in exchange for a revenue-sharing agreement), again if necessary [added emphasis] ..."

In practice, ownership of all three of the patents which Durham itself has taken out has been vested in the university alone, which appears to contravene the university's policy, as specified to the ESG. This indicates that researchers should be joint owners initially and should only assign their interest - to the university or the exploiting agency - at the point that a deal to exploit that IP is being concluded - if necessary. In point of fact, this policy may well be untenable in law. Patent law overrides contract law, and since the university appears to have granted researchers joint ownership of inventions which they generate, it is questionable whether they can then use contract law to oblige researchers to assign those rights.

(57) We should not attach too much weight to the impact of policy-makers' career backgrounds on policy, though: at Glasgow, Strathclyde and York, the decision to vest ownership of IP exclusively in the university was taken by groups composed principally or entirely of senior academic and administrative officers.

(58) When the CII was responsible for the exploitation of IP at Strathclyde, it either accepted responsibility for a given piece of IP or, if it was unable to accommodate more work, rejected it. Strathclyde now believes that in the first situation, researchers perceived their IP to have been taken away from them, to have lost their moral ownership of it and to have no control over what happened to it; in the second situation, researchers seem to have been left to their own devices entirely and to have received no guidance or support at all.

(59) Although it is not City's avowed wish to "skill" the academic community in such matters, one would imagine this is likely to be an inevitable by-product of the university's partnership approach to the exploitation of IP.

(60) In the course of a radio interview the ILO remarked that Glasgow had well over 100 patents; in fact, Glasgow had relatively few patents but closer to 100 licensees.

(61) Glasgow's policy-implementer is an accountant whose career has been spent partly in a private sector accountancy firm and, more recently, in university administration.

(62) Glasgow provided a copy of the relevant correspondence in confidence; it is not possible, therefore, to quote directly from it.

(63) Source: Letter from the Acting Vice-Chancellor, **Liverpool University**, to Sir John Kingman, 3 October 1985.

(64) Source: Letter from the Vice-Chancellor, **Liverpool University**, to Dr. J. A. Catterall, Secretary of the SERC, 19 June, 1986 (ref. GJD/BH/PB).

(65) The university in question was **Durham**, where the policy-implementer refers this question to the Treasurer. Two more universities thought along those lines originally: **Hull** intended its Sub-Committee on Patents to become a standing committee and to advise on how to proceed in each case; in practice, the policy-implementer has never called on it and, if it still exists, it has not noticed this omission. In the early 1980s **Kent** established an Industry, Research & Development Committee which might have been intended to perform this function; in practice, it has not met since early 1986, let alone considered such questions, and has now been wound up. It was replaced in 1988/89 by an Industrial & Commercial Policy Board, which, by mid-1990, had made no contact at all with the administrator whose had assumed responsibility for IP.

(66) Source: The Commercial Exploitation of Intellectual Property: A Statement of Policy, University of **Liverpool**, written by the Ex-Acting Vice-Chancellor in April 1989.

(67) Three policy-implementers have commercial experience which they regard as relevant, however - those at **Durham**, **Glasgow** and **Hull**. Curiously, only four policy-implementers have joined the Licensing Executives' Society in order to improve their skills - those at **Bristol**, **Glasgow**, **Liverpool** and **York**. It is worth noting that **Strathclyde's** policy-implementer has neither previous experience, nor has he joined the LES.

(68) On this occasion, **Liverpool's** urge to retain full control paid off handsomely, however.

(69) The Committee of Deans is **Bristol's** equivalent of a policy & resources committee.

(70) See, for instance, Section 8, paragraphs (a)-(h), entitled "*Staff Inventions and Discoveries - from the Manual of Financial & Related Procedures*", **Durham University**, November 1986.

(71) As noted in the case study presented in Appendix F, **Durham** felt it was politically advisable to accept the Research Councils' offer, embodied in the Kingman letter.

(72) **Durham** made very little reference to the role of the researcher in the exploitation process in its initial response to the Kingman letter. The SERC wrote (on behalf of the ESG) requesting further details about assessing the potential of IP, securing exploitation, royalty-sharing and terms and conditions of employment, but **Durham's** reply gives little away beyond the comment that "*the staff concerned were closely involved in the negotiations*" leading to a number of commercial agreements made to date (Source: Letter from the Vice-Chancellor, University of **Durham**, to the Secretary of the SERC, 25 July, 1986 (ref. F/TA/49C1 P/DF/30).

(73) Report to the Scrutiny Group on Exploitation Arrangements, **Durham University**, January 1989.

(75) Until recently, Kent has not been involved in any licence agreements at all; this, and also, perhaps, the fact that the person now responsible for IP is a career administrator with no experience in industry, means that Kent has no experience on which to base a general approach. York has a better record, but for years negotiations have been conducted by the individual researchers involved, with no guidance from the centre; nor does the centre appear to have debriefed them afterwards. This means that York has not harnessed its experience to form the basis of a general approach. Now, a career academic with no experience of industry is in charge of IP, but he currently delegates the right to negotiate the terms of licence/assignment agreements to the researchers.

NOTES TO CHAPTER 8

(1) See, for instance, Letter No. RG 10/86, sent to universities and polytechnics by the SERC's Finance Division on 2 September, 1986.

(2) The only other way for them to have learned about this was through the media, which concentrated on the removal of the BTG's monopoly, but were less interested in the details of the arrangements put in its place.

(3) The so-called "new blood lecturers" scheme was announced by the Secretary of State for Education and Science on 16 December 1982. It provided additional funding for 230 new lecturers nation-wide, to be appointed in 1983/84; 200 of these were to be in natural sciences disciplines, 30 in arts disciplines.

(4) Mark II of the UGC's Severance and Early Retirement Scheme - whereby the UGC paid the cost of buying out academic's pensions, rather than the university - was introduced early in 1987 and wound up in 1989.

(5) The New Academic Appointments Scheme was effectively mark II of the "new blood" scheme introduced in the mid-1980s; it commenced on 1 August 1989 and is due to end on 31 July 1994.

(6) It is possible, of course, that the administration did send the editor the relevant information, but for one reason or another, the editor excluded it.

(7) Bristol's Committee of Deans functioned as the university's Policy & Resources Committee at the time.

(8) As the case study in Appendix F described, Kent's current policy-implementer drafted a 3-page policy statement in 1989, but he was prevented from circulating it after being outvoted by the other members of an informal group which meets periodically to discuss research grants *etc* - on the grounds that it was not "*punchy*" enough.

(9) Source: Paragraph 6 of the Kingman letter, 14 May, 1985.

(10) I am indebted to Ms. Anne Rees of the SERC's Exploitation Scrutiny Group Secretariat for this information.

(11) On the basis that it would be reasonable to expect each institution to disseminate each piece of information at least once, universities were allocated 1 point each in respect of measures (a)-(c), 1 point in respect of measure (d) - but no points in respect of any of these measures if they did not disseminate the relevant piece of information at all. This gave a maximum score of 3 each for measures (a)-(c) and a maximum score of 1 for measure (d). Since some universities disseminated the same information more than once, usually using an alternative mechanism, this was regarded as reinforcing the information and worthy of an extra point for each occasion. This is why some universities scored > 100%. (NB This "reinforcement" is quite separate from the reminders detailed in Figures 23-24.

(12) Universities were allocated 2 points if they informed the the academic community, but only 1 point if they informed only selected academics and 0 points if they did not formally inform anyone; this gave a maximum score of 6 points for measures (a)-(c) and 2 points for measure (d). Where universities disseminated the same information more than once, they only scored once, since thoroughness was scored in the preceding table; however, if they informed only selected academics the first time, but the academic community the second time - or vice versa - they received 2 points, rather than 1.

(13) Universities were allocated 4 points if they disseminated each piece of information within 6 months, 3 points within 12 months, 2 points within 18 months, 1 point if they did so within 24 months and 0 points if they did not disseminate a piece of information. This gave a maximum score of 12 points in respect of measures (a)-(c) and 4 points in respect of measure (d). Where universities disseminated the same information again in a subsequent six-month period, they only scored once, since thoroughness was scored in the first table.

(14) LA/2690, AUT, July 1985.

(15) One point was allocated for each of the two mechanisms; this gave a maximum score of 2 each for measures (e) and (f). Points actually scored were then expressed as a percentage of the maximum possible score.

(16) Universities were expected to start informing new members of staff in the same session as they informed existing members of staff - their individual baseline year. Accordingly, they scored 1 point for each year that reminders have been issued, upto and including 1989/90; this figure was worked out as a percentage of the points they should have got, taking into account their individual baseline years.

(17) Bristol's ILO does not know whether the Vice-Chancellor first circulated a memo on this subject to the academic community - or selected members of it - in 1986 or 1987; if it was 1986, then 1987 was the first year in which the Vice-Chancellor is believed to have sent a reminder.

(18) One point was allocated for each of the three mechanisms; this gave a maximum score of 3 each for measures (g) and (h).

(19) For the two types of written reminder, 2 points were allocated for universities which informed the whole academic community but 1 point for universities which informed only selected academics; only 1 point was allocated for face-to-face reminders since, by definition, these target selected academics, not the whole community. This gave a maximum score of 5 each for measures (g) and (h). In practice, three universities received half-scores in respect of measure (h) because presented the information less explicitly and every case except Strathclyde, the opportunities presented were less open-ended than the government probably intended.

(20) Seven universities were expected to start issuing "trigger" reminders on an annual basis from 1987/88; accordingly, they scored 1 point for each year that reminders have been issued, upto and including 1989/90. They were expected to issue an "ongoing" reminder from 1987/88, too; accordingly they scored 1 point for the year the ongoing reminders were introduced and each year since, upto and including 1989/90. This gave a maximum score of 6 each for measures (g) and (h). York was expected to start issuing reminders from 1988/89, in view of the fact that it was authorised one year later than the other seven; City was not expected to have issued any reminders, in view of the fact that it was not authorised by the Research Councils until 1989.

(21) Source: Paragraph 6, The Exploitation of Research Council Funded Inventions, LA/2690b, AUT, July 1985.

(22) The scoring system underlying the scores shown in **Evaluation 8.9** took the year in which each university was authorised by the Research Councils as their individual baseline. It assumed that the seven universities authorised in 1986 should have issued a one-off, trigger policy statement that same year, perhaps at the same time as publicising the fact that they had been authorised by the Research Councils, and that they should have provided an ongoing policy statement from the same time. Those who actually did this in 1986 should attract a score of 5, those doing so in 1987 a score of 4 and so on; those which had not done so at all by the end of the 1989/90 session would score zero. Similarly, those which relied on one-off, trigger policy statements or ongoing statements issued before 1986 should score 4 for 1985, 3 for 1984 and so on.

Since York was not authorised until a year later, it should attract a score of 5 for issuing these two forms of policy statement in 1987, a score of 4 for doing so in 1988 and so on; similarly, if it relied on one-off trigger policy statements or ongoing statements issued before 1987, it should score 4 for 1986, 3 for 1985 and so on. Since City was not authorised until 1989, it should attract a score of 5 for publicising its revenue-sharing formula in 1989, 4 for publicising it in 1990 and so on; similarly, if it relied on one-off trigger policy statements or ongoing statements issued before 1989, it should score 4 for 1988, 3 for 1987 and so on.

(23) The scoring system underlying the scores shown in **Evaluation 8.10** assumed that a neutral policy statement, which makes no reference to the exploitation process or the respective roles of the university and the researcher, has the same impact as no policy statement at all; accordingly, both situations attracted a zero score. It assumed that a fairly positive policy statement should score +1, a very positive statement +2, a fairly negative policy statement should score -1 and a very negative statement -2.

(24) The score for the combined effect of the content and timing of IP statements was calculated by multiplying together the scores achieved under the two headings in **Evaluations 8.9** and **8.10**.

(25) The publicity items detailed in **Figures 27-31** are derived exclusively from each institution's newsletter, because it was felt that this was the only vehicle for publicity which every member of staff would have an equal chance of seeing. It was recognised that there could be other, one-off or occasional vehicles for publicity, but it was not certain that every member of staff would have an equal chance of seeing them; moreover, identifying publicity vehicles of this nature and monitoring them presented operational difficulties for this study.

(26) The science park which Glasgow and Strathclyde share incorporates the phrase "*science park*" in its name, whereas Hull has chosen to call its project a "*high technology park*" and Durham settled on "*research centre*". Liverpool and City have "*innovation centres*" and Kent a "*research and development centre*". In addition, Strathclyde has a separate "*incubator unit*".

York does not seem to have settled on a title for its development yet, referring to it variously as a "*science park*", "*research park*" and "*technology-related park*". It is not clear yet exactly what Bristol will call its science park, either.

(27) The two-site science park which Glasgow and Strathclyde share covers a total of 62 acres, which had some 80,000 sq. ft. of building space at the end of 1989. By the same time, Hull's science park had approx. 37,500 sq. ft. of building space. Durham's was comparable at this time, with 35,000 sq. ft. of lettable floorspace. Kent's science park offers just 12,000 sq. ft. of laboratories and offices, Liverpool's just 11,000 sq. ft. of lettable space; no figures are available for City. Strathclyde' incubator unit offers 30,000 sq. ft. of accommodation.

**When it is finished, Bristol's will may well be the most extensive science park in Britain, exceeding the size of Cambridge's. York's proposed science park will cover 21 acres, providing 30,000 sq. ft. of building space.

(28) **Liverpool's** science park opened for business in 1982. **Glasgow's/Strathclyde's** dates from 1983 originally, **Hull's** from 1985 and **Durham's** from 1986. **City's** opened for business in 1988 and **Kent's** ca. 1988/89. **Strathclyde'** incubator unit opened in 1990.

(29) **Provision:** Universities which had set up a dedicated IL office by the year they were authorised by the Research Councils were allocated one point, plus one extra point for each year since that they have had a dedicated IL office. The resulting score was divided by 5 (**Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde**) or 4 (**York**) or 2 (**City**) - *ie.* the number of years between being authorised and 1990 (inclusive) - and expressed as a percentage.

Publicity: Universities were allocated a point for each publicity item in the newsletter relating to the IL office during the period 1985-90 (**Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde**), 1986-90 (**York**) and 1988-90 (**City**); these periods take in one year before the universities listed in the following brackets were authorised by the Research Councils, to take account of advance publicity about the setting up of the IL office, where appropriate. An average of one publicity item a year during the period in question was seen as a reasonable minimum expectation. The resulting score was therefore divided by 6 (**Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde**) or 5 (**York**) or 3 (**City**) - *ie.* the minimum number of publicity items for the period - and expressed as a percentage.

(30) **Provision:** Universities are not obliged to operate by means of a holding company; they may opt to found university companies/joint ventures directly, rather than indirectly, via a holding company; accordingly, they were not scored for whether they have a holding company.

Publicity: On the other hand, if they do/did have one, they were expected to publicise its existence and function. The publicity period was defined as starting in the year before they founded the company, to allow for advance publicity, and ending in 1990/the year the holding company was wound up, if earlier. An average of one publicity item a year during the period in question was seen as a reasonable minimum expectation. Universities were allocated a score of 0 if they achieved this; if not, they were allocated a minus score equivalent to the shortfall. The resulting score was divided by 7 (**Hull and Liverpool**) or 5 (**Bristol**) or 4 (**Durham**) - *ie.* the minimum expectation of one publicity item for each "qualifying" year - and expressed as a percentage.

(31) **Approval-in-Principle:** Universities were allocated one point if they approve of joint ventures with members of staff in principle, 0.5 points if they are hesitant but do not rule it out, and 0 points if they are not prepared to enter into joint ventures with members of staff. Universities were not penalised for not having translated approval-in-principle of joint ventures with members of staff into practice.

Publicity: However, they were penalised if they did not publicise their approval-in-principle. An average of one publicity item per year during the period 1985-90 (**Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde**), 1986-90 (**York**) and 1988-90 (**City**) - *ie.* the year before they received their letter of authorisation from the Research Councils - was seen as a reasonable minimum expectation. Universities were awarded a point for each publicity item in the newsletter relating to the concept of joint ventures during the relevant period. This was translated into a score of 0 if the number of points received was equivalent to the requisite number of publicity items for this period; this score was converted in turn to 0 per cent. If the number of points was not equivalent, universities were allocated a minus score equivalent to the shortfall; the resulting score was divided by 6 (**Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde**) or 5 (**York**) or 3 (**City**) - *ie.* the requisite number of publicity items for the period - and expressed as a percentage. Universities which are hesitant, but do not rule out the possibility of joint ventures with members of staff, were not expected to have publicised the idea. Where universities had eventually entered into joint ventures with members of staff, they were scored in the above fashion for publicising approval-in-principle until such time as they had actual examples of joint ventures to publicise.

Thereafter, they were assessed on the basis of actual joint ventures, rather than approval-in-principle. Universities were expected to publicise the setting up of each joint venture during the period 1985-90 (Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde), 1986-90 (York) and 1988-90 (City) - *ie.* from the year before they received their letter of authorisation from the Research Councils; furthermore, they were expected to report on the progress of each joint venture at least once a year, once it had been set up. Universities were awarded a point for each publicity item about joint ventures in the newsletter during the relevant period. This was translated into a score of 0 if the number of points was equivalent to the requisite number of publicity items and converted in turn to 0 per cent. If not, they were allocated a minus score equivalent to the shortfall; the resulting score was divided by the requisite number of publicity items and expressed as a percentage.

(32) Approval-in-Principle: Universities were allocated one point if they approve of university companies in principle, 0.5 points if they are hesitant but do not rule it out, and 0 points if they have no interest in setting up university companies. Universities were not penalised for not having translated approval-in-principle of university companies into practice.

Publicity: However, they were penalised if they did not publicise their approval-in-principle. An average of one publicity item per year during the period 1985-90 (Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde), 1986-90 (York) and 1988-90 (City) - *ie.* the year before they received their letter of authorisation from the Research Councils - was seen as a reasonable minimum expectation. Universities were awarded a point for each publicity item in the newsletter relating to the concept of university companies during the relevant period. This was translated into a score of 0 if the number of points received was equivalent to the requisite number of publicity items for this period; this score was converted in turn to 0 per cent. If the number of points was not equivalent, universities were allocated a minus score equivalent to the shortfall; the resulting score was divided by 6 (Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde) or 5 (York) or 3 (City) - *ie.* the requisite number of publicity items for the period - and expressed as a percentage. Universities which are hesitant, but do not rule out the possibility of university companies were not expected to have publicised the idea. Nor were universities which do not approve in principle expected to publicise the idea. Where universities had eventually set up university companies, they were scored in the above fashion for publicising approval-in-principle until such time as they had actual examples of university companies to publicise.

Thereafter, they were assessed on the basis of actual university companies rather than approval-in-principle. Universities were expected to publicise the setting up of each university company during the period 1985-90 (Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde), 1986-90 (York) and 1988-90 (City) - *ie.* from the year before they received their letter of authorisation from the Research Councils; furthermore, they were expected to report on the progress of each university company at least once a year, once it had been set up. Universities were awarded a point for each publicity item about their companies in the newsletter during the relevant period. This was translated into a score of 0 if the number of points was equivalent to the requisite number of publicity items and converted in turn to 0 per cent. If not, they were allocated a minus score equivalent to the shortfall; the resulting score was divided by the requisite number of publicity items and expressed as a percentage.

(33) Approval-in-Principle: Universities were allocated one point if they approve in principle of having a science park, 0.5 points if they are hesitant but do not rule it out, and 0 points if they do not approve in principle of having a science park. Universities were not penalised for not having translated approval-in-principle of having a science park into practice.

Publicity: However, they were penalised if they did not publicise their approval-in-principle. An average of one publicity item per year during the period 1985-90 (Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde), 1986-90 (York) and 1988-90 (City) - *ie.* the year before they received their letter of authorisation from the Research Councils - was seen as a reasonable minimum expectation. Universities were awarded a point for each publicity item in the newsletter relating to the concept of having a science park during the relevant period. This was translated into a score of 0 if the number of points received was equivalent to the requisite number

of publicity items for this period; this score was converted in turn to 0 per cent. If the number of points was not equivalent, universities were allocated a minus score equivalent to the shortfall; the resulting score was divided by 6 (Bristol, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde) or 5 (York) or 3 (City) - *ie.* the requisite number of publicity items for the period - and expressed as a percentage. Universities which are hesitant, but do not rule out the possibility of having a science park were not expected to have publicised the idea. Where universities had eventually created a science park, they were scored in the above fashion for publicising approval-in-principle until such time as they had an actual example to publicise.

Thereafter, they were assessed on the basis of their actual science park, rather than approval-in-principle. Universities were expected to publicise the science park from the year in which it was created to 1990 (City, Durham, Glasgow, Hull, Kent, Liverpool and Strathclyde), 1986-90 (York). Furthermore, they were expected to report on the progress of the science park at least once a year, once it had been set up. Universities were awarded a point for each publicity item about the science park in the newsletter during the relevant period. This was translated into a score of 0 if the number of points was equivalent to the requisite number of publicity items and converted in turn to 0 per cent. If not, they were allocated a minus score equivalent to the shortfall; the resulting score was divided by the requisite number of publicity items and expressed as a percentage.

(34) Where discoveries are exploited by the BTG or the Research Corporation Ltd, this is liable to differ. Under the BTG's standard revenue-sharing agreement, the first owner(s) of the IP being exploited receive the first £5,000 gross. They then receive 20 per cent of the gross income until the BTG has covered its costs; thereafter, the income is split 50:50 between the first owner(s) and the BTG. Under the Research Corporation's standard revenue-sharing agreement, the institution which generated the IP receives 60 per cent of the gross, with costs being met out of the 40 per cent which the Research Corporation retains.

(35) In fact, there is no evidence that Hull has ever remembered to do this, in practice; moreover, this provision is missing from Hull's latest policy statement.

(36) Account is taken of the number of researchers only if an external sponsor pays the costs of protecting their discovery.

(37) Hull's complex, algebraic formula is reproduced in Appendix I.

(38) This was calculated for each income bracket by dividing the standard deviation by the average for these universities, as a group, and expressing it as a percentage.

(39) The nine participating universities were ranked in order of generosity for each of the seven income bands; the most generous - those in the top position - scored 10, the second most generous - those in the next position - scored 9 and so on, yielding a maximum score of 70, once the seven scores were aggregated.

(40) This was calculated by subtracting the CVCP's suggested figure from the average for the participating universities, dividing it by the CVCP's suggested figure and multiplying the result by 100.

(41) These figures are derived from the annual rate of inflation for the intervening years, namely:

1987: 4.2 per cent;
1988: 4.9 per cent;
1989: 7.8 per cent;
1990: 9.5 per cent.

(42) This was calculated by subtracting the average of the AUT's two suggested figures from the average for the participating universities, dividing it by the average of the AUT's suggested figures and multiplying the result by 100.

(43) City does not return a fixed percentage to the department in question; it returns somewhere between 60 and 75 per cent of the residue to the department. The sums quoted in Figures 37 and 39 represent the most which the centre would take and the least which a department would receive - *ie.* they are calculated on the basis of the centre returning just 60 per cent of the residue to the department. Calculating on the basis of returning 75 per cent, departments would receive the following sums:

£10K	£30K	£50K	£100K	£500K	£1m
937	4687	8437	27187	25218	7533437

(44) Prior to 1990, Strathclyde had a binary administrative structure, headed by the Registrar and the Bursar respectively. It now has a unitary administrative structure, headed by a Registrar/Secretary.

(45) As indicated in chapter 5, in the first stage of the fieldwork, universities were asked to nominate someone who could provide information on the institution's policy on the exploitation of IP, and someone who could provide information on the manner in which that policy was implemented. Thus, these respondents were selected by the participating universities, not by the researcher.

(46) This "tax" is generally supposed to apply to days devoted to such activities between Monday and Friday, inclusive; in some quarters of the university there is some debate about this, however, on the basis that the university "owns" academics 365 days per year, 24 hours per day.

(47) It was assumed that the seven universities authorised in 1986 should have disseminated details of their revenue-sharing formulae to existing staff that same year, at the same time as publicising the fact that they had been authorised by the Research Councils; those disseminating details in 1986 would attract a score of 5, those disseminating details in 1987 a score of 4 and so on; those which had not publicised this at all by the end of the 1989/90 session would score zero. Since York was not authorised until a year later, it could attract a score of 5 for publicising its revenue-sharing formula in 1987, a score of 4 for publicising this in 1988 and so on. Since City was not authorised until 1989, it could attract a score of 5 for publicising its revenue-sharing formula in 1989, 4 for publicising it in 1990 and so on.

(48) Universities were expected to have disseminated details of their revenue-sharing formulae in both ways - "trigger" and "ongoing"; those which did so scored 2; those which disseminated either "trigger" or "ongoing" information scored 1; those which did not disseminate details by either method scored 0.

(49) It was assumed that the seven universities authorised in 1986 should have disseminated details of their revenue-sharing formulae to new staff from that same year, at the same time as publicising the fact that they had been authorised by the Research Councils; those disseminating details in 1986 would attract a score of 5, those disseminating details in 1987 a score of 4 and so on; those which had not publicised this at all by the end of the 1989/90 session would score zero. Since York was not authorised until a year later, it could attract a score of 5 for publicising its revenue-sharing formula in 1987, a score of 4 for publicising this in 1988 and so on. Since City was not authorised until 1989, it could attract a score of 5 for publicising its revenue-sharing formula in 1989, 4 for publicising it in 1990 and so on.

(50) Universities disseminating details of their revenue-sharing formulae in a dedicated IP document scored 3 for prominence; those doing so in another, short document scored 2 for prominence; those including this information in a large, compendious document containing all sorts of other information scored 1 for prominence.

(51) However, in June 1989 a senior member of Kent's administration drafted a paper entitled "Research Contracts, Academic Services and Consultancies" (ref. HRC/SBH39/19.6.89) which affirmed the university's interest in increasing its income from these sources. It was noted:

"If the university wished to expand its contract work appreciably, it will have to accept that there is a potential conflict between it and more traditional academic work. It may be possible to mitigate this by ... accepting that in terms of career development, the successful completion of research contracts and consultancies (including obtaining licences and patents) will be given equal credit to grants and publications ..."

However, it is not clear how wide a circulation this paper had. Nor is it clear whether these proposals were subsequently accepted in their entirety by Senate and Council and duly incorporated into the promotions material; Kent was unwilling to make available a copy of the latest promotions criteria. Instead, the informant concerned read out what he described as the relevant sections; they did not appear to include statements to the above effect.

(52) The City University Bureau for Industrial Research.

(53) Source: City University Newsletter, no. 20, 25 March, 1985.

(54) Source: Note 8, Minutes of the AUT's IPR Working Party, 23 April 1985.

(55) The UGC has dreamt up a number of incentives to encourage departments to generate an income from external sources. Since the mid-1980s, only 60 per cent (approx) of a university's block recurrent grant has been determined by the number of student FTEs; the remaining 40 per cent or so is divided into four components. The "SR" component - the UFC's contribution to the dual support research funding system, is calculated on basis of the number of staff and research students. The "DR" component, distributed two years in arrears, is calculated on the basis of income from the Research Councils and charities. The "CR" component, also distributed two years in arrears, is calculated on the basis of income from research contracts. The "JR" component is selectively distributed in accordance with each university's performance in the most recent research selectivity exercise; universities are supposed in turn to selectively distribute this according to the individual departments' performance in the research selectivity exercise; there is increasing evidence that they are not doing this, however.

(56) "University companies" should be interpreted in the widest possible sense here, not in the narrow sense defined for the purposes of this study (see section 8.4 (k)(iv)).

NOTES TO CHAPTER 9:

(1) *eg.* an unsympathetic attitude to academia on the part of messengers with an industrial background. Personal characteristics such as a lack of interpersonal skills or a bad presentation style might also be diluted in impact in this manner.

(2) It is evident that in this respect the expectations of the ESG and the Research Councils may differ from those of the CVCP and the UFC. Although it was originally envisaged that patents would constitute one of the UFC's performance indicators, the CVCP and the UFC came to the view that using any quantitative measure of patents as a performance indicator could be very misleading "because the purpose of much research is not primarily to produce commercially exploitable results" - and because patents are not the only route for exploitation (Source of quote: personal letter to investigator from Mr A M A Powell, Senior Administrative Officer, Committee of Vice-Chancellors & Principals (ref. R9/19/4), 6 February, 1991).

(3) Universities were expected to start informing the academic community about the importance of notifying the relevant authorities about potentially exploitable IP before disclosing research findings in the year in which they were authorised by the Research Councils. In that year and every subsequent year, they were expected to have targetted the whole academic community at least once, at least one cross-section of the academic community and at least one vertical section. They scored 3 points for each year they achieved this (1 for targetting the whole academic community, 1 for targetting a cross-section, 1 for targetting a vertical section), giving an "expected score" of 15 in **Bristol, Durham, Glasgow, Hull, Liverpool and Strathclyde**, but only 12 in **York**, which was not authorised until 1987, and only 6 in **City**, which was not authorised until 1989. If any university employed more than one stratagem per year, it scored an extra point per stratagem under the appropriate heading - cross-section, vertical section or the entire academic community. The points actually scored by each university were then expressed as a percentage of their "expected score". (Note: In **Figures 42 and 43**, target audiences B-F represent cross-sections of the academic community, whereas G-I represent vertical sections. Strategies to target single individuals were not scored)

(4) Universities were expected to deliver this message in at least one non-IP-specific context annually, as well as two IP-specific contexts, from the year that they were authorised by the Research Councils. They scored 3 points for each year they achieved this (1 for using a non-IP-specific context and 2 for two IP-specific contexts), giving an "expected score" of 15 in **Bristol, Durham, Glasgow, Hull, Liverpool and Strathclyde**, but only 12 in **York**, which was not authorised until 1987, and only 6 in **City**, which was not authorised until 1989. If any university delivered its message in more than one non-IP-specific context per year, it scored an extra point; if any university delivered its message in more than two IP-specific contexts per year, it scored an extra point. The points actually scored by each university were then expressed as a percentage of their "expected score". (Note: In **Figures 42-43**, the non-IP-specific contexts were judged to be A2, A3, A7, A8, B10, F9, H10; the rest were judged to be IP-specific contexts. Strategies to target single individuals were not scored).

(5) Universities were expected to use both written and verbal media to disseminate this message each year; furthermore, they were expected to provide ongoing written information from the year they were authorised by the Research Councils, and to complement this with "trigger" information to at least one segment of the academic community each year. They scored 3 points for each year they achieved this (1 for using a verbal medium, 1 for written, "trigger" information, 1 for ongoing written information), giving an "expected score" of 15 in **Bristol, Durham, Glasgow, Hull, Liverpool and Strathclyde**, but only 12 in **York**, which was not authorised until 1987, and only 6 in **City**, which was not authorised until 1989. If any university used any of these media more than once per year, it scored an extra point per medium under the appropriate heading - verbal, written (trigger) or written (ongoing). The points actually scored by each university were then expressed as a percentage of their "expected score". (Note: In **Figure 42-43**, manifestations 1-7 represent written, "trigger" information, manifestation 8 represents ongoing written information, and manifestations 9-14 represent verbal manifestations)

(6) Universities were expected to use at least one external agent to deliver this message annually, as well as two internal agents, from the year that they were authorised by the Research Councils. They scored 3 points for each year they achieved this (1 for using an external agent, 2 for using two internal agents), giving an "expected score" of 15 in **Bristol, Durham, Glasgow, Hull, Liverpool and Strathclyde**, but only 12 in **York**, which was not authorised until 1987, and only 6 in **City**, which was not authorised until 1989. If any university used an external agent to deliver this message more than once in a year, it scored an extra point; if any university used an internal agent to deliver this message more than twice in a year, it scored an extra point. The points actually scored by each university were then expressed as a percentage of their "expected score".

(7) The Patent Office estimates that around 80 per cent of patents granted do not get exploited (Source: Patent Office Roadshow, Glasgow, 1 November 1990).

(8) The Patent Office has granted patents on literally dozens of schemes for better mousetraps, at least one of which offers the option of multiple forms of execution (poisoning, drowning *etc*) for mice which are successfully lured inside (Source: Patent Office Roadshow, Glasgow, 1 November 1990).

(9) From the year that each university was authorised by the Research Councils - upto and including 1990, the policy-implementer was expected to have a grasp of all three forms of evaluation: scientific, technical and market. Universities scored 3 points for each year they achieved this (1 for recognising the need for a scientific evaluation, 1 for recognising the need for a technical evaluation and 1 for a market evaluation), giving a maximum of 6 points for City, 12 points for York and 15 points for the other seven universities. The points scored by each university were then expressed as a percentage of their maximum possible score.

(10) From the year that each university was authorised by the Research Councils - upto and including 1990, the policy-implementer was expected to communicate his grasp of the principles, such as it was, to academics with IP to exploit. Universities were allocated one point for each form of evaluation which policy-implementers communicated to academics, giving a maximum score of 2 or 3 per year, depending on the score which they achieved in Evaluation 9.5; in other words, policy-implementers were expected to communicate their grasp of the principles to academics but were not penalised for not communicating information which they themselves did not appear to possess in the first place. The points scored by each university were then expressed as a percentage of their maximum possible score.

(11) From the year that each university was authorised by the Research Councils - upto and including 1990, universities were allocated one point for each form of evaluation which they allowed academics themselves to undertake, if they wished to; if they did not allow academics to undertake any particular form of evaluation themselves, but allowed them to have some say in the choice of organisation to which this task is delegated, they were allocated half a point. This gave a maximum score of 2 or 3 per year, depending on the score which they achieved in Evaluation 9.6; in other words, universities were only penalised in this evaluation if they appeared to allow academics neither to undertake those forms of evaluation which policy-implementers had explained to them were necessary nor to have a say in the choice of organisation to which this task is delegated. The points scored by each university were then expressed as a percentage of their maximum possible score.

(12) This needs to be done whether the IP requires to be protected by a patent or a registered design; the Patent Office concedes that its name is misleading in this respect.

(13) Each university was expected to provide academics with information about the different types of IP which IP law distinguishes and the way(s) in which each may be protected. It was regarded as immaterial whether they provided this information directly - via the policy-implementer, or indirectly - via a patent agent or some other external agent. However, each was expected to provide the relevant information, directly or indirectly, from the year in which it was authorised by the Research Councils. Universities were allocated one point for that year and each year since, upto and including 1990, giving a maximum of 2 points for City, 4 points for York and 5 points for the other seven universities. The points scored by each university were then expressed as a percentage of its maximum possible score.

(14) Each university was expected to provide academics with information about the procedures and costs entailed in different types of IP protection. Again, it was regarded as immaterial whether they provided this information directly - via the policy-implementer, or indirectly - via a patent agent or some other external agent. However, each was expected to provide the relevant information, directly or indirectly, from the year in which it was authorised by the Research Councils. Universities were allocated one point for that year and each year since, upto and including 1990, giving a maximum of 2 points for City, 4 points for York and 5 points for the other seven universities. The points scored by each university were then expressed as a percentage of its maximum possible score.

(15) Again, each university was expected to provide academics with information about the conventions of drafting patent/design specifications. It was regarded as immaterial whether they provided this information directly - via the policy-implementer, or indirectly - via a patent agent or some other external agent. However, each was expected to provide the relevant information, directly or indirectly, from the year in which it was authorised by the Research Councils. Universities were allocated one point for that year and each year since, upto and including 1990, giving a maximum of 2 points for City, 4 points for York and 5 points for the other seven universities. The points scored by each university were then expressed as a percentage of its maximum possible score.

(16) Technique 1, reliance on patent office publications only, is a purely reactive technique, whereas the other 19 entail proactive strategies on the part of the policy-implementer/the academic with IP to exploit/a broker.

(17) Each university's score for the range of techniques employed to locate potential licencees/assignees was calculated by adding up the number of techniques listed in Figure 50, excluding technique no. 1; this was then expressed as a percentage of 20.

(18) Of the techniques listed in Figure 50, techniques 2-7 inclusive were defined for the purposes of this study as novel to most academics; techniques 8-16 inclusive were defined as intermediate and techniques 17-20 inclusive as familiar. The techniques most commonly employed by each university, identified in Figure 50, were characterised according to this scheme, added up and then expressed as a percentage of the total number of techniques commonly employed.

(19) Once again, techniques 2-7 inclusive were defined for the purposes of this study as novel to most academics; techniques 8-16 inclusive were defined as intermediate and techniques 17-20 inclusive as familiar. All the techniques which policy-implementers in each university reported having used/considered using were characterised according to this scheme; the numbers were added up and then expressed as a percentage of the total number of techniques reportedly employed/considered.

(20) Universities were expected to have provided guidance concerning the importance of approaching potential licencees/assignees armed with a confidentiality agreement from the year in which they were authorised by the Research Councils upto and including 1990. They were allocated one point for each year that they have provided this information, giving a maximum of 2 points for City, 4 points for York and 5 points for the other seven universities. They were also expected to have provided guidance to academics who themselves wished to draw up a confidentiality agreement appropriate to their circumstances, rather than necessarily use one provided by the university. This was scored on exactly the same basis. In both cases, the points scored by each university were then expressed as a percentage of the two maximum possible scores.

(21) Universities were expected to have offered would-be academic entrepreneurs guidance in relation to writing business plans - or referred them to sources of external advice - from the year in which they were authorised by the Research Councils upto and including 1990. They were allocated one point for each year that they have provided this information, giving a maximum of 2 points for City, 4 points for York and 5 points for the other seven universities. The points scored by each university were then expressed as a percentage of its maximum possible score.

(22) Source: The Sunday Times (p20), 16 June, 1991.

(23) At the end of the 1980s, it was decided to privatise the British Technology Group. Various privatisation schemes were mooted in the course of 1991; in March 1992 the BTG was finally acquired by a consortium led by BTG's own management and staff.

(24) The information provided by policy-makers and policy-implementers was checked by contacting economic development officers in the relevant city councils and county councils/districts and regions. In Scotland, it was also checked by contacting the SDA.

(25) Universities were expected to take the view that they should give would-be academic entrepreneurs guidance/refer them to external sources of advice for guidance in relation to other aspects of business start-up. They were expected to have adopted this view from the year in which they were authorised by the Research Councils - upto and including 1990. They were allocated 2 points for each year that they have accepted full responsibility, 1 point for each year that they have accepted some responsibility and 0 points for years in which they have accepted no responsibility. This gave a maximum of 4 points for City, 8 points for York and 10 points for the other seven universities. The points scored by each university were then expressed as a percentage of its maximum possible score.

(26) From the year that they were authorised by the Research Councils - upto and including 1990, universities scored 3 points for each year that they gave extensive, hands-on, company-specific advice (A in Figure 55), 2 points for fairly extensive, hands-on, company-specific advice or buying in such advice (B or C in Figure 55), 1 point for limited advice (D or E in Figure 55) and 0 points for giving no advice at all (F in Figure 55). If they imposed any conditions on who might receive this advice (eg. not academics founding independent spin-off companies), their score was halved. This gave a maximum of 6 points for City, 12 points for York and 15 points for the other seven universities. The points scored by each university were then expressed as a percentage of its maximum possible score.

(27) Similarly, from the year that they were authorised by the Research Councils - upto and including 1990, universities were expected to develop knowledge of and contact with the six different sources of external advice indicated in Figure 56 (Types 1-6 in Figure 55, in so far as each type was available locally, and with any other appropriate source (Type 7 in Figure 55). Universities scored one point for each source of advice with which they had developed contact, giving a maximum of 35 points for Durham, Glasgow and Strathclyde, 30 points for Bristol, Hull, Kent and Liverpool, 24 points for York and 14 points for City. The points scored by each university were then expressed as a percentage of its maximum possible score.

(28) For instance, the Black & Decker "Workmate" is protected by some 45 patents, a registered design and a trademark (Source: The Patent Office Roadshow, Glasgow, 1 November, 1990).

(29) Figure 59 relates to situations where the university itself pays initially for the services of a patent agent - until it can recoup the cost from a licensee/assignee; in situations where other organisations (eg. the BTG or a company) pay for a patent agent, the relative contributions made by academics and patent agents may be quite different.

(30) Universities were expected to generate strong patent/registered design specifications - and to have done so from the year in which they were authorised by the Research Councils, upto and including 1990. They were deemed to generate strong specifications where these are drafted by the patent agent after preliminary discussion with the academic(s) concerned, or where the academic(s) concerned draft the specifications following preliminary discussion with a patent agent - and the patent agent refines the resulting specification before filing it (1 and/or 2, 4 or 1, 3, 5 in Figure 59). They were deemed to generate specifications of medium strength where these are drafted by the academic(s) concerned after preliminary discussions with a patent agent (1, 3 in Figure 59). They were deemed to generate specifications of low strength where they are drafted by the academic(s) concerned without guidance from a patent agent, but refined by a patent agent before submission (3, 5 in Figure 59). They were deemed to generate potentially weak specifications where they are drafted by the academic(s) concerned without reference to a patent agent (3 in Figure 59).

Universities scored 4 points for each year that they have enabled strong specifications to be generated, 3 points for each year they have enabled specifications of medium strength to be generated, 2 points for each year they have enabled specifications of low strength to be generated and just 1 point for each year they have enabled potentially weak specifications to be generated. This gave a maximum of 8 points for City, 16 points for York and 20 points for the other seven universities. The points actually scored by each university were then expressed as a percentage of its maximum possible score.

(31) Universities were expected to fund an expert and independent market evaluation whenever necessary. They were expected to have done this from the year in which they were authorised by the Research Councils, upto and including 1990. They were allocated 2 points for each year they have been prepared to fund a market evaluation whenever necessary, 1 point if they have only occasionally been prepared to fund one, 0 points for each year they have not been prepared to fund a market evaluation at all. This gave a maximum of 4 points for City, 8 points for York and 10 points for the other seven universities. The points actually scored by each university were then expressed as a percentage of its maximum possible score.

(32) Universities were expected to centrally fund* the cost of acquiring patents/registered designs. They were expected to have centrally funded this from the year in which they were authorised by the Research Councils - upto and including 1990. They were allocated 2 points for each year that they have done so, 1 point for each year that they have first directed academics to make a first call upon their department and 0 points for years in which they have not funded the cost at all. This gave a maximum of 4 points for City, 8 points for York and 10 points for the other seven universities. The points actually scored by each university were then expressed as a percentage of its maximum possible score.

* NB Funding the cost of a patent agent via a company such as KSIP was treated as central funding for the purposes of this study.

(33) Expenditure relative to the size of the university was calculated by dividing expenditure for 1989/90 by the number of staff FTEs in the science base (based on the figures for 1988/89 quoted in the case studies presented in Appendix F); this was felt to be fairer than calculating it on the basis of the total number of staff FTEs, including those in arts and social sciences.

Since there is no known way of calculating the appropriate level of expenditure on acquiring patents/registered designs in a given university, scores were allocated on the following basis. The nine universities were ranked in descending order according to their *per capita* expenditure. The institution(s) ranked 1st scored 9 points, the institution(s) ranked 2nd scored 8 points and so on. The points actually scored by each university were then expressed as a percentage of the maximum possible score - *ie.* 9; theoretically, if their *per capita* expenditure was very similar, all nine universities could be ranked 1st.

(34) Universities were expected to have a dedicated budget to cover the cost of a patent agent providing advice - or assistance with a patent/registered design specification, where appropriate. They were expected to have had a dedicated budget from the year in which they were authorised by the Research Councils - upto and including 1990. They were allocated 1 point for each year that they have had a dedicated budget, 0 points for each year that have not had a dedicated budget. This gave a maximum of 2 points for City, 4 points for York and 5 points for the other seven universities. The points scored by each university were then expressed as a percentage of its maximum possible score.

(35) Universities which have a dedicated budget were expected to be flexible about it, using the limit as a notional guide rather than an absolute limit, if the situation warranted it. They were expected to adopt this approach since they were authorised by the Research Councils and every year since - upto and including 1990. Those which are not prepared to be flexible, *eg.* via virement from other budget headings, an end-of-year top-up or a carrying-over facility, scored -1 point for every year that they adopted this approach; those prepared to be flexible scored 0 points for every year they adopted this approach. The points actually scored by each university were then expressed as a negative percentage or zero, as appropriate.

(36) Some of the participating universities - most notably Strathclyde - have clearly thought about this subject and were able to give coherent answers. Others - most notably Liverpool - have not thought much about it; nor, apparently, have they had occasion to reach an *ad hoc* decision. Accordingly, it was necessary to try to establish hypothetically whether academics would be granted partial or full leave of absence in order to start up a company.

(37) There are six possible frameworks within which academics could legitimately become involved in university companies/joint ventures/independent spin-off companies exploiting their IP:

- * evenings and/or weekends
- * consultancy time
- * informal rescheduling of an academic's workload
- * part-time employment
- * sabbatical
- * complete leave of absence

Universities were allocated 1 point for each framework which the centre is prepared, in principle, to countenance. The points actually scored by each university were then expressed as a percentage of its maximum possible.

(38) Consultancy The information presented in Figure 62 was translated into days per year. ("No limit" was interpreted as being equivalent to 52 days per year on the basis that nobody at either Kent* or York does anywhere near that amount of consultancy; this probably explains the lack of limit) This gave a maximum of 52 days; in universities which allow less time than this, the score was equivalent to the number of days per year allowed; this was then expressed as a percentage of 52.

Part-Time Contract "No fixed limit" in Figure 66 was interpreted arbitrarily as giving a maximum of 5 years; in universities which allow less time than this, the score was equivalent to the number of years allowed; this was then expressed as a percentage of 5 years. Universities which do not grant a part-time contract to academics wishing to become involved in a university company/joint venture/independent spin-off company exploiting their research discoveries scored 0 points.

Sabbatical Aggregating 3 sabbatical terms to make up a year scored 3 points; aggregating 2 scored 2 points; granting one term alone scored 1 point; universities unwilling to grant a sabbatical to academics wishing to become involved in a university company/joint venture/independent spin-off company exploiting their research discoveries scored 0 points. The points scored by each university were then expressed as a percentage of the maximum possible score - *ie.* 3.

Leave of Absence "No fixed limit" in Figure 66 was interpreted arbitrarily as giving a maximum of 5 years; in universities which allow less time than this, the score was equivalent to the number of years allowed; this was then expressed as a percentage of 5 years.

* Note: Kent has allowed one academic to do consultancy full-time over a 3-year period, in preference to his normal academic workload; this is a one-off arrangement which is unlikely to be repeated due to unforeseen difficulties.

(39) Where extending a previously agreed period of leave of absence is concerned, "no fixed limit" in Figure 66 was interpreted arbitrarily as giving a maximum of 5 years; in universities which allow less time than this, the score was equivalent to the number of years allowed; this was then expressed as a percentage of 5 years. Universities which are unlikely to grant an extension scored 0 points.

(40) Universities were expected to have set up - provisionally at least - the six financial support mechanisms shown in Figure 67a-67b. They were expected to have set these up by the year in which they were authorised by the Research Councils and to have maintained them upto and including 1990. Each university was allocated 1 point for each financial support mechanism established; this was then multiplied by the number of years the support mechanism has been available, dating from the year the university was authorised. This gave a maximum of 12 points for City, 24 points for York and 30 points for the other seven universities. The points scored by each university were then expressed as a percentage of its maximum possible score.

(41) Universities were expected to take a positive attitude to academic entrepreneurs using each of the five types of physical and human resource listed in Figure 68, demand permitting. They scored 2 points if they took a positive attitude, 1 point if they were reluctant to allow use of any resource but nonetheless allowed use of it on occasion, and 0 points if they did not allow use of any type of resource under any circumstances. Universities which imposed conditions on the entrepreneurial contexts in which any resource could be used had their due score halved. This gave a maximum of 10 points for each university. The points actually scored by each university were then expressed as a percentage of the maximum possible score.

(42) Start-Up Phase: Universities were allocated 1 point for each of the charge systems they are prepared to countenance in relation to those types of physical and human resource which they allow academic entrepreneurs to use, demand permitting; if the set of charge systems countenanced for any one resource included charge system E, F or G, their score was doubled. This gave a maximum of 30 points for Bristol, Durham, Kent, Liverpool and York, a maximum of 24 points for City and Glasgow and a maximum of just 18 points for Hull. The points actually scored by each university were then expressed as a percentage of their maximum possible score (since none of the participating universities seems prepared to countenance more than three different charge systems for any one resource, this was treated as the maximum to be expected, yielding a maximum of 6 points, if the set of charge systems included E, F or G).

Development/Consolidation Phase: was scored in exactly the same way as the start-up phase.

(43) The decision-making process in relation to academic entrepreneurs using those types of physical and human resource generally allowed in each university was scored in the following way: universities scored 1 point for each resource where the decision-making process involved the centre and the HoD working in tandem, 0 points where the centre/the HoD alone makes the decision. This gave a maximum of 5 points for Bristol, Durham, Kent, Liverpool and York, a maximum of 4 points for City and Glasgow and a maximum of 3 points for Hull. The points actually scored by each university were then expressed as a percentage of their maximum possible score.

(44) The Commercial Exploitation of IP: A Statement of Policy, University of Liverpool, April 1989.

(45) *eg.* Patent Office training course for university ILOs, as held at Washington, County Durham, 29 November 1990.

(46) In 1991 Liverpool found an alternative interim solution: it invited NIMTECH, the North West's Regional Technology Centre, to conduct a pilot technology audit in a few departments. It is believed that the cost was covered by DTI funding which NIMTECH had been awarded under an appropriate initiative.

NOTES TO CHAPTER 10:

(1) If interviewees volunteered the information that the awareness of their staff rated "*five on a scale of ten*", or simply "*aware*", this was interpreted as "3". Terms like "*unaware*" or "*ignorant*" were interpreted as a "1". Phrases like "*vaguely aware*" were interpreted as a "2", while phrases like "*pretty aware*" were interpreted as a "4" and "*very aware*" or "*very widely known*" were interpreted as a "5".

(2) The same caveats apply to mapping the interviewees' responses against this five-point scale as applied to the previous five-point scale.

(3) The category ignorance of objections was not felt to fit easily into this categorisation scheme.

(4) The only difference is that York did not provide professional indemnity cover.

NOTES TO CHAPTER 11:

(1) Very reluctantly, in view of the wealth of data, it was decided not to include mini "case studies within case studies" as the third section of the case study narratives in Appendix F, as originally planned. Academic entrepreneurs were guaranteed anonymity - with one or two exceptions, where permission was explicitly obtained to use material notwithstanding the impossibility of disguising the identity of the informant. In the light of the guarantee they were given, many academic entrepreneurs were very outspoken; moreover, some were in business illicitly. The investigator had to honour that guarantee and could find no way of using the data elicited in a meaningful way without effectively renegeing on it.

(2) It is worth noting that two of the interviewees were associated with the same enterprise, while one interviewee was associated with two different enterprises.

(3) The nature of this informant's research was such that grants tended to be large and infrequent, with the result that he used his staff to do private contract research in order to retain them as a resource until the next grant arrived. On occasion, he asked the university to bear the cost of keeping them on.

(4) The investigator took the precaution of checking how these items had come to be in the university newsletter - *ie.* at whose initiative - and was informed that the initiative for such items almost invariably came from the entrepreneurs themselves.

(5) Two of the interviewees were entrepreneurially involved with the same company; thus only five enterprises are characterised here, rather than six.

NOTES TO CHAPTER 13:

(1) In chapter 5 this was attributed largely to woolly thinking and/or poor writing on the part of the authors. Another possible interpretation is that these documents were deliberately woolly and ambiguous, that they were drafted in a manner which allowed the ESG - and therefore UK universities, too - to deviate to a considerable extent from Margaret Thatcher's personal, specific, dogma-driven "solution" to the problems associated with the BTG. This interpretation has a certain appeal; it goes some way to explaining why the ESG, having quizzed several of the participating universities about the role of the researcher in the exploitation process, authorised these universities notwithstanding ambiguous responses to their enquiries and even responses which, it could be argued, overtly denied researchers anything more than a supporting as opposed to a starring role when it came to the exploitation of their findings and ideas. If this is a correct interpretation, then both the ESG and - wittingly or unwittingly - many of the participating universities have been engaged in a charade. This might, in turn, account for the ESG's unwillingness to identify its members by name, its preference for meeting behind closed doors and its habit of communicating via the Research Councils and the CVCP, instead of directly. The tensions identified by the CVCP in the wake of the removal of the BTG's monopoly could be adduced to support this interpretation, too. It is possible that the views of the Prime Minister, the DES, the Research Councils, the CVCP et al were so divergent that the woolly, ambiguous wording employed was the only wording which could accommodate every constituency's view. An alternative interpretation is that the Kingman letter and the DES statement exhibited genuinely woolly thinking, that the ESG did not attempt to recommend good, let alone best practice because its members had no clear idea what the Prime Minister's wishes might actually entail in practice. In other words, they were not upto the task of figuring out the algorithm of the identification, evaluation, protection and exploitation process and examining the implications of the Prime Minister's wishes - or even their own interpretation of her wishes - for each step in the algorithm. If this is the case, it is a classic example of the blind leading the blind.

(2) *ie.* those which existed prior to the abolition of the binary divide.

Case Study Narrative: Bristol University

(1) This is clearly how the University saw itself, too, for in the job specification for the head of the new Industrial Liaison Office, prepared by the Finance Office in September 1986, Bristol is described as "*a medium-sized University*" (ref. RS/31/015).

(2) In the 1988/89 session, Bristol had 7,513 student FTEs, compared to 7,125 in 1980/81, an increase of 5 per cent.

In 1988/89 there were 6,328 undergraduate FTEs, 562 taught postgraduate FTEs and 623 research student FTEs (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

In 1980/81 there were 6,149 undergraduate FTEs, 461 taught postgraduate FTEs and 515 research student FTEs (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1981).

(3) According to Bristol's USR Correspondent, the introduction of devolved budgets in the mid-1980s had the effect of freezing existing student numbers. This was later recognised and the 1989 Academic Plan provided for a 50 per cent, global expansion in student numbers by 1999.

(4) In the 1988/89 session, Bristol had a total of 1,411 full-time academic/academic-related staff, plus 132 part-timers; this compares with 1328 full-time academic/academic-related staff and 41 part-timers in 1980/81.

In 1980/81 there were 1,127 full-time academic staff and 160 full-time academic-related staff. (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1981). It is no longer clear what proportion of the full-time academic staff was UGC-funded and what proportion was funded by other sources. Academic-related staff represented 12% of Bristol's total academic/academic-related staff.

In 1988/89, 1,247 (59%) of full-time academic staff were funded by the UFC; 507 (41%) were funded from other sources; many of these were on fixed-term contracts. Once again, academic-related staff represented 12% of Bristol's academic/ academic-related staff.

(5) The Department of Architecture was closed completely once its existing students had graduated. The Department of Education was reduced in size by around 50 per cent and the History of Art Department became a service Department, no longer offering Honours courses.

(6) In 1988/89 Bristol's science base comprised the Departments of:

Anaesthesia, Anatomy, Child Health, Epidemiology & Community Medicine, Medicine, Mental Health, Obstetrics & Gynaecology, Ophthalmology, Otorhinolaryngology, Pathology, Pharmacology, Physiology, Radiodiagnosis, Radiotherapy, Surgery;

Biochemistry, Botany, Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Theoretical Chemistry, Physics, Geography, Geology, Psychology and Zoology;

Aerospace Engineering, Civil Engineering, Electrical & Electronic Engineering, Mechanical Engineering, Computer Science and Engineering Mathematics;

Agricultural Sciences, Animal Husbandry, Veterinary Medicine and Veterinary Surgery;

Child Dental Health, Conservative Dentistry, Prosthetic Dentistry & Dental Care of the Elderly, Oral Medicine, Surgery & Pathology.

(7) Source: "Trouble in the Ranks", Times Higher Education Supplement, 30 May, 1986.

(8) Ratings by subject area were:

<u>Outstanding:</u>	Veterinary Medicine, Chemistry, Civil Engineering, Geography
<u>Above Average:</u>	Clinical Medicine, Anatomy, Physiology, Pharmacology, Biochemistry, Zoology, Veterinary Anatomy, Veterinary Pathology, Veterinary Pharmacology, Animal Husbandry, Physics, Mechanical/Aero/Production Engineering
<u>Average:</u>	Clinical Dentistry, Psychology, Botany, Veterinary Surgery, Mathematics, Electrical & Electronic Engineering
<u>Below Average:</u>	Other Physical Sciences, Computer Sciences, General Engineering.

Source: "The Strengths and Weaknesses", Times Higher Education Supplement, 30 May, 1986.

(9) Source: "Poll of Polls", Times Higher Education Supplement, 30 May, 1986.

(10) Ratings by "unit of assessment" were:

<u>5:</u>	Pharmacology, Chemistry, Physics, Civil Engineering, Geography
<u>4:</u>	Anatomy & Physiology, Biochemistry, Veterinary Science, Mechanical/Aero/Production Engineering
<u>3:</u>	Clinical Medicine, Clinical Dentistry, Psychology, Other Biological Sciences, Other Physical Sciences, Mathematics, Computer Science, General Engineering
<u>2:</u>	Electrical & Electronic Engineering

Source: "Countdown to Excellence", Times Higher Education Supplement, 1 September, 1989.

(11) Source: UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986.

(12) The science base contributed 94 per cent of the University's income from the Research Councils, 90 per cent from charities, 100 per cent of its income from UK public corporations and private industry/commerce and 65 per cent of its combined income from central government, local authorities and various overseas organisations. (Source: Figures derived from Form 3 (p2), Table 3 of the statistical data prepared by Bristol University for the UGC and USR for 1984/85).

These figures err on the side of being conservative. They exclude the research grant and contract income of the Departments of Psychology and Geography, since it is beyond the scope of this study to apportion this income between the Faculties of Science and Social Sciences.

(13) The science base contributed 93 per cent of the University's income from the Research Councils, 87 per cent from charities, 99 per cent of its income from UK public corporations and private industry/commerce, and, once again, 65 per cent of its combined income from central government, local authorities and various overseas organisations. (Source: Figures derived from Form 3 (p2), Table 3 of the statistical data prepared by Bristol University for the UGC and USR in 1988/89).

(14) In the early 1970s, a Professor of Physics presented a paper to the Committee of Deans, arguing for the establishment of an IL office. His proposal was rejected:

"... There was a culture gap. It was because the University was so successful at bidding [for money from] the Research Councils. We didn't need to worry. We were still on the upswing ..."

Towards the end of the 1970s, the Dean of Engineering and the Information Officer tried to compensate for the absence of an ILO by trying to market the University's skills more efficiently. They produced a draft prospectus outlining the resources of various Departments. The project ground to a halt when personal circumstances obliged the Dean to leave the University.

(15) Professor Rawcliffe of the Electrical Engineering Department invented the PAM (Pole Amplitude Modulation) motor which was assigned to the NRDC in 1960. It was licensed all around the world, making it the University's most successful exploitation to date - and one of the NRDC's more successful, too.

(16) An officer from the University of Bristol's branch of the Association of University Teachers stated this during a telephone conversation with the investigator in October 1989.

(17) It has been suggested that if the Dean of Engineering had not departed when he did (see (14)), he might have given the necessary impetus to ensure an ILO was appointed in the wake of the 1981 cuts. In the event, when this was suggested by the working party examining ways to generate external revenue, there was insufficient support for the idea in Senate.

(18) At this point in time, Deputy Secretary was not a particularly senior position in the administration. The Director of Administration - a post since abolished - ranked immediately below the Vice-Chancellor in seniority. Below him, theoretically of equal status, were the Finance Officer, the Bursar, the Personnel Officer and the Registrar/Secretary. In 1988/89 this last post was split into two.

(19) It was suspected that 3i might be an alternative to the BTG, but no attempt was made to contact 3i to confirm this. The University also felt there must be other alternatives, if they cared to look for them - but in the event, they did not.

(20) Track Analysis Systems Ltd was founded by a group of physicists in the mid-1980s to exploit a material for detecting radiation. In this case, since they had published their research findings, the material concerned was in the public domain and could not be patented. Accordingly, the company did not need to acquire a license. It exploits the material and the academics' expertise without having to pay royalties, but pays the University a small fee in recognition of its rights over the IP.

(21) An ILO was seen as a prerequisite if universities were to increase the level of funding they received from industry. The UGC's views on this had just been expressed in "A Strategy for Higher Education into the 1990s" (HMSO, September 1984, pp. 35-38). The UGC recommended that the Government should provide additional funds for the establishment of an industrial seedcorn fund as an incentive to universities to seek further links with industry and commerce.

(22) The CVCP's working party on science parks was due to report late in 1985, for example.

(23) Sir Alec Merrison had retired as Vice-Chancellor of Bristol University in 1984. His chosen successor, Sir John Kingman, was at that time finishing his period as Chairman of the SERC. For the 1984/85 session, an Acting Vice-Chancellor was appointed from within the academic community. Given that he had only one year in which to achieve anything, Professor Hackett chose to concentrate on the University's relations with industry. His fellow committee members were the Deans of Science and Engineering, the Information Officer and a lay member of Council. The Deputy Secretary participated as an observer.

(24) The committee reported its wideranging findings and its recommendations to Senate in May 1985. The report was reproduced in full (excluding appendices) in the Supplement to the "Newsletter" on 16 May 1985, *"so that the debate on the issues raised [could] be as widespread as possible"*.

(25) The bonus was to be calculated on the basis of 5 per cent of the net income to the University derived from new business generated by the ILO, after deduction of direct costs, upto a maximum of 50 per cent of the basic salary.

(26) Despite the committee's recommendations, the office was subsequently called the Industrial Liaison Office (ILO) and rather than becoming Director of Industrial and Commercial Affairs, the person appointed is referred to as the Head of the ILO. There was a general concensus, on reflection, that the title "Director" suggested the direction of the academic community. Since this was unwelcome and unwarranted, the recommendation was scrapped.

(27) This quote is taken from the job specification for the Head of Industrial Liaison, reference: RS/31/015, 12 September 1986.

(28) The ILO took care to involve members of the administration, the University's lawyers, the AUT and even the academic community in its deliberations, wherever possible.

(29) He sees the research activities of the Departments of Electrical Engineering, Physical Chemistry, Pharmacology and the Veterinary School as particularly likely sources of IP.

(30) This quote is taken from the Conclusions of the Senate committee's report, printed in the Supplement to the "Newsletter", 16 May, 1985.

(31) This quote is taken from the job specification for the Head of Industrial Liaison, reference: RS/31/015, 12 September 1986.

(32) The terms and conditions of appointment indicate that each case will need to be considered in the light of individual circumstances. The University will take into account the balance between University time and resources used and those privately invested by the individual concerned.

(33) Bristol has confronted the fact that some Departments regularly end the year with a surplus, whilst others end it with a deficit. A policy decision has been taken to redistribute some of the surplus to offset the deficits. Accordingly, Departments which end the year with a surplus of more than £50,000 are taxed. In 1989/90 the tax amounted to 49 per cent of the residue, though this varies from year to year.

Since it is impossible to separate out that portion of the surplus which arises from IP as opposed to other sources, some Departments - most notably Departments in the Faculty of Engineering - could find their income from IP being taxed. This acts as a major incentive to spend the income from IP at once.

(34) Memorandum to Heads of Departments, Procedure Relating to Staff Appointments, Promotions and Salary Increments, 2 November, 1989.

(35) Bristol's induction course tends to deal with matters which affect everybody, irrespective of discipline or status; the ILO recognises that it might be difficult to put together a presentation which was equally relevant to everyone.

(36) This information was buried on the third page of a 5-page report of the findings and recommendations of the Senate committee investigating how the University should improve its relations with industry, which was printed in a Supplement to the "Newsletter", 16 May 1985.

(37) In mitigation, the editor of the "Newsletter" pointed out that in 1985/86 the University was preoccupied with the arrival of the new Vice-Chancellor, the University's response to the Jarratt Report and the new Academic Plan.

(38) It is not clear from the file which the ILO inherited whether members of staff were informed about the University's authorisation in 1986, but there is evidence that a memo was sent out by the Vice-Chancellor's office in 1987 and/or 1988. It is less clear who received these memos. Various options were considered, ranging from notifying all members of staff throughout the University to notifying key HoDs. The final decision is not on file and the ILO does not know what the Vice-Chancellor's practice is.

(39) In 1987/88 the ILO organised a day-long seminar which dealt with IP issues in the broadest sense. Open to all members of staff in all faculties, some 40 people attended. In 1988/89 the ILO arranged gave a series of seminars on identification, protection and exploitation which were specifically geared to Bristol's situation. Apart from one open seminar, most were given in the context of specific Departments or faculties, taking into account local needs and interests.

(40) The panel is an *ad hoc* group set up by the ILO. It is not a formally constituted University committee. During its first meeting, it established its remit and *modus operandi* and considered in the broadest terms whether the University's patent "policy" is the correct one. It was planned to continue this discussion at the next meeting, and only then to begin assessing the market value of particular discoveries.

(41) If a researcher is about to give a conference paper, the ILO makes every effort to protect his discoveries beforehand by a speedy initial registration. There have been occasions where the conference was only a week or so away.

(42) Bristol tries to get its IP protected in Europe, north America, Japan etc, despite the far greater cost:

"... The idea of the UK only, bearing in mind the mobility of technology and the ways one can get around a UK patent, means that it is becoming less interesting ..."

The ILO generally employs patenting routes which may cost more eventually, but where the initial expenditure is slower.

(43) There is no formal policy as to who has the final right of decision. The ILO describes the situation as "*a bit nebulous*" and recognises that it is difficult to proceed effectively without the academic's co-operation.

(44) This is the reason that the University received around 5 per cent of the revenue from the "Rawcliffe plugs" - see (15).

(45) This might include, for example, a joint venture between the University and the researcher(s), between the University and industry, between the University and the public sector, or joint ventures encompassing several or all of these parties.

(46) The plan was to set up a holding company after at least two of the commercial arms of Departments had been transformed into wholly-owned companies, which could then function as subsidiaries. At that point in time, two candidates had been identified and the imminent transformation into a limited company of the first, the Institute of Grinding Technology, had been announced. However, the academic who was due to become the managing director subsequently accepted a Chair at an American University. In 1989/90 the Institute was led by an academic with considerable scientific and technical skills, but insufficient managerial or marketing skills. Until such time as an academic emerges who has both sets of skills, or the University can identify a suitable entrepreneur to put in place as managing director, the Institute has retained its previous, arms' length quasi-academic status.

The first candidate for subsidiary status is therefore the wholly-owned Bristol Earthquake & Engineering Laboratory (BEELAB Ltd), in which the University has £100 share capital. The company was founded to exploit a wide range of equipment, including an earthquake simulator, which the Department of Civil Engineering has at its disposal.

There are currently at least four other institutes/centres/units which are virtually or completely self-funding (*ie.* they do not rely on grants from Research Councils or charities for their existence). In time, these may also be converted into limited companies, and thence into subsidiaries of the University holding company. The initiative for this will generally come from the academics involved, but the ILO will draw up the necessary business plans to assess the viability of their proposals.

(47) Licensing and even assigning to existing companies with a track record will continue to be part of the ILO's game plan for many years:

"... It is important to have a sort of unit trust arrangement where there's quite a wide spread of fairly predictable income, rather than very erratic and potentially very high reward but high risk [income]".

(48) The one exception is a biotechnology company which was founded at the end of 1989 by two members of the academic staff, one with tenure and one non-UFC-funded, to exploit techniques which they developed relating to monoclonal antibodies. In this particular case, there was no immediately obvious market for the IP. A niche market was subsequently identified as a result of the academics themselves having the energy and commitment to their discovery to do market research which led to the identification of future customers. A spin-off company with an exclusive license was seen as particularly appropriate in this situation, since their competitors were large companies which would probably want to suppress the discovery.

(49) When the ILO shifts his attention to this part of the exploitation process, he anticipates that a number of marketing tactics are likely to prove useful. These include tapping the Alumnae Association, making greater use of large and small companies with which the University has an existing contact, and placing strategic articles in the trade press and the media. Towards the end of the 1980s an academic who took the trouble to place an article about his research discoveries in an unrefereed journal (for which he got little academic credit) attracted the attention of Boeing, which expressed an interest in becoming a licensee.

(50) One respondent made the analogy of the first garage in an area to give Green Shield stamps ... the others soon feel under pressure to follow suite. He felt that Bristol arrived at its view of academic entrepreneurship in much the same way.

(51) As one respondent put it:

"... Entrepreneurship is part of generating funds. Generating funds is, in a way, accepting the government's policy, which is that we will reduce [our contribution] and you will generate more [money]. [The idea] that universities will not be so exclusively publicly-funded is [something] that quite a wide range of academics are very much against. They feel the University should not be pushed into this situation and should not allow the government to divest itself of its responsibility ..."

(52) Most notably these include the Institute of Grinding Technology, the Remote Sensing Unit, the School for Advanced Urban Studies, the Comparative Orthopaedics Unit and the Communications Engineering Unit.

(53) The Remote Sensing Unit, currently based in the Department of Geography, is linking with the Electronics & Electrical Engineering Departments of other universities to develop and market satellite reception facilities, image processing systems and sets of software packages for operational environmental monitoring based on data from meteorological satellites, for example.

(54) At the ILO's suggestion, the University has a 12-month option on acquiring a share in a biotechnology company which was formed by two members of the academic staff (see (52)). Depending on the company's performance, the University may exercise its right to acquire a 10-25 per cent shareholding at a nominal £1 per share. This arrangement was made in preference to a royalty payment partly because it overcame the problem of distinguishing between the IP which the researchers generated in the course of their academic duties and that which they generated in the course of their company activities. Since the University has the option of a share in both activities, the distinction becomes less crucial.

(55) The primary motivation for this purportedly relates to safety on campus. Since a number of such companies are known to operate from the campus, there is concern that the terms of the Factories Act may inadvertently be contravened where access, building modifications, safety etc are concerned.

However, there is also concern that even though academic spin-off companies are legally at arms' length from the University, visitors and clients may not make that clear a distinction. Therefore, it is important to check that a company's activities do not reflect negatively on the University's reputation.

(56) In the 1982 Academic Enterprise Competition, Bristol had one entry, based on a discovery made in the Pharmacology Department. In the 1988/89 competition, Bristol had two entries, one from the Vascular Studies Unit and one from the Anatomy Department (Source: private communication from the British Technology Group, 1989).

(57) Source: "Standing Orders of Council Governing the Appointment of Full-Time Members of the Non-Professorial Academic Staff", University of Bristol, August 1979.

(58) Twenty per cent is not a figure which is laid down as an entitlement; it is more a question of custom and practice.

(59) This was said, of course, before Bristol revealed that it was on the verge of financial collapse in 1990/91.

(60) Ironically, the ILO has never been shown this Council minute. The head of the ILO was alerted to its existence by members of the academic staff who have referred to it in conversation with him.

(61) By 1989/90 this was known to have happened - with varying arrangements - in the Departments of Engineering, Civil Engineering, Medicine and one other.

(62) Until 1987/88, the decision to give the University's blessing to on-campus companies was purely a local one, made by the HoD. Since then, the decision has involved satisfying the Finance Office that the correct charges are being levied for space occupied and resources - once the company is up and running. It has also involved satisfying the Safety Officer. In some cases, the HoD's in-principle decision may also be referred to the Committee of Deans.

(63) A lecturer from the Sociology Department is believed to have left the University in order to run The New Work Trust, a company limited by guarantee which provides business start-up advice, incubator units *etc* for small start-up companies.

(64) Bristol installed a modern telephone exchange towards the end of the 1980s. Academics making calls on private business can preface the number they want by a dialling code which logs the cost of their conversation. As yet, however, there appears to have been no great emphasis on using this facility, despite the fact that heads of Department have devolved budgets and pay real rather than notional money for excessive usage.

(65) The ILO recently required a biotechnology spin-off company to acquire off-campus premises, for example, due to the complexity of the laws surrounding biotechnology products.

(66) The committee charged with finding ways to generate income first mooted the idea of a science park in the early 1980s, in the wake of the 1981 cuts. The Department of Architecture, before it was closed down, proposed a vertical science park, a tower block costing close to £13m, which would be built in the city centre on University land.

In 1984/85 the working party chaired by the interim Vice-Chancellor proposed what the Information Officer describes as "*a bigger, better, shinier animal*" which would primarily attract major multi-national companies rather than small, start-up companies. This proposal gradually firmed up into a joint project with Bath University and Bristol Polytechnic for a 500 acre site at Emerson's Green, costing £50m. The proposal is for 100,000 sq.ft. of lakeside buildings of various sizes, suitable for R&D and manufacturing. There would also be a small number of incubator units, a block designed to act as a one-stop technology transfer resource, housing patent agents, lawyers *etc* - and cheap residential accommodation for postgraduates.

The project has been delayed by a public inquiry since it entailed a change to the proposed county structure plan and conflicted with a planning application for a retail scheme. If planning permission is given, the bulldozers will probably move in in 1991. The University hopes the science park will be open for business by the end of 1992.

Case Study Narrative: City University

(1) Source: Table 1: Comparative Changes in % Grant, Student Numbers and Unit of Resource for UK Universities, Special Issue of "Precinct", the University of Liverpool newsletter, June 1986. On the basis of the figures given in this table, the national average was an increase of 5.02 per cent in student numbers by 1989/90.

(2) In 1988/89 City had 3,367 student FTEs compared to 2,826 in 1980/81.

In 1988/89 there were 2,257 full-time undergraduate FTEs, 884 full-time taught postgraduate FTEs and 226 full-time research student FTEs (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

In 1980/81, in contrast, there were 2,317 undergraduate FTEs, 333 taught postgraduate FTEs and 212 research student FTEs.

There is a tremendous difference at City between numbers of student FTEs and numbers of students, however, more so than at most universities. In 1988/89, for example, the University registered 1,010 part-time postgraduates, most of whom were on taught courses (Source: Annual

Report, City University, 1988/89).

(3) In 1988/89 City had 459 full-time academic/academic-related staff, plus 40 part-timers. This compared with 412 full-time academic/academic-related staff and just 6 part-timers in 1980/81.

In 1988/89 262 (71%) of the full-time academic staff were funded by the UFC. 109 (29%) were funded from other sources; many of these were on fixed-term contracts. Academic-related staff accounted for 19% of City's academic/academic-related staff.

There is no surviving record of how many of the full-time academic staff were funded by the UGC in 1980/81. However, academic-related staff accounted for 14% of City's academic/academic-related staff.

(4) The traditional base of the Northampton Polytechnic Institute, which was metamorphosed into the City University in 1966, was engineering, optometry, physics and chemistry. The other subjects areas are more recent additions.

(5) There was a total of 246 academic/academic-related staff in these departments; 188 were UFC-funded and 58 non-UFC-funded.

(6) This information is derived from a series of tables of City's student FTE load for 1988/89 provided by the Academic Registrar's office. However, the categories employed do not equate exactly with Departments.

(7) Source: "Poll of Polls", Times Higher Education Supplement, 30 May, 1986. This poll ranks City as 49th out of 50 universities, with only Keele below it.

(8) In 1989/90 these included the Control Engineering Centre, the Centre for Information Engineering, the Centre for Measurement, Instrumentation & Applied Physics, the Centre for Aeronautics, the Engineering Design Centre, the Structures Research Centre, the Electrical Power & Energy Systems Research Centre, the Ocean Engineering Research Centre, Geotechnical Centrifuge Centre*, the Thermo-Fluids Engineering Research Centre, the Underwater Non-Destructive Evaluation Centre*, the Ocean Engineering Centre, the Centre for Biomedical Engineering, the Centre for Enterprise Management, the Centre for Measurement and Information in Medicine, the Research Unit on Low-Dimensional Magnetic Structures, the Actuarial Research Unit, the Social Statistics Research Unit, the Centre for Software Reliability and the Applied Vision Research Centre.

Some of these were collaborative ventures between one or more departments and those with an asterisk were collaborative ventures with other institutions. City's Research Committee laid down criteria which must be fulfilled before such centres can be established. These include academic criteria: they must be able to demonstrate the makings of a qualitative research output in terms of refereed articles - and financial criteria: they must demonstrate a minimum level of income from Research Councils and charities. In some cases, however, (eg. the Geotechnical Centrifuge Centre, the Ocean Engineering Centre) centres require the support of industry, too, in order to attain their objectives.

With one major exception, the Social Statistics Research Unit, City's research centres were all notional groupings of researchers, usually UFC-funded, who participated on a "cafeteria" basis. They did not usually have a separate staff on short-term contracts.

(9) Ratings by "unit of assessment":

- 3: Applied Mathematics, Statistics
- 2: Optometry, Speech Therapy, Systems Science, Mechanical/Aero/Production Engineering
- 1: Chemistry, Civil Engineering, Electrical & Electronic Engineering.

Source: The Academic Registrar, City University.

(10) City's current Secretary was previously Deputy Secretary and Bursar of Surrey University, which took a conscious decision in 1970/71 to concentrate on top-class research:

"... Fifteen, seventeen years later they have achieved it. That shows the length of time and the kind of investment you need to make ..."

(11) Source: UGC University Statistics 1984/85, Volume 3: Finance, USR, September 1986.

(12) The science base contributed 80 per cent of the University's income from the Research Councils, 84 per cent from charities, 69 per cent of its income from UK public corporations and private industry/commerce and 87 per cent of its combined income from central government, local authorities plus various overseas organisations (Source: UGC University Statistics, volume 3: Finance, USR, September 1987).

(13) The science base contributed 85 per cent of the University's income from the Research Councils, 59 per cent from charities, 59 per cent of its income from UK public corporations and private industry/commerce and 80 per cent of its combined income from central government, local authorities plus various overseas organisations (Source: UFC University Statistics, volume 3: Finance, USR, September 1990).

(14) In the course of the fieldwork, City's Secretary emphasised that the University has a "management", not an administration.

(15) City Technology Ltd (CTL) became a wholly-owned company in 1977/78. It was founded to exploit gas sensor technology developed in the Chemistry Department. Initially, this was offered on a voluntary basis to the NRDC, which "simply didn't respond quickly enough":

"... The commercial imperatives at the time were such that we had to get on and do something - so we did it ourselves ..."

CTL has always covenanted its gross profits to City, which then allocates it development funding as necessary. In 1987/88 CTL doubled its floorspace and became a fully independent commercial company, still wholly-owned by City. This possibly makes it the only wholly-owned university company in the UK to bring in profits of the order which it does.

(16) In 1982 City Technology Ltd won the Queen's Award for Technological Achievement, as it did again in 1985. In 1988 it won a Queen's Award for Export Achievement.

(17) Citifluor Ltd was founded to exploit materials developed in the Chemistry Department which do not "phase" quickly when medical slides are stained to facilitate examination.

(18) Surrey was the first British university to formulate a policy on patenting and IP. This policy foreshadowed much of the CVCP's code of practice, circulated in 1977/78.

(19) By "restructuring periods", the respondent is referring to 1981-84 and 1986-90, during which many universities underwent major structural changes, usually following the recommendations of the UGC.

(20) City operates with a binary management system, dividing academic from financial affairs. These two areas are the responsibility of the Academic Registrar and the Secretary respectively, who are of equal status and report directly to the Vice-Chancellor.

In practice, IP questions cut across both areas, but since the management at City is very small, this is usually dealt with at an informal level.

(21) Until then, discoveries arising out of Research Council-funded projects were offered to the BTG, as usual.

(22) City's Terms and Conditions of Employment obliged it to embark upon a consultation process.

(23) City Consultancy Services (CCS) was then set up following the demise of CUBIE to perform at least some of its functions in a less risky way. Its Director in 1989/90 was a member of the academic staff whose responsibility for CCS was only part-time.

(24) The only exception is ownership of copyright in publications other than course notes, syllabuses and examination papers.

(25) City has not updated its Staff Handbook since the 1970s. However, it makes an effort to issue annual Supplements.

(26) City's attitude to revenue earned by inventors is similar to its attitude towards members of staff who undertake paid, personal (arm's length) consultancy. There is no earnings limit, provided members of staff stick roughly to the rule of thumb of a maximum of one day per week. City does not take a percentage of earnings from personal, arm's length consultancy, though it may charge for equipment/instrumentation or support staff if the consultancy activities have incurred opportunity costs.

Like many institutions in central London, for City the problems of recruiting staff on nationally negotiated salaries with only a minimal London weighting have reached crisis proportions. This is seen as one way of allowing members of the academic staff to supplement their salaries and ease the burden.

(27) Where there are joint authors - and presumably joint inventors - half these points are awarded to each contributor.

(28) Source: City University Report on Research Activity, 1 December 1989.

(29) Source: Memorandum from the Academic Registrar's Office to all HoDs, 21 November 1989: Review of Academic Salaries 1989/90.

(30) City's salary review committee consists of 11 people: the Vice-Chancellor, two Pro-Vice-Chancellors, the Academic Registrar, the President of the local AUT, the Chairman of the Academic Staff Association plus three HoDs and two members of Senate of senior lecturer status or above. These last five are appointed by Senate and serve for three years.

(31) The "Newsletter" is scheduled to appear twice a term but in the calendar year 1989, for example, the last issue was published in July.

(32) Being a committee which reports to the Senate, the Research Committee has no lay members. It consists entirely of academic members and is serviced by the Deputy Academic Registrar.

(33) The centre believes that it is "fairly generous" in returning between 60 and 75 per cent of research overheads to research groups/centres or departments, so that many departments should be able to cover the cost.

(34) The Technological Development Fund was established around 1981, using the profits of CTL. This was done to ensure that this revenue "was not seen as a kind of income stream that could mitigate or temper the rigour that was being imposed by the UGC". Since CTL covenanted its profits gross to the University, it was vital for the company to have access to them for its working capital. Moreover, City felt it was appropriate to invest the residue on a capital basis, rather than fritter it away in subsidies.

Any other income which the University receives from exploiting IP, by whatever route, is also paid into the Technological Development Fund, after the proportions due to the inventors and the Department have been deducted.

(35) It is not clear whether assigning part of the ownership presents problems in a university which does not vest its patents jointly in the university and the inventor.

(36) This follows UDIL's recommendation (UDIL, 1988).

(37) Some details of how City Technology Ltd (CTL) was founded are given in note (19) above. The technology was developed by four member of the Chemistry Department's research staff, all of whom were on short-term contracts. The four became Executive Directors of CTL, with one taking on the role of Managing Director. In 1987/88 CTL became a fully independent commercial company, having won its third Queen's Award - for Export Achievement. CTL is recognised as a world leader in its field. In May 1988 City conferred an Honorary Degree on the Managing Director, who was about to retire.

In 1983/84 City founded Citifluor Ltd to market a particular chemical. The company is managed by the Head of the Chemistry Department on a day/week basis, with technical support.

In 1987/88 City founded Ocean Technology (UK) Ltd (OTEC) to provide technical consultancy services to international marine and offshore oil and gas industries, in association with a group of professional companies and consultants. A Professor and a Reader in the Civil Engineering Department were appointed as Executive Directors; the head of the University's computing service became the third Executive Director. The company brought in a part-time Managing Director from outside.

(38) OTEC's principal customers were in developing countries, several of which had severe economic as well as political problems. City believes it founded the company two years too late to get optimum advantage from the services it was offering.

(39) For instance, a number of inventions which originated in the Department of Optometry & Visual Science have been exploited by existing companies, since it was more appropriate to have them manufactured and marketed by existing instrument makers.

(40) In this situation, the assignation/licensing agreement could be between the research centre and the industrial partner or between the university and the industrial partner.

(41) HoDs are now appointed for five years initially, and would not normally be reappointed more than once. This prevents empire-building on a departmental scale, although in the view of the management, some research groups are exhibiting similar tendencies.

(42) City installed a new telephone system in 1980, but it does not offer the facility for users to employ codes to indicate private versus university use. The University therefore has to rely on academics being honest about reporting use of the telephone for private calls.

(43) The centre is well aware, for example, of the activities of LENTA, but would prefer to find *"horses for courses"* rather than use *"an overarching body there to generate economic activity for the whole of greater London"*.

(44) This is effectively what happened with OTEC, which was founded on the basis of a business plan drawn up by a Visiting Research Fellow who worked for a well-known consultants in marine engineering. Once the company was registered, this person assumed the role of MD, not on a salaried, employee basis but on the basis of an annual fee.

Case Study Narrative: Durham University

(1) Source: Table 1: Comparative Changes in % Grant, Student Numbers and Unit of Resource for UK Universities, Special Issue of "Precinct", University of Liverpool newsletter, June 1986. On the basis of the figures given in this table, the national average was an increase of 5.02 per cent in student numbers by 1989/90.

(2) In 1988/89 Durham had 5,255 student FTEs, compared to 4,727 in 1980/81.

In 1988/89 there were 4,348 undergraduate FTEs, 412 taught postgraduate FTEs and the equivalent of 495 full-time research students (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

In 1980/81, in contrast, there were 4,048 undergraduate FTEs, 333 taught postgraduate FTEs and the equivalent of 346 full-time research students (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(3) In 1988/89 Durham had 758 academic/academic-related FTEs, plus 30 part-timers. This compared with 725 academic/academic-related FTEs and 5 part-timers in 1980/81.

In 1988/89 441 (71%) of the full-time academic staff were funded by the UFC. 179 (29%) were funded from other sources; many of these were on fixed-term contracts. Academic-related staff, funded from other sources and often on short-term contracts, accounted for 18% of the total (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

There is no surviving record of how many of the full-time academic staff were funded by the UGC in 1980/81. However, academic-related staff, many of whom were on short-term contracts, accounted for 20% of the total (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(4) In December 1988 there were 179 academic staff in UGC-funded posts and 113 in non-UGC-funded posts in the Faculty of Science (Source: Deputy Secretary, University of Durham).

(5) Ratings by subject area:

Outstanding: Geography
Above Average: Botany, Engineering
Average: Chemistry, Physics, Other Physical Sciences, Mathematics
Below Average: Computer Sciences

Source: "The Strengths and Weaknesses", Times Higher Education Supplement, 30 May 1986.

(6) Source: "Poll of Polls", Times Higher Education Supplement, 30 May 1986.

(7) Ratings by "unit of assessment":

4: Chemistry, Physics, Geography
3: Other Biological Sciences, Other Physical Sciences, Mathematics, General Engineering

Source: "Countdown to Excellence", Times Higher Education Supplement, 1 September, 1989.

(8) Source: UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986

(9) The Faculty of Science contributed 93 per cent of the University's income from the Research Councils, 37 per cent of the income from UK charities, 79 per cent of the income from industry/commerce and 62 per cent of its combined income from central government, local government and various overseas organisations (Source: University of Durham Accounts for the year ended 31 July, 1985).

(10) The Faculty of Science contributed 86 per cent of the University's total income from the Research Councils, 48 per cent from UK charities, 98 per cent from industry/commerce and 42 per cent of its combined income from central government, local government and various overseas organisations (Source: University of Durham Accounts for the year ended 31 July, 1989).

(11) In the course of the 1970s and early 1980s, researchers in the Departments of Applied Physics, Chemistry and Engineering had brought potentially exploitable IP to the attention of the administration, for example.

(12) One took up a Chair in Engineering, the other a Chair in Computer Science. Both had worked in industry previously.

(13) Members of the working party were the Vice-Chancellor, the Treasurer, the Deputy Secretary, two lay members of Council with industrial experience and a number of academics, including a member of the law Department who specialised in IP matters.

(14) The Treasurer at Durham is not a lay member of Council with considerable industrial experience, as in some UK universities. The Treasurer is a full-time university employee, in the manner of the Bursar or the Finance Officer in other universities.

(15) This impression was the result of Durham academics experiencing, albeit on a minor scale, a number of unsatisfactory encounters with the BTG, together with awareness of a "*general, national dissatisfaction*".

(16) The Registrar died in a car crash; as a result, much of his regular workload was temporarily off-loaded onto some members of the working party.

(17) Durham's response was drafted by the Deputy Secretary, after consultation with the Vice-Chancellor and the acting Treasurer. The AUT was also consulted, in view of proposed changes to the Standard Terms and Conditions of Appointment.

(18) There was, apparently, only one discernible reaction of any kind. While the policy was being deliberated in Council, Durham's "*most successful exploiter*" became alarmed that the proposed phraseology suggested that people who joined a research team late on might expect to benefit to the same extent as those who had been involved from the beginning. Minor modifications in the wording were duly made.

(19) This attitude is reinforced by a critical incident in the university's recent history. Some years ago Durham made an appointment in Computing; his remit was to bring in outside work and cover his costs but:

"... It never worked. That has rather put us off that sort of thing".

(20) UDIRL was established to "*act as a contract R&D agency for industry*", to "*bring together and focus the expertise of [the] science and engineering Departments as a contribution to the development of the region*" and to attract high-tech companies to the science park. UDIRL is staffed by a full-time director, experimental officers, research assistants and an administrative assistant, together with support staff and is on target to become self-financing within 5 years. Its profits will be ploughed back into improving its equipment and instrumentation resources.

(Source of quotes: The University Calendar, 1988/89)

(21) At Durham, the person who is head of department is called "Chairman of the Board of Studies" or "Chairman of School"; for the sake of brevity and consistency, the term "HoD" will be employed in this case study.

(22) Source: Communication from the Personnel Officer to Chairmen of Boards of Studies and Schools, Heads of Houses, 16 October 1989 (ref. JB/SS).

(23) Source: Standard Terms and Conditions of Appointment to Lectureships in Durham, (ref. T.3.3) and Standard Terms and Conditions of Appointment of Research Assistants in the University of Durham (ref. T.7.1), University of Durham, 1988/89.

(24) The university recognises that researchers could patent their research findings clandestinely but does not think it is likely to be a significant problem. The confidentiality surrounding academic entrepreneurship as an activity, together with the relative isolation of the Assistant Treasurer from the academic community, suggests that it would be difficult for the university to identify academics who were operating in the black economy, however.

(25) Durham's submission to the Exploitation Scrutiny Group stated:

"... We rely on the academic staff to draw attention to work with exploitable potential. We expect HoDs to keep the possibility of commercial spin-off in the minds of their colleagues ... in larger departments we expect them to do this in conjunction with research group leaders".

(26) Durham negotiated a 3-year, non-exclusive enabling agreement with the Research Corporation, now 3i Research Exploitation Ltd.

(27) Until January 1990, Durham's Staff Development Officer was a part-time appointment. His priorities were to train HoDs to manage devolved budgets, to conduct staff appraisal, etc. Following the receipt of funding under the Enterprise in Higher Education Initiative, this was extended to a full-time appointment. It was anticipated that he might later turn his attention to IP matters.

(28) To date, Durham has assigned the IP which it generated to the respective industrial sponsors, albeit with some reluctance; in the centre's view, retaining the right to use the IP as background IP in future research does not have a great deal of value if that future research ends up being funded by other companies. The university feels heartened by UDIL's increasingly uncompromising stand concerning ownership of IP arising out of industrial sponsorship.

(29) This might include, for example, a joint venture between the university and the researcher(s), between the university and industry, between the university and the public sector, or joint ventures encompassing several or all of these parties.

(30) The Vice-Chancellor is the Director, the Treasurer is Company Secretary and the Vice-Chancellor and Registrar are named as share-holders.

(31) For instance, at the simplest level, a company can claw back VAT, whereas a university cannot.

(32) Academics at Durham are not free to make their own arrangements, without the express consent of Council. This is stated explicitly in the regulations:

"No person shall in connection with any invention, patent, process or manufacture, have authority to make representation on behalf of the University or enter into any contract in the like behalf or to be concerned in the like behalf in any transaction whatsoever relating thereto without the express consent of the Council. No consent given under this Statute shall be valid unless a copy of the relevant resolution of the Council has been communicated in writing by the Registrar/Secretary to the person to whom the consent is given".

(Source: University of Durham Calendar, 1988/89)

Council meets only twice a term and there are no meetings scheduled between late July and early November. However, this is unlikely to cause problems, since it is unlikely that the university will find it appropriate to give such authority to a member of staff or a student.

(33) A researcher/Lecturer in one department won joint second prize (£20,000) for his SMART-ARMS robots, manufactured by his spin-off company, Systems Control. A researcher/Lecturer in one Department won joint third prize (£10,000) for his precision diamond tooling techniques, commercialised by his spin-off company, Dianite Coatings Ltd.

(34) Ironically, at the end of 1989 the only academic spin-off company operating on the University science park is a consultancy started by the botanist, David Bellamy, a Professor in the Department of Adult Education at Durham. However, early in 1990 the first company founded by a Durham academic set up in the science park to provide a software maintenance service.

There is also an economic consultancy, founded by a Durham graduate after some years as an employee.

(35) At Durham all members of a Department are members of the Board of Studies, with "rights which are greater than merely attending a staff meeting" - ie. they have voting rights. Decisions about rescheduling workloads would therefore be taken by all members of staff attending, rather than by fiat of the HoD.

(36) In the wake of the Jarratt Report, Departments and Schools were turned into budget centres.

(37) The administration recognised that if the university activated its holding company and forms subsidiary companies or joint ventures with members of staff, the administration ...

"... would have to have an ad hoc arrangement. There would have to be some recompense to the budget centres for losing part of a member of staff" ...

In such cases, the administration felt it would have to become formally involved in the decision-making process.

(38) Officially, applications for leave of absence are granted or refused by the Vice-Chancellor, who is authorised to act on behalf of Council. However, applications for leave of absence will not be granted unless they have the support of the Chairman of the Board of Studies or Schools concerned. The Staff Handbook gives no guidance on the type of activities for which leave of absence might normally be granted.

(39) The Durham Mountjoy Research Centre is situated on University-owned land which has been leased for 125 years to English Estates. English Estates bears all the costs of the science park - including the cost of erecting the buildings - and enjoys all the revenues. The University receives no financial return other than that provided by the lease. The science park was opened in July 1986. It has 35,000 sq.ft. of lettable floorspace in total, comprising incubator units which range in size from 440 sq.ft. to 600 sq.ft, with a few corner units of 700 sq.ft.

Rents went up rapidly in the Durham area at the end of the 1980s. At the end of 1989, rents (exclusive of rates) in the science park for a 400 sq.ft. unit were just over £8.00/sq.ft. basic. On top of this there was a service charge of £0.60p/sq.ft. to cover heating, lighting, common areas, car parking, cleaning etc and a maintenance charge of approx. £0.90p/sq.ft. The overall cost, including rates, was £10-11/sq.ft. This is about twice the cost of accommodation on an industrial estate. However, rental in the science park includes free use of the common room, special tenants' rates for use of the Boardroom, seminar rooms and secretarial services and free use of the University library. Science park rents are slightly below office rents in Durham, where there is tremendous pressure on space.

The science park operates an "*easy in-easy out*" three year tenancy during which the rent is fixed for the full term of the lease. Tenants are required to give three months' notice.

(40) Tenant companies must be "*technologically-based*"; this is vetted very closely, if necessary bringing in consultants from the University to make an evaluation. They must also be "*financially-sound*". The University has a right of veto.

(41) Since the beginning of 1987 there has been a technology park with similar aims and objectives associated with Sunderland Polytechnic, 16 miles away. However, at the end of 1989, it also had a waiting list. There is also a "technology courtyard" at Consett's industrial park, 16 miles away, but road conditions in winter are often atrocious.

ICI's large technology park in Billingham is interested in attracting larger, established manufacturing companies rather than small, innovative start-up companies. It is more appropriate for start-up companies which are expanding. Conversely, start-up companies which spin-off from large companies located on the Billingham park sometimes locate in Durham's science park, rather than the Billingham park.

There are likely to be more incubator units available in due course: Newcastle University plans to create a science park in the city centre, sharing a site with a major retail centre.

Case Study Narrative: Glasgow University

(1) Numbers of student FTEs change from year to year, so that in 1985/86, for instance, Glasgow was deemed to be the largest university, excluding London, Oxford and Cambridge (Source: University of Glasgow Newsletter, 18 February 1988, p9, quoting "Hansard"). In 1988/89, when participating universities were selected, it was Britain's second largest university, judging by figures published by the Universities Statistical Record.

(2) In 1989/90 Glasgow had 1,740 full time academic/academic-related staff, plus 192 part-timers. This compares with 1,716 full-timers plus 113 part-timers in 1980/81.

In 1989/90 992 (66%) of the full-time academic were funded by the UFC; the remaining 513 (34%) were funded from other sources; many of these were on fixed-term contracts. Academic-related staff accounted for 14% of the total (Source: UFC University Statistics, volume 3: Finance, USR, September 1990).

Glasgow has no surviving record of the proportion of full-time academic staff who were UGC-funded in 1980/81. However, academic-related staff accounted for 13% of the total (Source: UGC University Statistics, volume 3: Finance, USR, September 1982).

(3) Source: Table 1: Comparative Changes in % Grant, Student Numbers and Unit of Resource for UK Universities, Special Issue of "Precinct", University of Liverpool newsletter, June 1986. On the basis of the figures given in this table, the national average was an increase of 5.02 per cent in student numbers by 1989/90.

(4) In 1988/89 Glasgow had 11,491 student FTEs, compared to 10,328 in 1980/81.

In 1988/89 there were 9,740 undergraduate FTEs, 793 taught postgraduate FTEs and 958 research student FTEs (Source: UGC University Statistics, volume 3: Finance, USR, September 1990).

In 1980/81 there were 9,041 undergraduate FTEs, 571 taught postgraduate FTEs and 716 research postgraduate FTEs (Source: UGC University Statistics, volume 3: Finance, USR, September 1982).

(5) The eight Faculties are: Arts, Social Sciences, Divinity, Science, Engineering, Law & Financial Studies, Medicine and Veterinary Medicine.

(6) In 1987 the Department of Religious Studies was closed. In 1986 the Departments of Natural Philosophy and Astronomy merged to form the new Department of Physics & Astronomy and staff from the Department of the History of Science transferred to the Department of Modern History in the Faculty of Arts.

(7) Glasgow has the oldest University School of Engineering in Britain, founded in 1840 and the first School of Naval Architecture in the world, founded in 1883.

(8) In 1988/89 the Faculty of Medicine grouped together the Departments of Anaesthesia, Anatomy, Bacteriology, Immunology, Cardiac Surgery, Child & Adolescent Psychiatry, Child Health, Clinical Physics, Community Medicine, Dermatology, Forensic Medicine & Science, General Practice, Geriatric Medicine, Haematology, Materia Medica, Medical Cardiology, Medical Genetics, Medicine, Neurology, Neuropathology, Neurosurgery, Nursing Studies, Obstetrics & Gynaecology, Oncology, Ophthalmology, Orthopaedics, Otolaryngology, Pathological Biochemistry, Physiology, Psychological Medicine, Radiology, Surgery, Surgical Paediatrics and Virology, plus two hospital-based Pathology Departments. The Dental School also belonged to the Faculty of Science and it, in turn, comprised the Departments of Conservative Dentistry, Oral Biology, Oral Medicine & Pathology, Oral Surgery, Orthodontics and Prosthodontics.

The Faculty of Veterinary Science grouped together the Departments of Veterinary Anatomy, Veterinary Physiology, Veterinary Animal Husbandry, Veterinary Pathology, Veterinary Parasitology, Veterinary Medicine, Veterinary Surgery, Veterinary Pharmacology and Veterinary Clinical Biochemistry.

(9) In 1989/90, there were 769 academic funded by the UFC (60%) and 503 (40%) in non-UFC-funded posts in the Faculties of Science, Engineering, Medicine and Veterinary Science. (Source: Glasgow University Personnel Department).

It is impossible to compare this with the percentage which the science base represented in 1980/81, since Glasgow kept no Faculty-by-Faculty record of the number of academics in non-UGC-funded posts at that time.

(10) Source: University of Glasgow Annual Report, 1988-89.

(11) Source: "Trouble in the Ranks", Times Higher Education Supplement, 30 May 1986.

(12) The 1986 research assessment rankings were as follows:

Outstanding: Veterinary Parasitology, Veterinary Pathology, Electronic & Electrical Engineering.

Above Average: Clinical Medicine, Oral Medicine, Pathology, Other Biological Sciences, Veterinary Clinical Biochemistry, Veterinary Medicine, Physics & Astronomy, Computer Sciences, Mechanical Engineering, Aerospace and Topographic Science.

Average: Clinical Dentistry, Anatomy & Physiology, Pharmacology, Biochemistry, Other Biological Sciences, Veterinary Science, Chemistry, Other Physical Sciences and Mathematics.

Below Average: Nursing, Civil Engineering and Geography.

Source: "The Strengths and Weaknesses", Times Higher Education Supplement, 30 May 1986.

(13) Source: "Poll of Polls", Times Higher Education Supplement, 30 May 1986.

(14) The 1989 research assessment rankings were as follows:

- 5:** Electrical & Electronic Engineering
- 4:** Clinical Medicine, Biochemistry, Other Biological Sciences, Veterinary Science, Physics, Other Physical Sciences and Computer Science
- 3:** Clinical Dentistry, Anatomy & Physiology, Pharmacology, Chemistry, Mathematics, and Mechanical/Aero/ Production Engineering
- 2:** Pharmacology
- 1:** Nursing, Other Studies Allied to Medicine and Civil Engineering.

Source: "Countdown to Excellence", Times Higher Education Supplement, 1 September, 1989.

(15) Derived from UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986.

(16) These Faculties contributed **95** per cent of the University's income from the Research Councils, **92** per cent from charities, **96** per cent of its income from UK public corporations and private industry/commerce, and **86** per cent of its combined income from central government, local authorities and various overseas organisations (Figures derived from Form 3, Table 3 of Glasgow University's statistical data prepared for the UGC and the USR in 1984/85).

(17) These Faculties contributed **91** per cent of the University's income from the Research Councils, **94** per cent from charities, **97** per cent of its income from UK public corporations and private industry/commerce and **92** per cent of its combined income from central government, local authorities plus various overseas organisations (Figures derived from Form 3, Table 3 of Glasgow University's statistical data prepared for the UGC and the USR in 1988/89).

(18) The most famous and apparently the most active of these was Lord Kelvin, who founded several companies to exploit his discoveries. A company set up to exploit battery technology failed, but the company he founded to exploit two inventions, a sounding device and a compass which resisted deviation from iron ships, was highly successful; in 1965, following a number of changes, it became the Kelvin Hughes division of Smiths Industries. Some inventions were exploited by existing companies, such as Ferranti, which used Kelvin's zig-zag winding for alternators.

Kelvin was "part of a wider circle of Scottish entrepreneur- professors". These included Lewis Gordon, Britain's first Professor of Engineering, who invented wire rope and helped found a famous cablemaking company in Gateshead. This company supplied half the cable when the underwater cable across the Atlantic was laid, an enterprise in which Kelvin acted as director and consulting inventor. "The connection of Gordon, Kelvin, Jenkin, Tait and Ewing as teachers, pupils and business partners embracing both University science and practical activity and entrepreneurship in the electrical industry was one of the strongest areas of close contact of the universities and British industry in the nineteenth century. It was a tribute to Scottish universities at this time that there was nothing comparable in England".

Quotes and information taken from The Universities and British Industry by Michael Sanderson, Routledge & Kegan Paul, London, 1972.

(19) "Guidelines on Inventions, License Agreements, Consultancies, Research Contracts, Computer Software, Audio-Visual Materials, Publications and Outside Work", published by the University Court.

(20) According to this respondent: "*The discussion of IP rights as such has become much more focussed and much clearer since then. The original idea ... well, we were just taking very gentle first steps ...*".

(21) It is difficult to determine unequivocally which is the case, since many of the key personnel have left in the intervening years, including the ILO, the Secretary to Court and the Principal.

(22) The form in question elicited the name of the company for whom consultancy work would be done, the duration, the number of hours per week including travel, the remuneration, a copy of the agreement, together with details of any other outside work which the applicant was pursuing. Where University resources were to be used, a separate form was provided which elicited details on staffing, including external staff, computing facilities, materials, travel, subsistence etc. Both forms required the signature of the HoD, with a comment which had regard "*inter alia to the work of the Department and possible conflicts of interest of members of staff*" (Source: Form (B) Outside Work, attached to the "Guidelines ...").

(23) Glasgow University differs from many UK universities in that the Registrar is a relatively junior officer, whose primary concern is with University records. Glasgow University has a unitary administrative structure (*ie.* there is no division of the personnel responsible for financial matters from those responsible for academic matters). At the top of the pyramid, immediately below the Principal and the University Management Group, is the Secretary to Court. The Finance Officer, Personnel Officer, Estates Officer and Registrar form the next level of command, but the Registrar is the most junior of these. In practice, he has less autonomy than the Finance Office or Estates & Buildings. This structure is traditional in Scotland's four ancient universities.

(24) Source: University of Glasgow Newsletter, December 1985.

(25) It is interesting that in this particular context, Glasgow chose to focus on its fellow Scottish universities. Generally, for comparison purposes, Glasgow identifies itself with Edinburgh and Bristol. Broader comparisons take in Leeds, Sheffield, Manchester "*and maybe Birmingham*" - *ie.* the big civic universities. We might profit by speculating on the reasons for a focus which is firstly very localised and secondly, encompasses not only universities of the same ilk as Glasgow, but also newer universities, in particular Strathclyde and Heriot-Watt. It is perhaps worth noting that the eight Scots members of UDIL have their own association, as do the industrial liaison officers of Scotland's Central Institutions; these two groups sometimes organise joint meetings. It is possible that this has engendered a spirit of co-operation which was noticeably absent in the English universities which participated in this study.

(26) "The Cambridge Phenomenon", (Segal, Quince, Wicksteed, 1984), was the first in-depth analysis of the role played, albeit involuntarily, by a UK University in incubating spin-off companies. It had been observed some 20 years earlier that certain US universities had performed this function, most notably MIT, which was instrumental in the development of the "Route 128 phenomenon". As its title suggests, "The Cambridge Phenomenon" sought to establish whether Cambridge University was associated with a similar phenomenon.

(27) HoDs may be appointed from full Professors, Titular Professors, Readers, Senior Lecturers and occasionally, even Lecturers. The appointment is renewable, but the extent to which this actually happens varies from one Department to another. In very large Departments, such as Chemistry, for example, the annual "turnover" can be as high as £3m, a situation which makes considerable demands on the HoD.

(28) On the initiative of the Director of Accommodation and Conference Services, the University started selling in the Visitors' Centre Blackpool-style sticks of rock with its name in the middle. Some members of the academic community were concerned that the University should be promoting sugar-based products when its medical and dental staff were trying to promote healthy eating habits. (Source: Glasgow Evening Times, 21 November 1989).

(29) The Commercial Policy Review Committee currently consists of the ILO, the current Vice-Principal (Industrial Liaison) and a lay member of Court; until recently, it was chaired by the previous Vice-Principal (Industrial Liaison).

(30) The new, 12-page document was titled "Commercial Policy Statements".

(31) In this situation, the money is diverted in an informal way to the inventor's Department. The inventor generally retains control over its disbursement.

(32) Scotland's national press (in particular The (Glasgow) Herald and The Scotsman) has frequently given coverage to the commercial activities of the academic community. From January 1987 to January 1990, for instance, there were at least 15 articles about inventive academics from Glasgow and the way in which their discoveries were being transferred into the economy.

(33) At Glasgow, after an initial Faculty-based assessment carried out by the appropriate Committee of Review, applicants are assessed for promotion on a University-wide competitive basis by the Board of Review. Appointed annually, the Board of Review consists of the Principal as Convenor, the Vice-Principals, the Senate Assessors on the University Court, the Convenor of the Finance Committee and one other member of Court who is neither a student nor a member of staff. This same Board is also responsible for conducting an annual review of promotion procedures and reporting its findings to Court and to the local AUT.

(34) Being highly structured, the forms do not make it particularly easy to do justice to such contributions. Under the heading Research Contribution there is a short section headed "*Links with industry/commerce and other outside bodies*"; under the heading Other Contributions there is a section which directs applicants to "*list any other contribution to the University, to the academic world, or to the local community, which you think is relevant to your application for promotion*" (Source: Promotion Procedures for Academic and Academic Related Staff, University of Glasgow, September 1989).

(35) "Exploitation of Research Council Funded Projects", Newsletter, 19 March 1987.

(36) "Patenting: The Opportunities and the Pitfalls", British Technology Group, 1989.

(37) The Research Corporation visited Glasgow University in 1986. A non-exclusive agreement was tentatively discussed, but the Research Corporation did not return to finalise the agreement. The ICDS was "*not awfully impressed with them*".

(38) Recently, for example, Glasgow identified IP which it felt it was not in a position to exploit. Another company indicated that the IP fitted its portfolio and was in a position to exploit it. On this occasion, the University chose to assign.

(39) This is a far from hypothetical concern. In recent years, one of Glasgow's own joint ventures was liquidated; since the University had chosen to license rather than to assign, it did not lose its rights to the IP. The University was subsequently able to relicense. Had it assigned the IP, the University could only have reasserted its ownership by making a cash outlay which outbid other interested parties.

(40) The ICDS has an overall exploitation budget which should not be exceeded. It is notionally divided into headings, however, and virement between headings is permissible.

(41) The ICDS could argue for an increase over and above inflation but feels that it would not be an easily-won argument because Court has recently voted additional funding to allow more staff to be taken on. Thus, the ICDS finds itself in a somewhat paradoxical situation:

"... The logic behind more staffing is increased activity. Its difficult to get [that] across to anybody in the public sector. It's the Government's narrow approach of year-by-year budgets, rather than an investment for a future return ..."

(42) This might include, for example, a joint venture between the University and the researcher(s), between the University and industry, between the University and the public sector, or joint ventures encompassing several or all of these parties.

(43) This may be an underestimate. At least ten "academics" have entered the Academic Enterprise Competition during the 1980s; there may be others who have not entered. In 1982, Glasgow fielded two entries to the Academic Enterprise Competition, one from the Department of Chemistry, one from the Department of Electronic & Electrical Engineering. The five "academics" from the Chemistry Department - they were, in fact, doctoral students - won joint second prize. Their discoveries were subsequently exploited by a successful start-up company, Cruachem.

The BTG has no record of the unsuccessful entries to the 1985 Academic Enterprise Competition, but Glasgow made at least one entry, with an invention originating in the Department of Electronic & Electrical Engineering. In the 1989 Competition, Glasgow fielded four entries, one each from the Departments of Electronic & Electrical Engineering, Biochemistry and Cardiac Surgery, and one from the Veterinary School (Source: private communication from The British Technology Group, 1989).

The ICDS has no record of researchers from Glasgow entering for a SMART award in any year, but since there was nothing to prevent academics entering directly, some may indeed have entered. None are known to have won. The same applies to the Prince of Wales Innovation Fund and Toshiba's Year of Invention.

(44) The existing joint ventures were: Inform Software Ltd, Biomac Ltd and Surface Temperature Systems Ltd. Surface Temperature Systems Ltd was originally an academic spin-off company, founded in the 1970s; it did not succeed, due to lack of development funding. Since the company did not go into liquidation, it still owns the patent. It is believed that the patent could now be successfully exploited and the University is participating in resurrecting the company.

Nanoform Ltd was in the process of being set up after the academic concerned won second prize (Section I) in the 1988/89 Academic Enterprise Competition. The company proposed to exploit a microcomputer-controlled polishing system driven by novel software, which could be used in the production of components for the optical and electronics industries.

(45) The University has already considered a number of options. The ICDS itself could be turned into a company, which could then attract outside investment. The University could set up a holding company, which would form subsidiaries for specific purposes, or it could set up a University-wide umbrella company. The last option is the least likely:

"... [We] don't think a campus company just for the sake of it makes sense. There has got to be a very specific purpose ..."

(46) For the same reasons, the University was happy to set up Inform Software Ltd; in this particular situation, company start-up was probably less trouble than identifying licensees and/or distributors.

(47) To date, the ICDS has located its managing directors principally through the SDA and the BTG.

(48) In fact, it has not been possible to identify any independent spin-off companies which failed, other than Intellimetrix. Equally, one of the University's joint ventures, TEG Products, has also failed, however.

(49) Towards the end of the 1980s the economic development officer of a nearby district council was certainly contemplating approaching academics from Glasgow University who lived within the council's boundaries with a view to assistance with starting up companies (licitly or illicitly) within the district, as part of the council's long-term job creation strategy (Source: private communication, May 1988).

(50) Academics could, of course, found a company without the University's knowledge. Glasgow has already discovered one such company. Even though it was unclear who owned the IP, the University decided to recoup what it could from the situation by trying to negotiate a "golden share". This would allow it to block anything the company did, should it choose to. The University also demanded to be allocated 50 per cent of the equity. At the end of 1989 the matter was not fully resolved, since the academic was unwilling to give up 50 per cent of his equity.

It was the University's view that whether or not it had rights to the IP involved, the academic had agreed to terms and conditions of contract which pledged him to ask permission before founding a company of any sort. Whether this was intentional or an oversight, the academic concerned had not sought permission.

(51) These are: the Centre for Housing Research, the Centre for Entrepreneurial Development and the Building Services Research Unit. Each of these does some contract research funded by industry/commerce or central/local government *etc.*

(52) Despite the new policy, this situation could arise where academics were exploiting their expertise, or where pre-existing independent academic spin-off companies were exploiting IP.

(53) Since November 1985 Glasgow has had a modern telephone exchange which keeps a full record of every number called, the caller, the duration and the cost. It is unclear, however, precisely who would monitor this to sort out business from *bona fide* University calls.

(54) The idea for the West of Scotland Science Park came from both Glasgow and Strathclyde Universities; the Scottish Development Agency co-ordinated the project, investing around £6m of its own funds to acquire a 125 year lease on 34 acres of Glasgow University's land (the Kelvin Campus) and to acquire a further 27 acres (the Todd Campus). Phase I of the Park was opened in September 1983, Phase II in December 1987. At the end of 1989 the buildings comprised around 80,000 sq.ft. (Source: The West of Scotland Science Park).

(55) The West of Scotland Science Park provides conference facilities and central services including telex, fax, photocopying and secretarial services on a pay-as-you-use basis. There are 13 small units ranging in size from 350 sq.ft. to 904 sq.ft, together with larger units of upto 1884 sq.ft. The rental/sq.ft. of the smaller units is relatively higher, ranging from £5/sq.ft. to £4.70/sq.ft. at the end of 1989. All units pay an additional £1.10/sq.ft. service charge. At that time, the annual rent for the two smallest sized units would have been about £2,135 and £2,388 respectively. The smaller units became available in December 1987. Prior to that, minimum annual rentals would have been closer to £6,000, including the service charge.

At the end of 1989 the minimum lease was one year, with one month's notice required. Two-year and six-year leases were also available, with the rent fixed for the first three years. Three months notice was required for longer leases. At the beginning of 1990, Phase I was fully occupied and Phase II was 95 per cent occupied, however.

By the end of 1989, seven University spin-offs (not exclusively from Glasgow) had taken space on the Park, but only three remained, one of which was a major consortium supported by Glasgow, Strathclyde and Heriot-Watt Universities together with Paisley College of Technology and Napier Polytechnic. The other four companies had failed.

(56) It is not a foregone conclusion that a University has to formally invest capital in a joint venture in order to acquire an equity share. When Imperial College founded Imperial Biotechnology Ltd in a joint venture with members of the academic staff, for example, the University contributed no capital at all, but retained a 45 per cent shareholding in recognition of the central role which it played in the enterprise.

(57) Source: Letter to the Assistant Industrial Liaison Officer of Glasgow University from the Exploitation Scrutiny Group Secretariat (ref. F/TE/03/C71), 17 August 1990.

Case Study Narrative: University of Kent

(1) At the beginning of the 1980s, for example, taking into account England's 30 or so autonomous, monolithic institutions, Kent was the largest member of the bottom size quartile (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(2) Source: Sixteenth Annual Report, University of Kent at Canterbury, December 1981.

(3) Source: Table 1: Comparative Changes in % Grant, Student Numbers and Unit of Resource for UK Universities, Special Issue of "Precinct", University of Liverpool newsletter, June 1986. On the basis of the figures given in this table, the national average was an increase of 5.02 per cent in student numbers by 1989/90.

(4) In 1988/89 Kent had 4,493 student FTEs, compared to 4,011 in 1980/81.

In 1988/89 there were 3,821 undergraduate FTEs, 337 taught postgraduate FTEs and 335 research student FTEs (Source: UFC University Statistics, volume 3: Finance, USR, September 1990). In 1980/81 there were 3,465 undergraduate FTEs, 225 taught postgraduate FTEs and 321 research student FTEs (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(5) In 1988/89, taking into account England's 30 or so autonomous, monolithic institutions, Kent had moved out of the bottom size quartile. It occupied sixth position in the next quartile (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

(6) In the 1988/89 session, Kent had 639 full-time academic/ academic-related staff, plus 31 part-timers. This compared with 559 full-timers plus 14 part-timers in 1980/81.

In 1988/89 356 (70%) of the full-time academic staff were funded by the UFC; the remaining 154 (30%) were funded from other sources; many of these were on fixed-term contracts. Academic-related staff accounted for 20% of the total (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

There is no surviving record of the proportion of full-time academic staff who were UGC-funded in 1980/81. However, academic-related staff accounted for 15% of the total (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(7) In 1988/89 the full-time academic/academic-related staff numbered 119 in the Faculty of Natural Sciences, 46 in the Faculty of Information Technology and 61 in the Computer Laboratory. There were also 8 part-timers (Source: The Registry, University of Kent, compiled for the local Association of University Teachers).

(8) Source: Assistant Registrar, University of Kent.

(9) When the UGC attempted in 1981 to re-establish the research resources required to underpin research done for the Research Councils, it used a formula based on student numbers. This meant that universities with a large science base gained at the expense of those, like Kent, with a small science base. Kent was receiving higher than average support from the SERC, yet paradoxically, it was penalised for having such a small percentage of science students, as the Vice-Chancellor outlined in the Annual Report for 1981.

(10) Research ratings by subject area:

<u>Above Average:</u>	Biochemistry, Other Biological Sciences, Computer Sciences
<u>Below Average:</u>	Chemistry, Physics, Mathematics, Electrical & Electronic Engineering.

Source: "The Strengths and Weaknesses", Times Higher Education Supplement, 30 May, 1986.

(11) Source: "Poll of Polls", Times Higher Education Supplement, 30 May, 1986.

(12) Research ratings by "unit of assessment"

- 4: Other Biological Sciences, Computer Science
- 3: Physics, Mathematics and Electrical & Electronic Engineering
- 2: Chemistry

Source: "Countdown to Excellence", Times Higher Education Supplement, 1 September, 1989.

(13) Source: UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986.

(14) The science base contributed 82 per cent of the University's income from the Research Councils, 34 per cent from charities, 100 per cent of its income from UK public corporations and private industry/commerce, and 37 per cent of its combined income from central government, local authorities and various overseas organisations

(15) The science base contributed 92 per cent of the University's income from the Research Councils, 66 per cent from charities, 87 per cent of its income from UK public corporations and private industry/commerce and 55 per cent of its combined income from central government, local authorities plus various overseas organisations (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

(16) The University does not have a central record of patents applied for/acquired before 1983. However, Kent's Annual Reports usually listed journal articles, books, broadcasts - and, apparently, patents acquired each year. To take an example, the Annual Report for 1981 lists the grant of a UK patent on work undertaken by a researcher attached to the Electronics Laboratory.

(17) The working party consisted of the then Dean (Professor of Microbiology), the Emeritus Professor of Experimental Physics, the Professor of Digital Electronics and the then Finance Officer (who had become the Registrar by 1989/90).

(18) The Faculty of Social Sciences founded the Applied Statistics Research Unit (ASRU), which has been highly successful, rivalling KSIP in its ability to garner contract research. In the intervening years other units have been set up to undertake contract work. Some of these (eg. the Mathematics External Courses Initiative) concentrate on offering courses. Others (eg. the Institute for Conservation and Ecology, recently transformed into the Durrell Institute) are research-oriented. Each is governed by a Board which reports to the Finance Committee and Council.

(19) The person appointed had worked for both the SERC and the UGC and was believed to have a track record in successfully identifying IP, arranging for it to be evaluated, protected and exploited.

(20) KSIP's initial Board of Directors consisted of around 16 people, the majority of whom were academics or members of the Registry.

(21) The BTG does not appear to have pursued any of the opportunities which Kent offered it prior to 1985; a number of (compulsory) assignments resulted in patent applications which the BTG subsequently dropped. The University derives no income from IP exploited by the BTG.

(22) When he was first appointed, KSIP's third Managing Director saw such a document, signed by the Registrar.

(23) Source: Note (ii) of a Report of the Board of Directors of KSIP Ltd to the Finance Committee, 24 June, 1988 (ref. IRS/SC, 10 May, 1988). NB Had KSIP ever generated a profit from exploiting IP which it owned - after distributing the relevant proportion of the income to the inventor(s) and covering its patenting costs, the profit would have been covenanted to the University, together with any other profits which KSIP generated.

(24) KSIP's third Managing Director recalls having seen such a document with a personnel reference on it when he was first appointed.

(25) In 1989/90 Kent did not have a centralised personnel office handling all appointments; the personnel division of the administration was responsible only for appointing secretarial staff, cleaners *etc.* Academic/academic-related staff, technicians *etc.* were appointed by the Faculties, which also dealt with the personnel aspects of such appointments.

(26) This tranche of royalty income arose more by accident than by design: a postgraduate student gave a paper at a conference, outlining a discovery which excited the interest of one of the companies present. Despite the fact that this IP was not protected and was *de facto* in the public domain, the company concerned asked for the IP to be assigned to it and paid an upfront fee of *ca.* £12,000.

(27) The academic disciplines of the then Pro-Vice-Chancellors were European Studies and Physics. The Deputy Vice-Chancellor was an Economist.

(28) The Registrar himself appears to have no recollection of drafting the response, but in the view of a colleague, it bears several of his hallmarks.

(29) The new Managing Director, the third, was appointed as the university's Industrial Co-operation Manager (ICM), an administrative grade 5 appointment, rather than as Managing Director of KSIP. His remit as ICM included acting as KSIP's Managing Director, however. This change was motivated by the fact that the University had not been sure to whom the previous Managing Director could legitimately be asked to report to in the University.

The new incumbent had studied chemistry and instrumentation at the Universities of Manchester, Liverpool and Loughborough, and business and marketing management at specialist colleges. He then became regional sales manager of the world's largest scientific instrument company. Subsequently he was responsible for transferring technology from Swedish universities into the economy.

(30) He was concerned, for example, about grants from the Research Councils, charities and other government agencies being handled by the university. Whereas he was often involved in negotiating industrial contracts, KSIP's company status prevented these public-sector and charitable grants being channelled to their academic recipients via KSIP. While this in itself need not create a problem, in practice, he felt that despite having flagged it as a problem, no real effort was made to alert him when public-sector grants were awarded.

He also felt that there were not enough hours in the day to single-handedly act as KSIP's Managing Director, as the university's industrial liaison officer and as the person responsible for proactively identifying, evaluating, protecting and exploiting IP.

(31) KSIP was set up on the basis that any profits would be covenanted to the university, not retained by the company.

(32) Kent has a unitary administrative structure in which the Registrar occupies the most senior position, immediately below the Vice-Chancellor. Below the Registrar are four Deputy Registrars, with responsibility for Estates & Buildings, Finance, Faculty matters and Academic matters - *ie.* it services the Senate, the Council, deals with student records *etc.* The Senior Assistant Registrar with responsibility for IP is located in the Faculty Section.

(33) In fact, the planned research grants office has not yet materialised.

(34) Apart from theoretical and experimental physics, Kent has an established interest in applied optics and space physics.

(35) Kent has chosen to focus on microbial technology, microbial biochemistry, molecular biology and cell biology.

(36) The decision to relocate responsibility for IP rather than look for solutions to KSIP's problems was also influenced by uncertainty over the exact nature of KSIP's relationship with the university.

(37) The previous UDIL meeting had taken place only two weeks before this respondent was interviewed.

(38) Source: Report of the Board of Directors of KSIP Ltd to Finance Committee, 24 June, 1988 (ref: IRS/SC, 10 May, 1988)

(39) "Research Contracts, Academic Services and Consultancies", ref. HRC/SBH39, University of Kent, 19 June, 1989.

(40) For instance, on a net income of £30,000, the inventor(s) would have received £16,873 under the agreement operating from 1 April 1988, compared to only £11,000 under the new arrangements. Similarly, on a net income of £50,000, the inventor(s) would have received £22,235 under the agreement operating from 1 April 1988, compared to only £16,000 under the new arrangements. This represents a drop of 35 per cent and 28 per cent respectively.

(41) The University has not considered whether this is, in fact, legal or not.

(42) Individual members of the academic staff have already agreed on an *ad hoc*, trial basis to covenant their royalties to the University.

(43) For instance, Kent believes that academics who covenant their royalties to the University can avoid tax. The University would then transfer the author's share of the royalties not by means of a personal payment but by means of research funds over which the author alone had control. Moreover, by dint of entering royalties as earned income, the University would hope to attract increased support from the UFC in future years in the same way that research grant and contract income attracts additional support.

(44) The Senior Assistant Registrar has confirmed persistent rumours and gossip by dint of checking the details of supposed academic spin-off companies through Companies House.

(45) The Biological Laboratory has just 17 full-time academic staff, the Chemical Laboratory and the Physics Laboratory 16 apiece, for instance.

(46) I am indebted to Dr J Phillips, formerly of Queen Mary Westfield College, London, for this information.

(47) The minutes of a meeting of KSIP's Board held on 7 July, 1986 note, under the heading "Exploitation of Research Council Funded Inventions", that the Chairman of KSIP assumed responsibility for ensuring that this was done. At this time - indeed, until July 1987, the Chairman of KSIP was actually the Vice-Chancellor.

(48) This oversight was probably due to the fact that KSIP's first Managing Director left a month after the authorisation was granted. A retired industrialist was then appointed to manage KSIP for 6 months until a permanent appointment could be made. KSIP's third Managing Director took up his appointment in July 1987, but responsibility for IP was a part of his remit which he found increasingly difficult to shoulder (see ⁽³⁰⁾, above). Initially, the new Managing Director assumed that the academic community had been informed about the removal of the BTG's monopoly and the University's subsequent authorisation to exploit IP arising out of Research Council-funded projects. After dealing with members of the academic staff for some months, he began to realise that the level of awareness was negligible, particularly among new Research Assistants/Research Fellows.

(49) In 1989 this group, which had no formal status and no formal remit, consisted of the Registrar, the Senior Assistant Registrar, the administrative officer for the Faculty of Information Technology and one or two others.

(50) The letter stated:

" If you have cashable IP hug it to your chest; don't publish it, broadcast it, even talk about it until the University has had a chance to value it. Perhaps it would be as well not to mention it to your students. Gone are the days when a lecturer's task was to teach by sharing knowledge. Even students can't be trusted not to turn it to their material advantage ..."

(51) "Patenting: The Opportunities and the Pitfalls", British Technology Group, 1989.

(52) He felt that even if there was no formal obligation to offer promising IP to the BTG, there was *"immense pressure to get into bed with them"*. If the university acceded to this pressure, there was inevitably a limit to the university being able to use its discoveries for its own ends.

(53) This enabled him to know where he might get valuable information (eg. Frost & Sullivan reports) without incurring the usual costs.

(54) In the middle of interviewing the Senior Assistant Registrar, a postgraduate student came to discuss a discovery which he had helped to make; the Senior Assistant Registrar did, indeed, immediately suggest contacting the BTG.

(55) Ironically, an overseas postgraduate student subsequently notified the administration of his interest in patenting the same discovery.

(56) KSIP's third Managing Director was able to use the portfolio of patents acquired by the first Managing Director to secure a number of research contracts, research studentships *etc.* He was concerned that the Exploitation Scrutiny Group might apply only financial criteria in their evaluation after the first three years. He was also concerned that their evaluation might be linked to the way in which the information requested was presented in the annual returns. He had already pressed the administration to consider face to face dialogue with the Exploitation Scrutiny Group on this subject.

(57) KSIP felt that because of the financial situation within universities, such opportunities have become restricted. If an academic was going to an international conference, it was KSIP's aim to do everything to enable him to present a paper at that conference, particularly as the publicity could engender new contacts which might lead, in turn, to development funding.

(58) The Financial Secretary proposed that an Industrial & Commercial Policy Board (ICPB) should be appointed, to replace the Industry, Research & Development Committee. This had been set up in 1986/87 but had not met once during the previous two years. He proposed that membership of the ICPB should include one particular lay member of Council as Chairman, the Vice-Chancellor, two lay members appointed by Council, the Deans of the Faculties (or their nominees) and the Registrar. Its remit should include *"review[ing] policy and practice with regard to IPR and patents"* - *ie.* providing a policy for the Senior Assistant Registrar to put into practice on a day-to-day basis.

These proposals were accepted by Council. By April 1989, the ICPB had been established and conducted its first meeting. However, it neither invited the Senior Assistant Registrar to attend, nor did it make contact with him afterwards. He is, in any case, sceptical about the ability of a committee such as this to reach policy decisions:

"When you are confronted with a hard and fast problem, you don't have the time to put it to a committee ..."

(59) KSIP would have preferred to have the patent agent write the first draft, after interrogating the researchers. However, researchers generally claimed this require take extra time, over and above the time they spent writing their paper.

(60) KSIP recognised that there were sponsors, such as those in the pharmaceutical industry, where a delay of 12-18 months was desirable, in the interests of acquiring world-wide patent protection.

(61) At Kent theses may be embargoed for upto five years.

(62) In this particular case, the original licensee was the victim of a take-over bid. The company's new owners had no interest in the IPR and KSIP offered it to the inventor.

(63) KSIP has allowed some patents to lapse.

(64) In 1980 an academic member of staff of the former Institute of Management, now the Business School, decided to set up a consortium to bid against four other groups for the commercial radio franchise for East Kent. From the beginning, he informed the Vice-Chancellor, who took the view that this was good for the University's links with the local community. In 1984, after his consortium won the franchise, the University acquired a 7 per cent stake in the station at a cost of £55,000. Confronted by a 2-day deadline, this was approved by the Finance and Planning Committees by means of Chairman's action. It was treated as one of the University's portfolio of investments, but it was recognised that there was the additional advantage of supporting the local community. In 1989 the University sold its stake in Invicta Radio for over £1m after the company had been floated on the Unlisted Securities Market. The University has not publicised its return - either internally or externally.

(65) In the mid-1980s the Professor of Microbial Biochemistry developed techniques of biodegrading toxic wastes by means of microbes as a result of a research contract for an American corporation. The IP belonged to the sponsor, but when it decided to shed its interests in this area, KSIP acquired the rights to the IP. KSIP then suggested that the University should apply for a SMART award, but it was impossible to meet the deadline. This was the trigger, however, for founding a company to exploit the IP. KSIP assigned its rights in the IP to the University, which in turn assigned its rights to Viridian, a start-up company located in East Kent. The University prefers to treat the details of its "relatively small" equity stake as confidential.

(66) Information provided by the BTG suggests that only eight other universities have never had academics who entered the Academic Enterprise Competition (East Anglia, Lancaster, St. Andrews, Exeter, City, Keele, Aberdeen and Aston).

(67) For instance, in 1989 the Chemical Laboratory established the Chemical Analysis Centre which offers a microanalytical service, exploiting techniques which can work with high accuracy on samples smaller than one milligram. The University recently agreed to underwrite from central funds the salary of a marketing manager. There have been certain problems associated with the fact that the Chemical Analysis Centre currently has non-company status. Clients often require certification of results; KSIP, as a company, was able to give this, having all the requisite liability insurance. The Chemical Analysis Centre has insufficient liability insurance to be able to offer certification in the same way.

The Computing Laboratory recently established the Kent Software Technology Centre as the commercial equivalent of the academically-oriented Software Tools Research Group.

(68) The unit in question is the Applied Statistics Research Unit (ASRU), part of the Faculty of Information Technology. It has a highly successful record of exploiting the expertise of full-time members of the academic staff, who contribute to its activities on a "cafeteria" basis, together with a number of external consultants. Owing to an increase in competition, it has recently been less successful, however. The Director has partly been motivated by concern about the way ASRU is managed. However, it is anticipated that the academic-run management committee may oppose a direct proposal for change.

(69) This was questioned by a member of the Business School who believes that many academics are quietly running consultancy companies and that some have even set up companies to try to exploit discoveries which they made in the course of their research.

(70) For instance, Kent Life Sciences was co-founded by two senior members of the Faculty of Natural Sciences, attached to the Biological Laboratory, together with two people from outside the University. Founded to exploit expertise in biological screening, the company ceased to be very active after one of the academic co-founders took a post at a university in the north of England.

Kent Electro-Optics was co-founded a Professor from the Faculty of Natural Sciences (attached to the Physics Laboratory) and a Professor from the Faculty of Information Technology (attached to the Electronics Laboratory). The company has now ceased trading, having served, in KSIP's view, a specific purpose.

(71) The academic whose discovery led to the university's first joint venture is a shareholder in the company; if the company is successful he will receive not only royalty payments but dividends and could, in due course, sell his shares for a considerable profit.

The Senior Assistant Registrar had misgivings about this:

"... the Financial Secretary and I sat down and agonised for a few minutes about whether this was excessive, too much for him. Our question was whether we should adapt the university's royalty rules in this case to give him less, on the grounds that he was already getting something via another route.

"We thought if we'd published a set of rules about the exploitation of inventions with royalty ratios in it, we ought to stick to it. The fact that he happened to be a shareholder as well was irrelevant ..."

(72) In one celebrated example dating from the early 1980s, the Professor of Microbial Biochemistry was allowed to devote a considerable part of his working week to consultancy work for three consecutive years. He was seconded to a multi-national company in return for £10,000 per year, non-index-linked, for an unspecified proportion of his time.

(73) Kent does not employ this terminology. It has "academic visits", which are short-term absences with pay, "study terms" which are equivalent to a sabbatical with pay, and "unpaid leave of absence", which is generally limited to two terms.

(74) In the 1989/90 session, a Laboratory Director chose to refuse one such request. The academic concerned decided to appeal the decision, but the University was not immediately able to identify the appropriate procedures.

(75) Source: Research Report 1985, University of Kent at Canterbury.

(76) Kent Research & Development Centre is located on the 300-acre campus, alongside the five laboratories. The existing building has 12,000 sq.ft. of laboratories and offices. It was built with at least one specific tenant in mind and does not have small, multi-purpose incubator units suitable for start-up companies. The university would now like to establish a more conventional science park.

(77) The local council has established some small business units at Whitstable, about ten miles from the campus, but there are restrictions on how they are used (*eg.* no gases may be used).

(78) These include the Kent Economic Development Board and the Economic Development Department, both run by the local County Council. There are also a dozen or so enterprise agencies in Kent which have been set up by private-sector funding; one of these, the East Kent Enterprise Agency, is located in Canterbury itself. Canterbury City Council also has an Economic Development Department.

(79) Source: Letter to the Registrar of the University of Kent from the Exploitation Scrutiny Group Secretariat (ref. F/TE/03/C16), 20 August 1990.

Case Study Narrative: Hull University

(1) Source: Table 1: Comparative Changes in % Grant, Student Numbers and Unit of Resource for UK Universities, Special Issue of "Precinct", University of Liverpool newsletter, June 1986. On the basis of the figures given in this table, the national average was an increase of 5.02 per cent in student numbers by 1989/90.

(2) In 1988/89 Hull had 5,169 student FTEs, compared to 5,652 in 1980/81.

In 1988/89 there were 4,364 undergraduate FTEs, 549 taught postgraduate FTEs and 256 research student FTEs (Source: UFC Statistics 1988/89, volume 3: Finance, USR, September 1990).

In 1980/81 there were 4,868 undergraduate FTEs, 486 taught postgraduate FTEs and 298 research student FTEs (Source: UGC Statistics 1980/81, volume 3: Finance, USR, September 1982).

(3) In 1980/81 there were 701 full-time academic/academic-related members of staff plus 8 part-timers (Source: UGC Statistics 1980/81, volume 3: Finance, USR, September 1982). 644 (92%) of these were academic staff; there is no surviving record of the proportion which was funded by the UGC. Academic-related staff accounted for 17% of Hull's full-time academic/academic-related employees (Source: UGC Statistics 1980/81, volume 3: Finance, USR, September 1982).

In 1988/89 there were 578 full-time, academic/academic-related staff members, plus 48 were part-timers. Of the 467 academic staff, 381 (82%) were were UFC-funded and 86 (18%) were funded by other sources, often on fixed-term contracts. Academic-related staff accounted for 19% of Hull's full-time academic/academic-related employees (Source: UFC Statistics 1988/89, volume 3: Finance, USR, September 1990).

In that session, Hull also had around 75 Honorary Professors, Lecturers, Fellows and Associates (Source: The University of Hull Calendar, 1988/89).

(4) According to Hull's Registrar, the University lost "considerably more than 27 per cent" of its original academic staff. The figure is difficult to establish now owing to the influx of non-UFC-funded academics in the intervening years. Most of these are on fairly short-term contracts.

(5) These are the Schools of Arts, Education, Humanities, Modern Languages, Economic & European Studies, Social & Political Sciences, Management, Law, Mathematics, Life Sciences, Engineering & Computing, Earth Resources and Chemistry. The fourteenth is the School of Adult & Continuing Education, a leftover from the late 1920s and early 1930s, when the Principal of the newly-opened University College of Hull felt his staff should have an alternative source of students in case the number of undergraduate students was too small to justify staff numbers (Source: Bamford (1978)). Much of the work of the School of Adult & Continuing Education is in the process of being absorbed by other units.

(6) Source: University of Hull Information Pack, ca. 1988 (no published date).

(7) The University College of Hull was intended to absorb Hull Technical College's Departments of Engineering and Chemistry, to enable it to act as "a reference point for the locality and its industry". However, these plans were thwarted by the first Principal, a specialist in English Literature, who felt that "... the only possible foundation of a true University institution is to be found in the faculties of Arts and Pure Science". He accepted the Department of Chemistry but rejected the Department of Engineering, together with plans for a Department of Pharmacy. (Quotes taken from Bamford, 1978).

Shortly after receiving its Charter in 1954, Hull tried to establish a number of technology-oriented Departments. However, the UGC decided that the University should concentrate on expanding its science base instead. In the era of expansion, the Department of Applied Physics, founded in 1962, was to become the cornerstone of a new Faculty of Applied Science, but this never materialised. In the mid-1960s the Departments of Biochemistry and Electrical Engineering were established, but Hull was denied a Department of Mechanical Engineering until 1980, when it established one in the guise of the Department of Engineering Design & Manufacture.

(8) Although its title suggests a research-oriented institute, in fact the Institute of Nursing studies offers Honours Degrees in Nursing Sciences and Nursing Studies.

(9) Nominally the School of Earth Sciences includes the Department of Geology, which now has a service function, since it no longer offers degree courses.

(10) In 1988/89 the academic staff in these four Schools numbered 196; of these, 137 (31%) were UGC-funded and 59 (66%) were non-UGC-funded (Source: The University of Hull Calendar, 1988/89).

(11) In 1988/89 the five science-based Schools handled 1,564 out of a total of 4,536 full-time undergraduate FTEs and 164 out of a total of 596 full-time postgraduate FTEs (Source: The Academic Registrar, University of Hull).

(12) Ratings by subject area:

Above Average: Electronic Engineering
Average: Psychology, Other Biological Sciences, Chemistry, Other Physical Sciences, Mathematics, Mechanical/Aero/Production Engineering, Geography
Below Average: Nursing, Other Studies Allied to Medicine, Biochemistry, Physics, Computer Sciences.

Source: "The Strengths and Weaknesses", Times Higher Education Supplement, 30 May, 1986.

(13) Source: "Poll of Polls", Times Higher Education Supplement, 30 May, 1986.

(14) Ratings by "unit of assessment":

4: Electrical & Electronic Engineering, Mechanical/Aero/Production Engineering
3: Nursing, Applied Biology, Applied Physics, Pure Mathematics, Computer Science, Geography
2: Psychology, Chemistry, Applied Mathematics, Statistics.

Source: "Countdown to Excellence", Times Higher Education Supplement, 1 September 1989.

(15) Source: UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986.

(16) They contributed 96 per cent of the University's income from the Research Councils and from charities, 77 per cent of its income from UK public corporations and private industry/commerce and 97 per cent of its combined income from central government, local authorities and various overseas organisations (Source: Figures derived from Form 3, Table 3 of Hull University's statistical data prepared for the UGC and the USR in relation to 1984/85).

(17) They contributed 92 per cent of the University's income from the Research Councils, 79 per cent from charities, 94 per cent of its income from UK public corporations and private industry/commerce and 93 per cent of its combined income from central government, local authorities and various overseas organisations (Source: Figures derived from Form 3, Table 3 of Hull University's statistical data prepared for the UGC and the USR in relation to 1988/89).

(18) In fact, Hull was granted its Royal Charter more rapidly than any other 20th century civic foundation; only 27 years elapsed between the University College of Hull being founded and the grant of the Charter in May 1954. However, as Bamford (1978) makes clear, many of the academic staff felt they had struggled for recognition in a way which the "instant universities" of the 1960s never had to:

"... Whether the modern universities got their Charters too easily or whether the older ones had to work too hard is a matter of opinion, but certainly the newer approach removed that sense of ultimate achievement, of standing alone and battling for existence which is part of the history of the older universities, and of Hull itself".

By the 1970s many of these academics were still at Hull, occupying senior positions.

(19) On the strength of over 20 years' research into liquid crystals, in 1971 Dr. George Gray of Hull's Chemistry Department was contracted by the MoD to participate in a collaborative project with the Royal Signals & Research Establishment (RSRE), Malvern. The objective was to identify stable liquid crystals which could be used in instrument display panels and possibly replace the cathode ray tube. The MoD had first broached the subject two years earlier. Since a contract was not immediately forthcoming, Dr. Gray approached both the SRC and the NRDC for funding. Both organisations rejected his proposal.

When the MoD contract finally materialised, Dr. Gray and a post-doctoral researcher were first in the world to identify a range of liquid crystals which were stable, colourless and handleable. Since it had been a collaborative project to which Dr. Gray contributed a considerable amount of background IP, the MoD offered Hull University the opportunity to acquire patent protection in its own name. The then Registrar pointed out that it would cost the University a considerable amount of money to obtain patent protection. He asked Dr. Gray whether he could guarantee that the University would get its money back. When Dr. Gray said he could offer no guarantees, the Registrar decided to reject the MoD's offer. The MoD then offered Dr. Gray himself the opportunity to acquire patent protection; he saw no way of raising the money needed and also turned down the offer. The MoD itself then acquired patent protection, with Dr. Gray and his post-doctoral researcher named as co-inventors. The MoD arranged for a company with whom it already had an agreement to exploit the materials and a second company to exploit potential applications. The materials came on the market in 1977.

Now a Professor, Gray is not sure he would describe the University's decision as a blunder:

"... I'm not sure they made a mistake, actually. They were very short of cash at the time and they were being asked to shoulder the responsibility of patenting these materials world-wide, which doesn't cost tuppence-halfpenny. I think it would have cost them several tens of £000s at a time when they couldn't afford it.

"Now, if I'd said - yes, you take out the patents and they'd fallen flat ... I hold fifty odd patents and until last week only two of them were paying any money ... The success rate from a patent is about one in forty. At the time I was being asked - because we'd patented very quickly - we hadn't really a cast-iron case ..."

Professor Gray also points out that the MoD has had to spend considerable sums defending its patents on liquid crystals in litigation.

(20) The Queen's Award for Technological Achievement was bestowed on the Chemistry Department in 1979 in recognition of work in research, device development and large scale commercial production of biphenyl liquid crystals.

(21) This is what Professor Gray estimates the centre has lost, based on the royalties which he has received personally. He points out, however, that the Chemistry Department has benefitted financially:

"... A considerable amount of money every year is knocked off my royalties to support the [liquid crystal research] group - and will continue to be ... I'm an academic. You have to keep that group going, maintain the size, maintain the patents.

"... It costs the MoD money to run this group and part of the costs of running the group has been taken out of the royalties, with my agreement. People who say I've made a lot of money out of it should also remember that there has been group running there now, for the past few years six or seven people, whose jobs have depended entirely on that money."

(22) Hull accepted at least part of the ownership of IP implied by the 1977 Patent Act. Researchers wishing to exploit their discoveries were asked to notify the Registrar and a verbal agreement would be reached about how any income would be split. The University's claims rested exclusively on the 1977 Act and were not reinforced through its own terms and conditions of employment.

(23) These young professors tended to come from universities with what one of them described as "a more positive attitude to exploiting expertise and inventions", eg. Warwick, or from industry.

(24) According to the CVCP, there was never any real prospect of the Treasury trying to offset significant earnings against the Exchequer grant. However, there was a widespread fear that this might happen, which occasioned the formal announcement (Source: private discussion with A. M. A. Powell, Senior Administrative Officer at the CVCP, 20 April, 1990).

(25) For instance, one of the "new breed of young professors", a biochemist who had worked for Unilever, discovered a way of making synthetic Evening Primrose Oil. The company which had originally sponsored the research during the late 1970s did not believe he would be able to perfect the process and gave up any rights in it. By 1981/82, however, financed from Departmental funds, he succeeded. The University filed a patent application and almost immediately the process was licensed to a large, existing company which had approached the University voluntarily.

(26) The fund was set up with approximately £20,000 in it. The intention was to see how long this lasted and then, in the light of experience, to determine how much should be put into the fund on an annual basis.

(27) Source: The University of Hull Research Handbook (Part 1), p29 of the 1990 draft version.

(28) There was also considerable pressure from members of the Faculty of Science & Technology to have a written policy which outlined the University's and the individual researcher's rights and responsibilities.

(29) The Sub-Committee on Patents consisted of the Registrar, the Personnel Officer, the then HoD of Engineering Design & Manufacture, the HoD of Electronic Engineering, the Professor of Microbial Biochemistry, the HoD of Applied Physics - a practising academic entrepreneur, the Professor of Chemistry - who had invented and helped exploit liquid crystals and a Professor of Social Administration, who had an interest in IP matters. The Financial Secretary was also involved to some degree, but not the AUT.

(30) Hull's usual strategy in a situation like this was to ascertain how the other Yorkshire universities were approaching the problem. In this instance, this was not formally done. However, the policy was informed by Sub-Committee members' informal knowledge of how the universities in which they were previously employed operated. These included Warwick.

(31) The post was originally conceived of as combining a general external relations function with that of industrial liaison.

(32) In 1985, funded by the European Community, Hull's Registrar made a study visit to ten provincial universities in Germany, France, Italy, Belgium, and Holland with which the University of Hull maintained "formal academic relations". The results were published in a report to the funding body, and in a subsequent journal article (see Mattison (1987)).

(33) The administration did not make a firm decision at the outset that it wished to recruit an outsider, but it felt it would be advantageous if someone from industry could be recruited, since the ILO had to act as a "hinge" between the University and industry.

(34) In the administration's view, the disciplines most likely to generate exploitable IP today are paraclinical medicine, chemistry, physics and engineering. Hull has four engineering sub-disciplines, physics and chemistry. Given the research interests of Hull's academic staff, the administration believes that researchers in these fields may be more likely to identify exploitable IP than many of their colleagues in other universities.

(35) The administration believes that, even when pursuing "pure" research objectives, Hull's academics have tended to be alert to the practical applications which emerge as a by-product of that research. For instance, Hull's most famous utilitarian discovery to date, liquid crystals, arose out of a "pure" research project.

(36) The administration recognises that this may change in time, particularly if Hull's Research Committee achieves its objectives *vis-a-vis* the University's research effort:

"... there may be 50 out of the 450 academic[s] ... who would dearly love to spend the whole of their research time ... on the colour of the plumage of birds in the Amazon jungle, or something. That might be a very interesting scientific problem but it may be for the good of the University of Hull and its future that we divert most of their research time into looking at biotechnological problems and applying this in a way which could grow companies, benefit brewers or whatever ..."

(37) Hull's Treasurer is a lay member of Council, not a salaried member of the administration.

(38) Hull has a unitary administrative structure in which the Registrar/Secretary is second only to the Vice-Chancellor. He presides over the Finance Office, the Estates Office, the Academic Registrar, the Administrative Secretary - and the ICDA Officer.

(39) Recognising that this offers a considerably lower salary than the head of ICDA had received for the work up to that point, the University gave him the freedom to enhance his income by means of outside work contracts. The ILO, however, does not see this as a cost-saving strategy which the University should pursue in the long-term. He has sent a "strongly worded" paper to the Registrar, stressing that the University must "get its act together" for the future.

(40) The income which has accrued to Hull under the "services rendered" category has risen from ca. £150,000 in 1985/86 to over £700,000 in 1988/89. The ICDA is held to be partially responsible for this increase.

(41) In the event, the post-holder was not required to take responsibility for external relations in the broader sense.

(42) The Working Party on Costing, Pricing & Income Targets for Schools was set up by the Policy & Resources Committee in the wake of the so-called Hanham Report (The Costing of Research and Projects in Universities, CVCP, 1988). Working party members included the Registrar, the Academic Registrar, the Financial Secretary, the Industrial & Commercial Development Officer, one Pro-Vice-Chancellor (Resources), the ex-Dean of the School of Chemistry and the Dean of the School of Management. The Working Party submitted its Final Report in June 1990.

(43) However, Hull has updated its General Terms of Engagement to incorporate recent legislation on pensions, retirement *etc.* It has also incorporated a statement obliging academic staff to participate in the University's staff development and appraisal scheme.

(44) Interestingly, in the most recent statement on ownership of IP a distinction is made between students sponsored by the Research Councils/the University and students who receive no sponsorship or whose sponsors waive their rights; the latter two groups now retain their rights to IP unless they require the University to help them patent and exploit their discoveries. In that case, their rights are the same as those enjoyed by members of staff (Source: Section I, paragraph 5 of the University Policy on Intellectual Property, Appendix V, Final Report, Working Party on Costing, Price & Income Targets for Schools, June 1990).

(45) Source: Seedcorn Fund Applications 1989/90 - Applications, The University of Hull Research Committee, 26 May 1989. Altogether there were 27 applications for funding totalling £41,000; nearly 60 per cent of them were submitted by scientists. The sums distributed ranged from £685 to £2,000.

In 1987/88, the Seedcorn Fund paid £2,000 to an academic in the Department of Electronic Engineering to help him develop a time domain phonetic vocoder, one potential application of his work on speech analysis and processing as applied to digital speech communications systems.

At the same time one of his colleagues also received £2,000 to allow him to develop techniques of modelling the intermodulation performance of radio equipment and the interference environment.

(46) At the time the Research Committee was chaired by the Pro-Vice-Chancellor (Resources); the other Pro-Vice-Chancellors are ex-officio members, as are the Chairmen of the Area Research Sub-Committees. The ICDA Officer sat on the Research Committee in a non-executive capacity.

(47) In this context, the term "royalties" is to be taken as shorthand for all income generated by the exploitation of IP, rather than as literally.

(48) If external sponsors meet the patenting costs, where there are up to three inventors, 75 per cent of the first £40,000 of net annual royalty income goes to the inventors and 25 per cent to the University. Where there are four or more inventors, 75 per cent of the first £80,000 goes to the inventors and 25 per cent to the University. In both cases, the net income is split 50:50 thereafter. In this case, the sliding scale operates in terms of annual income rather than absolute income.

(49) The complexity of the formula is intended to reflect the fact that the BTG returns only 50 per cent of the income to cover its supposed costs. Similarly, the MoD returns only 34 per cent of the income on the same grounds. Contracts with industry may specify quite diverse and idiosyncratic terms. Where the University itself incurs the patent costs, it appears to return only 50 per cent of the net income to the inventor(s), no matter how many there are, even though it recovers its costs first.

(50) "... *If the University does not commit itself financially but gives official support to and makes a substantial administrative input into negotiations for the commercial exploitation of an invention*", the University retains 40 per cent of the net income and returns 60 per cent to the inventors), no matter how many there are. It is not clear whether academic inventors can recoup the costs of patents which they have personally funded.

(51) Irrespective of the number of inventors, in terms of personal royalty income, it would be most advantageous for the discovery to be exploited by the BTG. If the discovery generated £15,000 for the University in one year, a single inventor would receive £11,250 from the BTG, compared to only £7,500 if the University had paid the patenting costs and licensed the discovery to a company or £9,000 if the University had not paid the patenting costs but had "*given official support*" and "*made a substantial administrative input into negotiations for commercial exploitation of an invention*"; this might, presumably, include situations where the inventor himself had founded a successful company to exploit his discovery. If there were, say, four co-inventors, from an annual

income of £15,000 they would each receive **£2,812** from the BTG, compared to only **£1,873** if the University had paid the patenting costs or **£2,250** if it had not paid the patenting costs but made a substantial administrative input.

The advantage offered by the BTG holds true at higher income levels, too. If the invention generated £100,000 for the University in any one year, the single inventor would receive **£60,000** from both the BTG and the University - provided it had not paid the patenting costs - but only **£50,000** if it had paid them. Four co-inventors would receive **£17,500** each from the BTG but only **£12,500** if the University paid the patenting costs or **£15,000** if the University's contribution to the exploitation process was limited to a substantial administrative input.

There is an additional incentive for the academic inventor to favour the BTG, particularly if it looks as though the discovery might generate a reasonable income over a number of years. At the end of five years at an income to the University of £15,000 a year, the single inventor would receive **£56,250** from the BTG, compared to only **£37,500** if the University paid the patenting costs and **£45,000** if it paid no costs but made a substantial administrative input. Similarly, four co-inventors would each receive **£14,060** from the BTG, compared to **£9,375** if the University paid the patenting costs or **£11,250** if it paid no costs but made a substantial administrative input.

NB: The academic inventor would receive exactly the same personal income from discoveries exploited by both the BTG and the MoD. However, since the MoD retains 66 per cent of the income to cover its costs, compared to the BTG's 50 per cent, a discovery exploited by the MoD would be required to generate considerably more income before it yielded the same level of return for the inventor. Income from a company which paid the patenting costs as part of the licensing deal would also be distributed on the same basis. Since the percentage of the overall income which royalties represent can vary enormously, an invention exploited by some companies might be required to generate even more income before it yielded the same return for the inventor.

(52) "Applications for Promotion & Other Salary Awards to Take Effect During the 1990/91 Session", ref. SJP/SH. 12 June 1990.

(53) Source: Appendix I, Memorandum relating to the Annual Report on Research 1989/90, ref. PSR/EA rescom/arr.

(54) Under the current funding regime, Hull splits the annual UFC allocation into two, a teaching element and a research element. These are distributed to Schools on a formula basis. Part of the research element - around 15 per cent of the total grant of each member Department - has been allocated selectively for the past three years on the basis of the Department's internal research grading*. In future, Departments' performance in relation to their income generation target will also be taken into account when determining the distribution of the discretionary element.

*This grading is done by the Research Committee and takes into account the UFC's most recent research grading, the Department's research plans and the UFC grade which it aims to get in the next research selectivity exercise.

(55) Three of these categories are those commonly used by the UFC, namely:

- (a) Research Council Grants
- (b) Other Research Grants/Contracts (eg. central/local government, industry/commerce, charities, EC etc)
- (c) Other Services Rendered (eg. short courses, hospital authorities, validation fees etc).

The fourth is fee income from overseas students, which the University accepts is a highly volatile market.

(56) From the late 1980s the administration expected overheads to be charged at a minimum of 50 per cent and made its calculations on this basis, irrespective of whether or not the 50 per cent had been achieved. Until 1990 30 per cent of the supposed overheads was retained by the centre and the remainder was channelled back to the Department which generated them. In June 1990 the Working Party on Costing, Pricing & Income Targets for Schools recommended that this should be changed to a 50:50 split between the centre and the Departments, since in practice 78 per cent of non-indirect costs were borne by the centre and only 22 per cent by the Departments.

(57) Appendix V of the Final Report of the Working Party on Costing, Price & Income Targets for Schools, June 1990 - which outlines the University's policy on IP - makes no reference to this.

(58) The "Bulletin" is published "*for the information of staff and students of the University*" and as such it is "*an informal newsletter, not an official publication*". Between January 1985 and June 1990, the "Bulletin" carried relatively few items dealing with any aspect of IP. Three articles described research grants/contracts which generated or were intended to generate specific products/processes. Four articles described commercially-oriented units/companies set up in/by the University to exploit expertise and/or equipment. A fifth article described the activities of an independent academic spin-off company. Two items dealt with the opening and the subsequent extension of the science park. Another announced Hull's 1986 participation in Techmart; the same issue publicised the DTI's contribution of £10,000 to help Hull University to help small firms in the Humberside and Grimsby area.

(59) For this reason, the ICDA Officer has made no attempt to circulate fresh copies of the University's patents policy. Copies are available in the ICDA office, should any academic express an interest.

(60) The Department of Electronic Engineering submitted an entry to the Academic Enterprise Competition in 1982. There were no entries from Hull in 1985, but in the 1988/89 competition there was an entry from the Department of Applied Biology (Source: Private communications from the BTG's London and Edinburgh offices).

(61) Source: Section II, paragraphs 1-3 of the University Policy on Intellectual Property, Appendix V, Final Report, Working Party on Costing, Price & Income Targets for Schools, June 1990.

(62) Source: The University of Hull Research Handbook (Part 1), p36 of the draft version.

(63) However, the ICDA Officer has made a presentation to administrative staff under the auspices of this scheme.

(64) At the third seminar, members of the Working Party on Costing, Price and Income Targets for Schools presented their Final Report, which deals with IP issues in Appendix V.

(65) In 1989/90 Hull did not have a dedicated research grant and contract support section. Grant proposal forms were drafted by the academics concerned and checked for financial probity by the Finance Officer. The ICDA Officer saw no great value in scrutinising them for IP at that stage, preferring to concentrate on research contracts, which he usually helped to draft. He relied on informal contacts to ascertain which grant applications were successful and which might eventually generate IP.

However, the administration was planning to restructure the ICDA in such a way that it would have a dedicated research grants and contracts officer who was also responsible for IP.

(66) "Innovation" is published twice a year by Longman Cartermill, with financial assistance from the SERC. It contains details of discoveries from Britain's universities, polytechnics, medical schools and government research laboratories. Entries are broken down by discipline, by the stage of development which has been reached and indicate whether or not they have been patented or published.

(67) Hull is served by the BTG's Manchester office, which went through a phase of changing its staff so frequently that the ICDA Officer found himself dealing with a different person on each occasion. This did not engender confidence.

In any case, the BTG's relationship with Hull's academics is not an easy one. The ICDA Officer concedes that because its predecessor, the NRDC, turned down the opportunity to exploit liquid crystals, there has been a tendency for the academic community to snigger at the BTG.

(68) For instance, during the 1980s a team of physicists from Hull discovered a way to recover a high proportion of the tin from used cans. At the time, the cost of tin was very high. They gave the BTG the chance to take charge of exploiting it, but their offer was rejected. Instead of accepting the BTG's evaluation, the physicists concerned devoted considerable efforts to perfecting the process, with a view to exploiting it more entrepreneurially. By the time they had perfected it, the world price of tin had dropped dramatically, making it uneconomical to use their process.

(69) "Reasonable" is not a term which has been explicitly defined at Hull. Delaying publication is seen by the administration as an operational issue rather than a policy issue. However, in keeping with the rules relating to embargoes on PhD theses, the University would be concerned if publication were delayed for longer than five years. In practice, the ICDA Officer tries to avoid committing academics to a course of action which will lead to delaying publication for longer than three years. This applies equally to IP which is exploited via secret know-how and IP which is in the process of being protected via a patent/a series of patents.

(70) Source: Paragraph 1, "The University's Policy on Patents", University of Hull, March 1986, ref. DJF/SS/JB.

(71) Source: Paragraph 2, "The University's Policy on Patents", University of Hull, 10 December 1986, ref. SJP/VMO.

(72) The ICDA Officer tries to locate discoveries on a conceptual matrix which indicates high versus low academic value, and high versus low commercial value. In most cases, a discovery with high commercial value has a relatively low academic value, and *vice versa*. The ICDA Officer believes that discoveries with high academic and high commercial value are rare. More commonly, discoveries are located in the middle of both values and reaching a consensus decision is not difficult.

(73) Writing a patent specification impinges not only on the academic's time, but also on secretarial time. Few government grants allow researchers to cover the cost of preparing patent specifications: certain DTI grants are the exception which make provision for this are the exception rather than the rule. If there is sufficient pressure on secretarial resources, HoDs have been known to consider using overhead income to cover the cost of having the specification typed. The ICDA Officer does not know whether any of Hull's HoDs have been prepared to use overhead income to temporarily free an academic to write the patent specification in the first place.

(74) Similarly, on the rare occasions that the University is confronted by renewal fees, the ICDA Officer only pays them if a "willing bride" has been identified. Since the University makes every attempt to transfer the responsibility for maintaining patent protection to licensees/assignees, this is fairly unusual, however.

(75) In this case, the academic concerned was very junior and relied on his HoD to negotiate with the University centrally.

(76) The company in question was registered in 1988/89 as a subsidiary of Hull Unico. Initially the University put up £1,000; this was followed in 1989/90 by a further £1,350, giving the University - via Hull Unico - a stake of around 25 per cent.

(77) By "*participation*" the administration meant that it would consider buying equity, rather than demanding it on a "*droit-de-seigneur*" basis, even though University regulations would not preclude this as an option. The administration did not have in mind a minimum or a maximum percentage - though it was mindful of the fact that the Charities Act (1960) precluded it from investing too heavily in a company. All decisions are made on an *ad hoc* basis, taking into account the merits of the proposed venture and the University's cash flow at the time.

(78) Hull's administration cited Bath as an example of a University believed to have lost in the region of £.25m as a result of incautious investment in a company with which it did not have an arm's length relationship. It is aware that if such companies are on the balance-sheet, the standard or recommended accounting procedure for universities requires that provision should be made for potential losses.

(79) The company was founded because at the time universities were not eligible to apply for certain DTI grants. Company status effectively enabled the University to apply - as part of a consortium - for assistance under the DTI's "Support for Innovation" programme. The consortium consisted of Laser Applications Ltd - an academic spin-off company founded by the HoD of the Department of Applied Physics - and two existing companies, Cambridge Interconnection Technology Ltd and Quantel Ltd, which subsequently opted out of active participation. The IP was jointly owned by all consortium members. The University - via Hull Unico - is entitled to 29 per cent of any royalties.

(80) The Treasurer of Hull University, a local industrialist, is Chairman of Hull Unico; the Financial Secretary acts as Company Secretary and the other members of the Board include the Vice-Chancellor, the Registrar and the head of the ICDA. The head of the ICDA is the only executive member of the Board; the company has no staff.

(81) Unico Marine was set up in 1985 to exploit the work of two postgraduate students who had done research for a regional water authority under the auspices of the Institute of Estuarine & Coastal Studies (IECS)*. The two students wanted to continue working in this area after graduation and felt that the University's involvement would give them greater credibility. The University contributed physical assets in the shape of vehicles, boats etc in exchange for a share of future profits.

* IECS is a cross-disciplinary unit which capitalises on the expertise of academics in two or three Departments. Most of its research is academic in character, rather than commercial and most of its funding comes from the Research Councils and the public sector, rather than from industry.

(82) In the ICDA Officer's view, there were two insuperable problems. Firstly, despite the fact that the then Vice-Chancellor, the Registrar and a senior professor who had his own spin-off company were directors of Hull Unico, not one of them had ever been to check on Unico Marine's activities. The University exercised no managerial control at all.

Secondly, a company located outside the Humberside region was, in any case, difficult to monitor. It was not a responsibility which the ICDA Officer was prepared to shoulder, since it felt the Hull campus should be its priority.

(83) See note (77) above for details.

(84) The ICDA Officer feels that the guidance which he received informally from a barrister associated with Hull Unico has stood him in good stead - though he would find it difficult to judge whether he has negotiated particularly good or particularly bad deals to date. He recognises that with experience, he will develop a better understanding of the nuances of negotiating licenses. In the meantime, if he feels he needs some support, he will involve the University's commercial solicitors. He has not thought of joining the LES.

(85) When the regulations relating to outside work were drawn up by the current Registrar in 1976, he did not envisage company start-up as an activity which academics were likely to pursue. In the intervening years, however, around a dozen academic spin-off companies have been founded, with the University's blessing. In the Registrar's view, the outside work rules were formulated in sufficiently general terms as to cover this and obviate the need for clauses relating specifically to company start-up.

(86) Hull's academics are not allowed to earn more than 25 per cent p.a. of their gross annual income from outside work. If they exceed this sum, they are required to covenant the excess to the University. Clearly, the University has to rely on members of the academic staff being honest, since it has no foolproof way of policing it. In one or two cases, academics have volunteered the information that they have exceeded the limit and covenanted the excess to the University.

(87) There is evidence to suggest that one or two academics at Hull set up "soft", R&D-based companies as early as the 1960s, though the majority date from the 1970s and 1980s. A member of the library staff set up a company during the mid-1970s to exploit his hobby - facsimile publishing.

(88) In the ICDA Officer's view, the administration was failing to enforce the outside work regulations in the case of a "soft" company exploiting the work of Departmental research group. The company was operating quite openly, to the extent of placing advertisements in the press which attributed its reputation to its academic origins.

The ICDA Officer felt that the HoD of the Department concerned was having "*mud thrown at him*" - by the academic staff of other Departments - because he appeared to tolerate the situation. In fact, although a HoD can withhold his approval if a member of staff requests permission to do outside work, only the Vice-Chancellor (in practice, the Registrar) can grant/deny the member of staff permission or take them to task for failing to seek permission.

(89) If would-be academic entrepreneurs object to the University exercising its right to participate, the Vice-Chancellor could refuse the academic permission to found a company. The ICDA Officer hopes that if the situation ever arises, the Vice-Chancellor will take a hard line: this might be the only way to prevent an academic from proceeding independently, especially if the IP was in the form of a jointly vested patent. In this situation, the ICDA Officer could refuse on the University's behalf to license the academic's company. As joint owner of the patent, the academic could equally veto any alternative licensees which the ICDA Officer proposed. This could lead to stale-mate.

(90) *ie.* the Vice-Chancellor, the Registrar, the Financial Secretary and members of the academic community.

(91) The University also sees some academic spin-off companies as doing work which might otherwise come to the University.

(92) In other words, income received in this category does not carry the added financial value of income in the other two categories, whereby research income received in year 1 is reflected in the the "DR" component of a University's block grant in year 3.

The University may also be suggesting that consultancy work carries no benefits in terms of future research selectivity exercises, either.

(93) Source: Section 4.5 of the Final Report, Working Party on Costing, Price & Income Targets for Schools, June 1990.

(94) Source: Sections 5.5 and 5.6 of the Final Report, Working Party on Costing, Price & Income Targets for Schools, June 1990.

(95) This is stated quite clearly in paragraph 6 of the University Policy on Intellectual Property, Appendix V, Final Report, Working Party on Costing, Price & Income Targets for Schools, June 1990.

(96) Hull's Calendar, Prospectus and Information Pack for 1988/89 listed some 28 institutes/centres/units/groups operating within the University. The vast majority of these had purely academic objectives, however. Only a few had commercial objectives, too. These included:

- * the Robotics Research Unit (Department of Electronic Engineering)
- * the Centre for Applied Electronics (ditto)
- * the Centre for Industrial Applied Mathematics (Department of Applied Mathematics)
- * the Institute of Estuarine & Coastal Studies (a stand-alone unit jointly run by the Departments of Geography, Law and Economics)

In some cases, Departments had two separate units which complemented each other, one concentrating on academic research, the other on providing a commercial service. For instance, Hull Analysis was the commercial counterpart of the School of Chemistry's Analytical Science Group. The commercial activities of the Psychology Department's Ergonomics Research Group were subsequently taken over by an academic spin-off company.

The Regional Electronics Centre was set up to give courses and advice on advanced manufacturing techniques as a result of a DTI initiative. As with 11 other centres throughout the UK, the DTI provided pump priming funding for the first two years, after which the Centre was expected to become self-sufficient.

(97) Deans are required to sign a document which effectively makes them completely responsible for their School's budget.

(98) Until now, academics at Hull have not been entitled to spend part of their working week on outside work; it has been more a custom and practice situation. Permission to do outside work has been - and will still be - given subject to the HoD agreeing that it should not impinge on the member of staff's primary academic commitments.

(99) Leave of absence falls into three categories:

- (a) Study leave - *ie.* sabbaticals;
- (b) Leave of absence for short periods to attend courses, conferences *etc.*;
- (c) Leave for *ad hoc* purposes.

(100) The University would be "*less enthusiastic*" about academics who requested leave of absence to set up companies exploiting their hobbies, however.

(101) In one instance, the academic entrepreneur was made redundant as a result of the entire Department being closed. In another, the academic concerned was on a short-term contract which ended.

(102) The Registrar stated that such activities were expressly proscribed in Hull's General Terms of Engagement of Academic Staff; in fact, there is no reference to this.

(103) Newlands High Technology Park was developed by English Estates in conjunction with the University, which owns the land. The first phase of the development provided 25,000 sq.ft. of space, including a few incubator units. There were nominally three units at 590 sq.ft., three at 690 sq.ft., a further three at 1,280 sq.ft. and seven at over 2,000 sq.ft. These were not fixed sizes, however: composite units upto 7,580 sq.ft. can be created, if necessary. Phase I was formally opened in 1987 but the first tenants moved in during 1985.

Phase II is now completed, offering two additional units of 5,000 sq.ft. and one of 2,500 sq.ft. In response to demand, one of the large units in Phase I has been converted into five small units varying in size from 300 sq.ft. to 400 sq.ft. There are plans for a third phase.

Rents are set by English Estates at £6 per sq.ft. for the smaller units, £4 per sq.ft. for the larger units in Phases I and II. This includes service charges. Phase III rents will be in the order of £9 per sq.ft., including services charges. Academics locating spin-off companies in incubator units on the science park currently face annual rents ranging from £1,800 to £4,140. This is very cheap compared to other parts of the country, but it is not cheap compared to other parts of Hull. The ICDA Officer feels that the relatively high rents in Newlands High Technology Park are quite acceptable, since proximity to the University enhances companies' prestige.

The minimum lease is three months on units below 5,000 sq. ft. in size. For larger units, the minimum lease is one year. Two of the 17 companies on-site in 1989/90 were founded by academics: Laser Monitoring Services Ltd and Advanced Processor Design, which was taken over by Lynx Plc in 1988.

(104) For instance, Hull City Council operated the Hull Business Centre, with units from 105 sq.ft. to 750 sq.ft. with rents at around £4 per sq.ft in 1989, inclusive of rates and service charges. It also operated factory units ranging in size from 430 sq.ft. to 970 sq.ft. at rents of £3.20 per sq.ft. inclusive of service charges but not rates. There was also office and workspace accommodation available in 1989 for as little as £5.70 per sq.ft. inclusive of service charges. (I am grateful to Mr N W Smales of Hull City Economic Development and Property Department for this information).

(105) For instance, the Acorn Business Park charged around £10 per sq.ft. exclusive of service charges or rates *etc.*

(106) "The Costing of Research and Projects in Universities", CVCP, 1988.

(107) Initially the DTI made £180,000 available over three years, starting in October 1986. Source: "The Bulletin", 5 November 1986.

(108) Source: Letter to the Registrar of Hull University from the Exploitation Scrutiny Group Secretariat (ref. F/TE/03/C14), 17 August, 1990.

(109) All but one of these respondents was interviewed - using the pilot questionnaire - in September 1989, before the new scheme was introduced. One respondent ^(F) was interviewed in June 1990, however, using the modified questionnaire; the interview with a second respondent ^(A) was broken off part of the way through in September 1989 owing to pressure of time; the interview was completed in June 1990, using the modified questionnaire for Q69 onwards. By this time details of the new scheme had been given limited circulation.

Case Study Narrative: Liverpool University

(1) Source: Table 1: Comparative Changes in % Grant, Student Numbers and Unit of Resource for UK Universities, Special Issue of "Precinct", University of Liverpool newsletter, June 1986. On the basis of the figures given in this table, the national average was an increase of 5.02 per cent in student numbers by 1989/90.

(2) In 1988/89 Liverpool had 8,458 student FTEs, compared to 8,169 in 1980/81.

In 1988/89 there were 6,871 undergraduate FTEs, 725 taught postgraduate FTEs and 862 research student FTEs (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

In 1980/81, in contrast, there were 6,783 undergraduate FTEs, 662 taught postgraduate FTEs and 724 research student FTEs (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(3) In 1988/89 Liverpool had 1,489 full-time academic/academic-related staff, plus 75 part-timers.

(3) In 1988/89 Liverpool had 1,489 full-time academic/academic-related staff, plus 75 part-timers. This compared with 1,368 full-timers plus 6 part-timers in 1980/81.

In 1988/89 855 (70%) of the full-time academic staff were funded by the UFC; the remaining 367 (30%) were funded from other sources; many of these were on fixed-term contracts. Academic-related staff accounted for 18% of the total (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

There is no surviving record of the proportion of full-time academic staff who were UGC-funded in 1980/81. However, academic-related staff accounted for 16% of the total (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(4) Following a UGC subject review, the Departments of Greek, Latin and Classical Archaeology were merged into a single Department of Classics & Archaeology; a sizeable proportion of the academic staff was dispersed to other universities. Anticipating the recommendations of another UGC subject review, the University merged the Departments of Geology, Geophysics and Oceanography into a single Department of Earth Sciences, retaining the staff concerned. This was followed in 1988/89 by the merger of the six life sciences Departments into a single School of Ecology, Evolution and Physiology, for similar reasons. At the same time, the Departments of Organic Chemistry and Inorganic, Physical & Industrial Chemistry were merged to form a single Department of Chemistry.

(5) In 1988/89 the Faculty of Medicine grouped together the Departments of Anaesthesia, Child Health, Community Health, Dermatology, General Practice, Genito-Urinary Medicine, Geriatric Medicine, Haematology, Human Anatomy & Cell Biology, Immunology, International Community Health, Medical Entomology, Medical Microbiology, Medicine, Neurological Science, Nursing, Obstetrics & Gynaecology, Ophthalmology, Orthopaedic & Accident Surgery, Otorhinolaryngology, Parasitology, Pathology, Pharmacology & Therapeutics, Physiology, Psychiatry, Radiation Oncology, Radio Diagnosis, Surgery, Tropical Medicine & Infectious Diseases and Tropical Paediatrics & International Child Health.

The Dental School also came under the wing of the Faculty of Medicine, grouping together the Departments of Dental Sciences, Dental Surgery and Operative Dentistry.

The Faculty of Veterinary Science comprised the Departments of Animal Husbandry, Veterinary Clinical Science, Veterinary Parasitology, Veterinary Pathology and Veterinary Preclinical Sciences.

(6) Source: Senior Assistant Registrar, Planning & Development Division, University of Liverpool.

(7) Source: "Trouble in the Ranks", Times Higher Education Supplement, 30 May, 1986.

(8) Ratings by subject area in 1986:

<u>Outstanding:</u>	Pure Mathematics
<u>Above Average:</u>	Anatomy & Physiology, Pharmacology, Genetics, Chemistry, Physics, Geological Sciences, Materials Science & Engineering, Production Engineering
<u>Average:</u>	Clinical Dentistry, Clinical Medicine, Other Biological Sciences, Computer Science, Civil Engineering, Architecture, Farm Animal Medicine, Veterinary Anatomy, Veterinary Physiology, Veterinary Pathology

Below Average: Nursing, Other Studies Allied to Medicine, Biochemistry, Veterinary Science, Electrical & Electronic Engineering, Mechanical Engineering, Other Technologies

Source: "The Strengths and Weaknesses", Times Higher Education Supplement, 30 May, 1986.

(9) Source: "Poll of Polls", Times Higher Education Supplement, 30 May 1986.

(10) Ratings by "unit of assessment" in 1989:

<u>5</u> :	Physics, Other Physical Sciences, Pharmacology
<u>4</u> :	Anatomy & Physiology, Chemistry, Mathematics, Metallurgy & Minerals
<u>3</u> :	Clinical Medicine, Other Biological Sciences, Computer Science, Electrical & Electronic Engineering, Mechanical/Aero/Production Engineering
<u>2</u> :	Clinical Dentistry, Pharmacy, Biochemistry, Veterinary Science
<u>1</u> :	Civil Engineering

Source: "Countdown to Excellence", Times Higher Education Supplement, 1 September 1989.

NB This breaks down the ratings by cost centre; in some universities, "units of assessment" do not fit neatly into cost centres. The results given may therefore be incomplete.

(11) Source: UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986.

(12) These four Faculties contributed **95** per cent of the University's income from the Research Councils, **99** per cent from charities, **100** per cent of its income from UK public corporations and private industry/commerce and **85** per cent of its combined income from central government, local authorities and various overseas organisations (These percentages are derived from Form 3, Table 3 of the information supplied to the UGC by the University of Liverpool for 1984/85).

(13) They contributed **95** per cent of the University's income from the Research Councils, **86** per cent from charities, **98** per cent of its income from UK public corporations and private industry/commerce and **91** per cent of its combined income from central government, local authorities plus various overseas organisations (These percentages are derived from Form 3, Table 3 of the information supplied to the UFC by the University of Liverpool for 1988/89).

(14) Liverpool's former Acting Vice-Chancellor (1984-85) emphasised that the University grew out of a city with a commercial rather than an industrial tradition. As a port, the city's interests were in insurance, finance, law, the cotton exchange - and ship-building. Accordingly, the University established one of the first engineering Faculties in England but it was not regarded by the rest of the academic community as a proper discipline. The prevailing interest in "pure" disciplines was reinforced by the appointment of James Mountford, a Latinist, as the Vice-Chancellor who oversaw the immediate post-war expansion of the University.

(15) The officer in question had joined the administration in the mid-1940s, became Registrar in the late 1950s and stayed until he retired in 1984. He was an administrator, rather than an innovator. He saw his remit as the implementation of policy rather than the creation of new policy initiatives.

From the beginning of the 1980s, however, this ethos began to be challenged from within the administration - by two holders of the post of Academic Secretary in turn. The current Academic Secretary also claims to be keen for the University's IP to be effectively exploited.

(16) The Outside Work rules provided a framework for recouping costs: academics were asked to pass 15 per cent of the resulting income to the University until all the costs had been covered.

(17) The new Assistant Registrar had a PhD in chemistry and had spent two years as a University-based post-doctoral researcher before becoming a research chemist in the company which subsequently became Amersham International. He joined Liverpool's administration eight years later.

(18) At Liverpool University the Registrar has overall responsibility for the administration, below the Vice-Chancellor. Below the Registrar at the time were five officers of equal status: the Director of Finance, the Director of Building Services, the Director of Estates, the Administrative Secretary and the Academic Secretary. The new Assistant Registrar reported to the Academic Secretary partly because of his personal interest and partly because, prior to the publication of the Jarratt Report in 1985, Council did not take an interest in industrial liaison, despite the revenue-raising potential of IP in both its "hard" and "soft" forms.

(19) The Wolfson Foundation provided two thirds of the new Assistant Registrar's salary for the first 5 years (1980-84); the University made up the shortfall.

(20) In the late 1960s the Professor of Applied Mathematics had expressed concern that Liverpool postgraduates left without any knowledge of industry. To remedy this, ICI seconded an employee to act as Director of Industrial Studies - to give open lectures to postgraduates in any discipline. Shell and a number of other companies provided additional funding. The lectures were not well attended, so ICI's third secondee converted them into a undergraduate course which became a popular option for students in both the Faculty of Science and the Faculty of Engineering. This subsequently became an orthodox academic Department, the Department of Industrial Studies - located in the Faculty of Engineering, with the University funding an HoD of Professorial status. The first such HoD became a co-founder of UDIL.

(21) The informal "Monday morning meeting", a weekly get-together of the Vice-Chancellor, the Pro-Vice-Chancellors and the Registrar evolved into the formally-constituted Senior Management Team in the wake of the 1985 Jarratt Report.

(22) The President of Council, a stockbroker, had been Treasurer of the Liverpool School of Tropical Medicine; in that capacity, he had raised over £1.5m by appeal. He felt that the University would raise more money by appeal than by setting up a company. The University took his advice and organised an appeal; it also set up a company.

(23) When the then Vice-Chancellor died unexpectedly in 1984, the HoD of the Department of Mechanical Engineering, who was also ex-Dean of the Faculty of Engineering and the most senior former Pro-Vice-Chancellor, was invited to become Vice-Chancellor in his place. Since he was nearly 60 years old, he had no desire to become the substantive Vice-Chancellor. Instead, he became Acting Vice-Chancellor for 16 months until a suitable appointee could be located.

(24) Liverpool is an unusually well-endowed University. At the time, this represented a negligible proportion of the £44m in liquid assets which the University had prior to the stockmarket crash of October 1987 (Source: Acting Vice-Chancellor (1984/85)).

(25) This average conceals a spread which ranged from about two opportunities in one year compared to ten in another.

(26) During 1984 the new Acting Vice-Chancellor had carried out his own analysis of the management of Liverpool University and made recommendations which in part, at least, anticipated the recommendations of the Jarratt Report.

(27) There was originally a fourth officer, an Industrial Development Officer, jointly appointed by Liverpool University and Liverpool Polytechnic. Funded by the DES, his remit was to promote technology transfer, primarily by liaising with the field officers of the Northwest's Regional Technology Centre, NIMTECH. He resigned in April 1989 following a serious road accident. His duties at Liverpool University were taken over by the Director of ORSIL.

- (28) The Assistant Registrar was promoted in 1987.
- (29) The Director, formerly an academic in the Department of Electrical Engineering & Electronics, is a grade 5 appointment. In 1990 it was upgraded to grade 6, equivalent to a Professorial salary.
- (30) In 1989/90 ORSIL's primary objective was to increase the level of external research funding.
- (31) It is interesting, in this context, to note that while the University's new mission statement recognises the importance of "*forming effective partnerships with industrial, commercial, professional and governmental institutions*" and with local and regional community groups, there is no mention of the transfer of technology or the exploitation of IP (Source: University of Liverpool Mission Statement, A Declaration of the Objectives and Aims of the University, adopted by Council and presented to Court in November, 1988).
- (32) There are two exceptions: (i) research which has been supported by outside funds, where the results may belong either to the sponsor or to the University, depending on the terms of the contract and (ii) research which is done by academics in accordance with the Outside Work rules.
- (33) Source: section C21, paragraph 6 of the Handbook for Academic & Academic-Related Staff, January 1990.
- (34) Source: Section C22 of the Handbook for Academic & Academic-Related Staff, January 1990.
- (35) The first four of these criteria are derived from the 1977 Patent Act and relate to whether or not researchers could be expected to invent something in the course of carrying out their normal/specially assigned duties. The next five concern the relative contributions made by various researchers and the University itself. The last, also derived from the 1977 Act, takes into account the financial return and other benefits which the invention yields.
- (36) Liverpool has not laid down a minimum percentage for overhead recovery. From July 1989 the University centrally started taking 10 per cent of the total £ awarded in any contract/grant. The remaining 90 per cent went initially to the grant-holder to cover direct costs. Any excess was kept by the Department.
- (37) This met with the disapproval of some members of staff in the humanities.
- (38) Source: Section B50, Handbook for Academic & Academic-Related Staff, University of Liverpool, January 1990.
- (39) Source: Section B51, Handbook for Academic & Academic-Related Staff, University of Liverpool, January 1990.
- (40) Source: Section B52, Handbook for Academic & Academic-Related Staff, University of Liverpool, January 1990.
- (41) In one instance, which dates from after the 1977 Patent Act, a former member of ORSIL's staff discovered through a chance conversation with a company that it was exploiting IP which had been transferred in a private arrangement by a member of the academic staff. When contacted, the academic concerned claimed he felt he had acted legitimately because the discovery was made jointly with a student; only students in receipt of Research Council grants were obliged to assign their IP to the University. Despite the fact that the academic concerned had breached his terms and conditions of employment, in this instance, ORSIL took no action because the company concerned was about to go out of business and the patent had limited value.

It is known that there are other instances of academics clandestinely running companies exploiting IP they have generated.

(42) Source: Extract from a Paper Prepared for the Planning & Resources Committee, July 1987, Annex to "Research Support & Industrial Liaison", a Report on the First Year of Operation, University of Liverpool, 1989.

(43) According to the Senior Assistant Registrar, who has been involved with the University's IP since the beginning of the 1980s:

"When I started, the ethos was very much more academic than [at] many others, or certainly a number of others. That has changed, but I think everybody else has changed as well. Perhaps we are still more academic than ... certainly places like Salford or Bradford, the former CATs. That's a matter of history".

(44) In 1989/90 ORSIL believed that if universities failed to capitalise properly on their IP, if opportunities were missed, those rights could well revert to the BTG.

(45) "Patenting: The Opportunities and the Pitfalls", British Technology Group, London, 1989.

(46) There is pressure on new members of the academic staff to attend the induction programme. However, since this takes place in June each year, it is possible for a new academic to be in post for nearly a year before the opportunity presents itself. Moreover, it is considered acceptable if new members of staff attend within three years of being appointed.

Whatever the staff development programme features, it tends to attract no more than 10-20 per cent of the academic community at any one time.

(47) Since June 1987 the University newsletter has carried a column entitled "Research Matters". However, it has appeared very sporadically and has concentrated on research grants/contracts won, rather than the results of research, exploitable or otherwise.

(48) ORSIL's Director believes that it may be more productive to present these seminars himself, since he is still perceived as an academic, not an administrator or an outsider. He believes that the BTG is now far too aggressive, that the DTI is hard for academics to identify with and that the Patent Office tends to give rather dry presentations.

(49) Two of Liverpool's discoveries are currently on offer to the BTG. Though promising, disclosure prior to protecting them means that they are in the public domain; it remains to be seen what can be salvaged. This happens repeatedly:

"We can take a very recent example of someone who came to me with a good idea. We went through it and [he] confirmed that [he] hadn't published anything at all, though [he] had submitted a paper to an international journal.

"We went right through it and just before he left he made the comment - It was well received when I gave my talk"! What talk? It was a talk to a professional body. [He] hadn't realised that that put the work into the public domain".

(50) The term of appointment varies from one Department to the next. Five years is becoming the norm, however. There is no limit to the number of times than an individual can be reappointed, but in practice few academics want to shoulder the burden for too long.

(51) According to ORSIL, no HoDs in the Faculty of Engineering would adopt a negative attitude towards the researchers wishing to see their discoveries exploited. This is not the case in every science-based Faculty, however:

"I can certainly think of at least one person in the [Faculty of Medicine] who would feel that exploitation is not the sort of thing a University ought to be doing".

(52) In-house research committees consist of the HoD or a Professor from each of the constituent Departments.

(53) Together with the Administrative Services Committee, the Buildings & Estates Committee and the Staff Development Committee, the Academic Committee is one of the major committees of the University. It makes recommendations to the Planning & Resources Committee on academic policy and is responsible for developing and implementing the University's Academic Plan.

As ORSIL saw it in 1989/90, the Academic Committee was concentrating on counteracting a "them and us" situation which developed in some quarters following changes introduced before and after the publication of the Jarratt Report.

(54) Source: Extract from a Paper Prepared for the Planning & Resources Committee, July 1987, Annex to "Research Support & Industrial Liaison", a Report on the First Year of Operation, University of Liverpool, 1989.

(55) At that time, 3i Research Exploitation Ltd charged a daily rate for conducting a comprehensive technical audit. Given the size of Liverpool University, ORSIL estimated the bill would be £5,000-£10,000.

(56) This became evident in 1988 following ORSIL's request for information relating to discoveries arising out of Research Council-funded projects. It became obvious from the replies that academics were not notifying ORSIL of all that was going on. Personal contact with a "hit list" of researchers was far more productive:

"It was amazing (original emphasis) what crept out of the woodwork ... We found all manner of things that were going on, quite legitimately, which we didn't know about. For example, a big unit originally funded by Wolfson is actually making a product - or rather, the product was being made [as a result of] work done here. The University was receiving money for it which was going back into the unit, and we didn't know anything about it".

(57) For instance, the Director of Research at Pilkington was formerly a Professor at Liverpool University.

(58) Well over half the IP identified at Liverpool arises out of research sponsored by industry/commerce or out of collaborative programmes which commit the University to offering the IP to the industrial partner(s).

(59) Apart from organisations like the BTG, the Research Corporation and DTE, the IP could also be assigned to local technology transfer agencies like the Merseyside Innovation Centre. This is a private company limited by guarantee which was established in 1981 jointly by Liverpool University, the former Merseyside County Council and Liverpool Polytechnic, with the aim of promoting the economic regeneration of Merseyside - eg. via technology transfer.

(60) In one recent case, a researcher flagged a discovery which ORSIL felt was of dubious value. The researcher himself proposed that he should register the discovery himself, via the "do-it-yourself route" and ORSIL paid the fee. The discovery was picked up within a short time by a company and is now in the process of being exploited.

(61) In 1989/90 ORSIL did not have a dedicated annual patent budget. It spent what it regarded as necessary. Patenting costs were borne by central funds under a budget heading covering legal costs and were monitored very closely by the Planning & Resources Committee. Until recently, a significant proportion the annual expenditure had arisen from Liverpool's portfolio of patents relating to optical sensors, a high-risk/high-reward area where the University was obliged to bear the cost of patent protection itself for a number of years. Much of this burden was subsequently borne by an industrial partner.

(62) ORSIL never takes a unilateral decision as to whether or not to continue paying renewal fees. The decision is always taken with the agreement of the researcher who generated the IP.

(63) Section C23 of the 1990 staff handbook indicates that unless the University does not wish to participate in the development or exploitation of an invention, "*the University shall undertake responsibility for its further development and exploitation and the member of staff shall, as directed by the University, do any one or more of the following*". The first four clauses require academics to keep their discovery secret until it has been patented, to apply or join with the University in applying for patent protection or to offer the discovery to the BTG.

(64) Prior to 1977/78, the University effectively relinquished any rights it might have had in determining how IP generated by members of staff should be "protected" or exploited, though it retained a limited financial interest.

(65) This might include, for example, a joint venture between the University and the researcher(s), between the University and industry, between the University and the public sector, or joint ventures encompassing several or all of these parties.

(66) Due to inexperience, the University underestimated the lead time - and, more importantly, the amount of capital - which ULTRA would require to successfully exploit the 15 or so projects originally identified. Since the University was unwilling to give up sole ownership of the company or to invest more of its own money, ULTRA was forced to concentrate on the two or three most promising projects.

(67) ULTRA Physics was originally intended to function as a subsidiary of ULTRA, marketing products - chiefly instrumentation. In practice, it became increasingly R&D-oriented. By mutual agreement, the company was subsequently spun-off as an independent operation. Since then, Ultra Physics has turned its attention to marketing instrumentation once more.

(68) The other was Ultra Digital Systems.

(69) ULTRA had two main product ranges: in electronics and biotechnology.

(70) ULTRA's first Managing Director was asked to step down after it became clear that the scale on which he wished to operate demanded far more capital than the University wished to commit and uncertainty over when the University might see a return on its investment.

(71) To date, these opportunities have exploited expertise rather than "hard" IP. In 1985, for instance, following new legislation which allowed universities to generate their own electricity, the Director of Engineering Services proposed that Liverpool should instal a gas turbine to generate electricity and use the exhaust heat to heat the buildings. Having gained the support of the (lay) Treasurer and the Acting Vice-Chancellor, Liverpool formed a wholly-owned company, University of Liverpool Energy Company (ULEC) to do this. A capital outlay of £2m *in toto* - financed partly by bank loans - generated savings of £0.5m within the first year of operation.

Recently, Liverpool founded a second company, ULEC Services Ltd, to sell its expertise to other universities. The two members of staff who were the prime movers in establishing ULEC were seconded to the new company on a full-time basis.

(72) Section C23 of the staff handbook states that unless the University does not wish to participate in the development or exploitation of an invention, "*the University shall undertake responsibility for its further development and exploitation and the member of staff shall, as directed by the University, do any one or more of the following*". The following clauses outline academics' obligation to collaborate with the University in one of three ways listed - assigning/licensing to industry, assigning/ licensing to the BTG or the Merseyside Innovation Centre. It does not mention independent academic spin-off companies.

(73) Liverpool has had a fairly average number of entries to the Academic Enterprise Competition, with two entries in 1982, at least one in 1985 and two in 1988 (Source: private communication from the British Technology Group, 1989).

(74) In 1985 Liverpool won third prize, which provided part of the start-up capital for Epicem Ltd. The company was set up to exploit strategically important materials developed originally for the MoD by Liverpool's Chemistry Department. The MoD suggested that the chemicals in question should be produced in commercial quantities for UK customers, since the only other source in the world was Japan. The entry to the Academic Enterprise Competition was fronted by the Research Assistant concerned, who subsequently became Technical Director of the company, which is a joint venture with another company.

(75) ORSIL reported it was in the process of constructing a database of companies with which the University has a connection.

(76) ORSIL believed that, if necessary, it would have access to local databases run by the Merseyside Innovation Centre and/or by NIMTECH, the North West's Regional Technology Centre.

(77) Most of the Centres and Institutes listed in the Annual Report have purely academic objectives. A few supply commercial services, too - *eg.* The Magnetic Resonance Research Centre, the Radiometric, Mineral Magnetic & Palaeoenvironmental Research Centre, the Centre for Mathematical Software Research, the Electron Microscopy Unit. However, the former Environmental Advisory Unit had purely commercial objectives, while the newly-formed Industrial Ecology Research Centre does contract research for industry/commerce.

(78) The Professor of Botany, an expert in the "greening" of waste land, found he could not accept all the personal consultancy he was offered. He set up the Environmental Advisory Unit as a quasi-commercial operation within his Department, employing researchers on short-term contracts as required.

(79) In 1988 the former Environmental Advisory Unit was spun-off as a private company, the Economic Advisory Unit (Liverpool University) Ltd (Source: "Precinct", University of Liverpool newsletter, 14 November, 1988).

(80) In the late 1980s the Department of Obstetrics & Gynaecology set up an *in-vitro* fertilisation (IVF) service, capitalising on the expertise of a Lecturer in the Department. The IVF service used new techniques which enable women to be treated on an outpatient basis; there was no need to undergo an operation and a general anaesthetic. Women were charged around £750 for a treatment cycle, less than half the cost of a typical private clinic in London. The University contributed £60,000 to underwrite its initial running costs (Source: "Precinct", University of Liverpool newsletter, 1 February, 1989).

(81) The Outside Work Committee consists of the Vice-Chancellor, the President of Council (as Chairman), the Vice-President of Council, the Pro-Chancellor elected by Court, the three Pro-Vice-Chancellors, the Treasurer and the Deputy Treasurer. Staff may apply to do Outside Work at any time, but the Committee meets on fixed dates twice a term.

(82) For instance, ORSIL was aware of one who had a market gardening business, and two or three who were involved in antiques businesses.

(83) The Acting Vice-Chancellor discovered that one academic whose performance was causing concern was co-running a pub with his wife.

(84) This is a norm rather than an entitlement and in practice the time allowed varies from one Department to another, depending on the exigencies of the situation at any given time.

(85) Source: Section B77, Handbook for Academic & Academic-Related Staff, University of Liverpool, January 1990.

(86) The Leave of Absence Committee consists of the Vice-Chancellor (as Chairman), the President of Council, the Vice-President of Council, the Pro-Chancellor elected by Court, the three Pro-Vice-Chancellors, the Treasurer and the Deputy Treasurer - *ie.* it has the same membership as the Outside Work Committee. Staff may apply for Leave of Absence at any time, but the Committee meets on fixed dates twice a term. In the event of an emergency, the Director of Staffing Services can take action which would be retrospectively endorsed.

(87) Liverpool's new telephone system, installed in October 1988, permits itemised billing of directly dialled calls from University extensions.

(88) The MIC is a member of the UKSPA but it differs from many science parks in that it is not intended to generate a return on University land; it is not built on University land. Nor is it specifically intended to transfer technology coming out of the University. Its prime purpose is "to create jobs and wealth for Merseyside. Not for the University, not for the Polytechnic, but for Merseyside" by whatever means is appropriate. Its remit is regional economic development and it works alongside a number of agencies whose remit is restricted to economic regeneration in the City of Liverpool or in specific districts.

(89) The then Director of the MIC was known as "*the godfather of small industry*" in the area. The MIC gave a variety of support to SMEs in the county of Merseyside, ranging from assessment of inventions, technical problem solving and prototype fabrication to company start-up, marketing advice, financial advice, quality assurance and computing services. Initial consultations were usually free; in-depth advice tailored to an individual company's requirements attracted a fee, however it was part of the MIC's remit to find grant aid, where possible, to cover the cost.

(90) In its current building, the MIC has 11,000 sq.ft. of incubator space, ranging from units at 200 sq.ft. to units at 2,000 sq.ft. The largest single room is 700 sq.ft. There is a uniform rental of £7.50 per sq.ft. which includes a service charge of £2.50 per sq.ft. The service charge covers heating, lighting, cleaning of common areas and security. All tenants also benefit from a shared, full-time receptionist and an office which handles incoming and outgoing post. Other facilities - *eg.* the typing pool, payroll etc can be bought by the hour or by contract, as required. The MIC provides informal business advice at no cost. Situations which require a more formal approach must be paid for, but the MIC's Finance Advisory Service generally obtains local, national or European grant aid on behalf of small businesses to offset at least part of the cost.

Lease terms are extremely flexible: the minimum lease is for a half-day. Leases do not involve a maximum term, either. In addition to its own service activities, the MIC currently houses 14 companies, of which two are academic spin-off companies. There is a short waiting list, but the MIC plans to expand in the near future.

(91) One is Wavertree Technology Park, established by the County Council, English Estates and Plessey in the mid-1980s. English Estates managed the land and the buildings, Plessey provided management advice to tenant companies. There are a few small units around 500 sq.ft. in size, but most of the units are 1000 sq.ft. in size or bigger.

The other is the Brunswick Business Park (no comparable details available).

Both are located within 2-3 miles of the University.

(92) The Academic Committee consists of one Pro-Vice-Chancellor (as Chairman), the Vice-Chancellor and nine of the elected members of Senate - a maximum of two from any one Faculty. (If Deans are elected to the Academic Committee, they must relinquish their Deanship)

(93) The University has a good, informal link with 3i, which has a representative on the Commercial Opportunities Group.

Case Study Narrative: Strathclyde University

(1) Source: Table 1: Comparative Changes in % Grant, Student Numbers and Unit of Resource for UK Universities, Special Issue of "Precinct", University of Liverpool newsletter, June 1986. On the basis of the figures given in this table, the national average was an increase of 5.02 per cent in student numbers by 1989/90.

(2) In 1988/89 Strathclyde had 8,149 student FTEs, compared to 6,911 in 1980/81.

In 1988/89 there were 6,368 undergraduate FTEs, 1,104 taught postgraduate FTEs and 677 research student FTEs (Source: UFC Statistics 1988/89, volume 3: Finance, USR, September 1990).

In 1980/81 there were 5,611 undergraduate FTEs, 791 taught postgraduates FTEs and 509 research student FTEs (Source: UGC Statistics 1980/81, volume 3: Finance, USR, September 1982..

(3) In 1988/89 Strathclyde had 1,185 academic/academic related staff FTEs plus 61 part-timers, compared to 1,055 plus 22 part-timers in 1980/81.

In 1989/90 Strathclyde 675 (68%) of the full-time academic staff were funded by the UFC; the remaining 322 (32%) were funded from other sources; many of these were on fixed-term contracts. Academic-related staff accounted for 16% of the total (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

There is no surviving record of the proportion of full-time academic staff who were UGC-funded in 1980/81. However, academic-related staff accounted for 15% of the total (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(4) The Department of Statistics was created at the end of the 1988/89 session as a result of staff from the Department of Mathematics' statistics division joining forces with the Population Dynamics Group from the Department of Physics & Applied Physics (Source: University of Strathclyde Newsletter: "Prism" no, 41, August 1990).

(5) Source: the Registry, Strathclyde University.

(6) In 1989/90 3,745 undergraduates and 474 research students were registered in the two science Faculties (Source: the Registry, Strathclyde University).

(7) Ratings by subject area:

<u>Above Average:</u>	Pharmacy, Chemistry, Physical Oceanography, Electrical & Electronic Engineering, Bio-Engineering
<u>Average:</u>	Pharmacology, Other Physical Sciences, Computer Sciences, Mechanical/Aero/Production Engineering, Metallurgy & Materials, Other Technologies
<u>Below Average:</u>	Biochemistry, Other Biological Sciences, Physics, Mathematics, Chemical Engineering, Civil Engineering, Mineral Engineering.

Source: "Poll of Polls", Times Higher Education Supplement, 30 May, 1986.

(8) Source: "Poll of Polls", Times Higher Education Supplement, 30 May, 1986.

(9) Ratings by "unit of assessment":

- 5: Medical Engineering
- 4: Pharmacology, Statistics, Electrical & Electronic Engineering, Marine Technology
- 3: Pharmacy, Biological Sciences, Chemistry, Physics, Applied Mathematics, Pure Mathematics, Computer Science, Mechanical/Aero/Production Engineering and Architecture
- 2: Food Science, Microbiology, Energy Studies, Design Technology, Metallurgy & Metals
- 1: General Engineering, Chemical Engineering, Civil Engineering, Mineral Engineering.

Source: Registry, University of Strathclyde.

(10) Source: UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986.

(11) They contributed **92** per cent of the university's income from the Research Councils, **51** per cent from charities, **85** per cent of its income from UK public corporations and private industry/commerce and **73** per cent of its combined income from central government, local authorities and various overseas organisations (Figures derived from: UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986).

(12) These Departments contributed **90** per cent of the university's income from the Research Councils, **89** per cent from charities, **72** per cent of its income from UK public corporations and private industry/commerce and **79** per cent of its combined income from central government, local authorities and various overseas organisations (Figures derived from: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

(13) Source: University of Strathclyde Newsletter: "Prism" no. 53, June 1990.

(14) I am grateful to Mr D Stewart, formerly of Strathclyde University, for providing this information.

(15) One had been Chief Metallurgist at BP; the other had worked for both John Brown Engineering and Babcock & Wilcox as an engineer.

(16) The other HEIs included Paisley College of Technology, Dundee College of Technology, Robert Gordons Institute (Aberdeen), and what subsequently became Heriot-Watt University. These five institutions operated on a collaborative, rather than a competitive basis. Their objective was to solve the problem posed, with the most appropriate institution providing the expertise.

(17) There is no readily available record of the exact sum, but £300,000 is the figure most frequently mentioned by respondents who were involved at the time.

(18) Strathclyde has traditionally had a binary administrative structure in which the Registrar and the Bursar assume responsibility for the academic and financial affairs of the University respectively and are of equal status, immediately below the Principal. In the course of 1989/90, however, the University moved to a unitary administrative structure with a Secretary, a newly created post, at its head, overseeing both the academic and the financial affairs of the University (Source: University of Strathclyde Newsletter: Court Report for "Prism", "Prism" no. 50, March 1990).

(19) In 1984 the University's patent portfolio contained close to 50 items, a mixture of full patents and applications, of which only 5 or 6 were earning any income. However, that income amounted to around £300,000 p.a. by the mid-1980s.

(20) A wide range of dates for the establishment of the CII is to be found in the literature. 1968 is the date given by the ex-Principal, Sir Samuel Curran, in his memoirs.

(21) In Strathclyde the Court is roughly equivalent to the Council in English universities.

(22) The two ILOs had been appointed prior to the inclusion of Ordinance 16 - relating to tenure - in the University Calendar. It was also unclear whether they were academic/academic-related appointees. Since they had regularly voted for Senate members, they argued that they were academics with tenure. One became a lecturer in the School of Engineering and the other joined the University's public relations team, turning the quarterly Gazette into a monthly newsletter.

(23) The muscle-relaxant "Atracurium" was discovered more or less by accident by researchers in the Department of Pharmacy at the beginning of the 1980s. Strathclyde licensed it to Burroughs Wellcome in 1983 and by the end of 1989 had received close to £10m in royalties.

(24) The University provided development funding for the IP which it later licensed to Flexigage Ltd. This was repaid when the company received its first-round funding. In recognition of its support, the University was allocated (*gratis*) a proportion of the 25 per cent which was not allocated to the major backer; the academic staff involved were allocated the remaining shares.

The University provided a loan to Polysystems Ltd and subsequently purchased shares in the company.

(25) The commission was given to Arthur D. Little, which presented its report after little or no on-site research:

"[It] missed out on all sorts of realities of the commercial consultancy [situation]. It is not brilliant. A number of things were wrong financially and of course, none of that really materialised until we started ..."

(26) Following the government's announcement in 1983 that the cost of providing an infrastructure for collaboration with industry represented proper use of a university's general income, Strathclyde was able to cover the full cost of an industrial liaison office without fear of being told that this was not a legitimate use of their funds.

(27) The Director of RDS in 1989/90 was an engineering graduate with many years' practical experience of production engineering. This was followed by a period devoted to marketing production engineering services in the UK and abroad, after which he became marketing manager of a Wolfson-funded Microelectronics Institute and then managing director of a government-backed spin-off company set up to market microelectronics hardware and software.

(28) The Deputy Director had previously worked in the Bursar's office for 17 years, with responsibility for IP.

(29) The conference which influenced the new Principal most was a follow-up to the the Scottish Council (Development & Industry)'s publication of "Profit through Partnership" in 1983.

(30) The only exception to this is the stipulation that, in keeping with the terms of the 1977 Patent Act, members of staff notify RDS if they believe they have generated protectable IP.

(31) In 1984 RDS appointed an EC Liaison Officer. Strathclyde was one of the first universities in the UK to make such an appointment, which it believes contributes to the fact that for several years, Strathclyde won more £ from the EC than any other university in the UK.

(32) Despite the fact that the 1977 Patent Act had been passed and was soon to come into force, and despite the fact that the CVCP had alerted universities to its implications in 1977, there was no reference to the Patent Act.

(33) Source: Section 3.26 (Patents) and Section 3.25 (Outside Employment) respectively.

(34) This was to be found in section 6.2, as part of the University's Financial Code of Practice.

(35) The Joint Management Committee was set up informally in the early 1980s in order to try and deal coherently with the implications of the 1981 cuts. It was to some extent the forerunner of the University Management Group, which was formally constituted in 1987 on the recommendation of the Committee on the Organisation and Efficiency of Decision-Making. This Committee, "composed largely of distinguished external authorities", was set up in the wake of the Jarratt Report (CVCP, 1985). (Source: University of Strathclyde Newsletter: "Prism", September 1987).

(36) In its last full financial year, STT achieved a turnover in excess of £400,000 (Source: University of Strathclyde Newsletter: "Prism" no. 45, November 1989).

(37) These are effectively commercial arms of Departments, which perform the same function as "soft" companies, though they generally have quasi-company status rather than true company status.

(38) When the UFC called for bids for grants to support income-generating developments, Strathclyde received £100,000 to assist it set up the Enterprise Office (Source: University of Strathclyde Newsletter: "Prism" no. 45, November 1989).

(39) The person appointed as IPR Officer had previously been a technician in the Department of Pharmacology & Physiology for 17 years, during which time he completed an MSc by research and registered for a part-time PhD. He was the co-discoverer of a drug which had similar applications and similar potential to "Atracurium". Exploitation of this drug was mismanaged with the result that neither the University nor the inventors received a penny for their efforts.

(40) Academics are encouraged to participate in the process of evaluating, protecting and exploiting IP, which is viewed as a team effort; however, academic time is not costed into the cost-gauging equation.

(41) The IPR Officer discovered that the University had been automatically paying annual renewal fees, even if the patent was 15 years old and there was no prospect of a licensee.

(42) RDS pursues a strategy of obtaining as much revenue as it can "upfront". It earns a considerable sums from option fees;

"... when people say they would like to look at our technology and evaluate it, we say - well, fine, but it will cost you £25,000 for, say, 90 days ..."

It is not unknown for companies to ask for extensions, at the same rate. RDS also prefers to negotiate "upfront" license fees in preference to royalty income or in conjunction with royalty income. Moreover, it looks for guaranteed royalties in the early years.

(43) Strathclyde originally returned 90 per cent of overhead income to the Department. This was later reduced to 50 per cent when the University found it difficult to balance its accounts. However, it is intended to return a higher proportion to Departments as soon as possible.

(44) The drug "Atracurium" was discovered in the Department of Pharmacy; in 1989/90 it was earning the University around £1m per year in royalties.

(45) The working party consisted of two Deputy Principals, a Dean and the Director of RDS.

(46) Court agreed that all costs attributable to a University source which are used to translate research into a commercial proposition - together with all professional costs incurred in protecting IP and in licensing it - should be a first charge on 80 per cent of any royalty income received. The remaining 20 per cent is to be treated as distributable income to be shared out - on the same basis as 100 per cent of the income after all costs have been reimbursed. On income upto £10,000, the split is 80:16:4 between the inventor(s), the University and the Department respectively. The next £40,000 is shared on a 60:32:8 basis and the following £50,000 on a 40:48:12 basis. Income between £100,000 and £0.5m is to be split 30:56:14 and income over £0.5m attracts a split of 25:60:15. (Source: University of Strathclyde Newsletter: Court Report for "Prism", "Prism" no. 51, April 1990).

(47) Researchers have no legal authority over IP they generate because Strathclyde does not vest patents jointly in the University and the inventors. RDS regards this as an unnecessary complication when it comes to negotiating and documenting agreements to exploit them.

(48) In order to patent cell lines, samples must be deposited in recognised national depositories. RDS is concerned about the potential for cell lines to be cloned overnight, if security is not watertight. For the same reason, RDS demands royalties on all monoclonal antibodies derived from cell lines which it has licensed to industry, unless the company can produce hard evidence of having used cell lines from a different source. The burden of proof is on the company, not the University.

(49) Between 1972 - when records started - and the end of 1989, Strathclyde had applied for 166 patents and been granted 39, a ratio of over 4:1 (Source: R&D Services, Strathclyde University).

(50) By the end of 1989, RDS had tried to "cold sell" IP in this way on two occasions. Both attempts were successful. One yielded a license agreement with a German company which guaranteed the University £100,000 per year for two years plus very advantageous royalties. The other yielded a highly successful collaborative agreement.

(51) The section relating to Outside Employment stated that "*the University Court encourages full-time staff to engage in outside employment, ie. employment, in the field for which appointed, undertaken for another employer for payment*". It indicated that private practice and participation in a commercial or professional enterprise fell into this category and that before undertaking any outside employment, staff should seek permission in writing from the Principal, giving "*full particulars*". It was made clear that financial arrangements would be made "*according to the circumstances in each case*" but that they would be based on the arrangements for personal consultancies. (Quotes taken from the Staff Handbook for 1978, section 3.25).

(52) The Business Venture Group (BVG) was formally constituted in 1984 following recommendations from the Principal and the then Bursar. It consisted of several lay members of Court and senior University officers, plus the Vice-Principal, the Deputy Principal (Management) and the Deputy Principal (Research) and it reported to the University Management Group and to Court. Its stated mission was "*to enable research results to be translated into commercial ventures by providing advice, managerial services and early seed funding*". It identified six, linked objectives which will enable it to carry out its mission. (Source: Paper presented by the Director of RDS to the University Court on 26 November, 1989). The BVG helps formulate policy -and reformulate it in the light of experience, but it is more geared to examining specific investment opportunities and acting as an enabler, where appropriate. The BVG administers the University's Commercial Development Fund.

(53) Source: Paper presented by the Director of RDS to the University Court on 26 November, 1989.

(54) RDS has already experienced what can happen when academics in two "rival" Departments put forward the idea of company start-up, and RDS decides to fund only one of them. The one who was not funded ...

"... grumbled like hell to me, the Principal, to whoever would listen. He didn't raise his little finger to do anything to justify the investment, whereas his colleague in the other Department worked colossally hard and got industrial involvement and contracts ..."

(55) Examples include the Strathclyde Institute for Drug Research and the Centre for Parallel Processing. These commercially-oriented institutes/units/centres sometimes have separate, academically-oriented equivalents, such as the Addiction Research Group (ARGUS).

(56) If the capital investment needed is small, academic staff could be allocated the majority shareholding. If it is upward of £0.25m, they would be unlikely to receive more than 20-25 per cent. They may be given the opportunity to buy additional shares, however.

(57) RDS uses a variety of techniques to locate "*the right person*" - headhunting, advertising, the SDA, databases of people wanting to become CEOs *etc.*

(58) The Faculty Boards consist principally of HoDs of all the member Departments.

(59) The idea for the West of Scotland Science Park came from both Glasgow and Strathclyde Universities; the Scottish Development Agency co-ordinated the project, investing around £6m of its own funds to secure a 125 year lease on 34 acres of Glasgow University's land (the Kelvin Campus) and to acquire a further 27 acres (the Todd Campus). Phase I of the Park was opened in September 1983, Phase II in December 1987. At the end of 1989 the buildings comprised around 80,000 sq.ft. (Source: The West of Scotland Science Park).

(60) The West of Scotland Science Park provides conference facilities and central services including telex, fax, photocopying and secretarial services on a pay-as-you-use basis. There are 13 small units ranging in size from 350 sq.ft. to 904 sq.ft, together with larger units of upto 1884 sq.ft. The rental/sq.ft. of the smaller units is relatively higher, ranging from £5/sq.ft. to £4.70/sq.ft. at the end of 1989. All units pay an additional £1.10/sq.ft. service charge. At that time, the annual rent for the two smallest sized units would have been about £2,135 and £2,388 respectively. The smaller units became available in December 1987. Prior to that, minimum annual rentals would have been closer to £6,000, including the service charge.

At the end of 1989 the minimum lease was one year, with one month's notice required. Two-year and six-year leases were also available, with the rent fixed for the first three years. Three months notice was required for longer leases. At the beginning of 1990, Phase I was fully occupied and Phase II was 95 per cent occupied, however.

By the end of 1989, seven university spin-offs (not exclusively from Glasgow) had taken space on the Park, but only three remained, one of which was a major consortium supported by Glasgow, Strathclyde and Heriot-Watt Universities together with Paisley College of Technology and Napier Polytechnic. The other four companies had failed.

(61) The incubator unit grew from an initiative of the Scottish Development Agency (SDA), which was trying to create incubator units in the wake of management consultants' recommendations on how best to promote advanced engineering. The SDA approached Strathclyde's Principal in 1986 with a view to creating such a unit on campus. Strathclyde agreed to convert 30,000 sq.ft. - the top three floors - of an old warehouse which it owned. The £0.5m required to renovate and refurbish the property and fund the company was provided by the SDA, TSB Scotland and Gresham Plc. Strathclyde University Incubator Ltd. is a joint venture between these three partners and the University, which has leased the building to the company.

The incubator unit was opened in January 1990. Although the original intention was to promote advanced engineering, there is no restriction on the types of business activity which tenants pursue, except that they should involve "*innovative risk-taking*". The smallest units are "broom cupboard" sized and the rental is currently £14/sq.ft., of which a proportion represents a management services charge. There is no minimum lease but tenants will be encouraged to leave after 3 or 4 years maximum. In addition to accommodation, the incubator unit provides communal equipment, secretarial support and day-to-day business support.

(62) University of Strathclyde Newsletter: "Prism" no. 39, June 1989 and "Prism" no. 50, March 1990 respectively.

(63) University of Strathclyde Newsletter: Court Report for "Prism", "Prism" no. 51, April 1990.

Case Study Narrative: York University

(1) At both the beginning and the end of the 1980s, for example, taking into account the 40 or so autonomous, monolithic institutions in Great Britain, York only just occupied the bottom size quartile.

(2) In the course of being interviewed, one member of the administration said: "*There was a naivety on the part of one or two of the very early university administrators*", which resulted in York putting in for the bottom of the range of potential income rather than aiming higher and reaching a consensus. Once the UGC moved to a formula basis for funding universities based on FTEs, the university began to recoup lost ground.

(3) Source: Table 1: Comparative Changes in % Grant, Student Numbers and Unit of Resource for UK Universities, Special Issue of "Precinct", University of Liverpool newsletter, June 1986. On the basis of the figures given in this table, the national average was an increase of 5.02 per cent in student numbers by 1989/90.

(4) In 1988/89 York had 4,082 student FTEs, compared to 3,407 in 1980/81.

In 1988/89 there were 3,137 undergraduate FTEs, 595 taught postgraduate FTEs and 350 research student FTEs (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990). In 1980/81 there were 2,822 undergraduate FTEs, 350 taught postgraduate FTEs and 235 research student FTEs (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(5) In 1989/90 York had 593 full-time academic/academic-related staff plus 52 part-timers. this compared with 499 full-timers plus 15 part-timers in 1980/81.

In 1988/89 328 (55%) of the full-time academic staff were funded by the UFC; the remaining 172 (45%) were funded from other sources; many of these were on fixed-term contracts. Academic-related staff accounted for 16 per cent of the total (Source: UFC University Statistics 1988/89, volume 3: Finance, USR, September 1990).

There is no surviving record of the proportion of full-time academic staff who were UGC-funded in 1980/81. However, academic-related staff accounted for 18 per cent of the total (Source: UGC University Statistics 1980/81, volume 3: Finance, USR, September 1982).

(6) In 1980/81 there were only 93 UGC-funded staff in the science departments, compared to 146 in 1988/89 (Source: Deputy Registrar, University of York). In real terms, by the end of the decade, the number of academic staff in the science Departments had increased by 64 per cent.

(7) These subject areas were:

Outstanding: Electrical & Electronic Engineering
Above Average: Biology, Computer Science
Average: Chemistry, Mathematics, Physics

Source: "The Strengths and Weaknesses", Times Higher Education Supplement, 30 May, 1986.

(8) Source: "Poll of Polls", Times Higher Education Supplement, 30 May, 1986.

(9) These "units of assessment" were:

4: Electrical & Electronic Engineering, Physics, Computer Science,
Other Biological Sciences
3: Mathematics, Chemistry

Source: "Countdown to Excellence", Times Higher Education Supplement, 1 September 1989.

(10) Information taken from the University of York "News Sheet", Issue No. 208, October 1989.

(11) Source: UGC University Statistics 1984/85, volume 3: Finance, USR, September 1986.

(12) They contributed **81** per cent of the University's income from the Research Councils, **54** per cent of its income from charities, **90** per cent of its income from UK public corporations and private sector industry/commerce, and **36** per cent of its combined income from central government, local authorities, public corporations and various overseas organisations (These figures are derived from Form 3, Table 3 of the statistical data prepared for the UGC and the USR by University of York, relating to 1984/85).

(13) Scientists contributed **73** per cent of the income from Research Councils, **58** per cent of the income from charities, **78** per cent of the income from UK public corporations and industry/commerce and **37** per cent of the combined income from central government, local authorities and various overseas organisations (These figures are derived from Form 3, Table 3 of the statistical data prepared for the UFC and the USR by University of York, relating to 1988/89).

(14) In his report for 1988/89 the Vice-Chancellor, an economic historian, described the industrial scene in the York area as based on the 19th century. In York itself, the three largest employers are Rowntree Mackintosh, British Rail and the University. The dominant economic activities in the surrounding area are tourism and agriculture.

(15) The Physics Department at York chose to concentrate on expensive, surface physics which requires £millions in funding; this was seen as unlikely to generate IP which is exploitable on a small scale. The Chemistry Department tended to focus on issues relating to the education of chemistry. The Biology Department's strengths related to the environment, which has only recently benefitted from non-traditional sources of funding.

(16) This was the first British compiler to be validated by the US Department of Defense for use with its standard programming language, Ada.

(17) York has a tripartite administrative structure in which all academic matters are handled by the Registrar's office, all financial matters by the Finance Office and all matters relating to estates and buildings by the Bursar. The Registrar, the Finance Officer and the Bursar are of equal rank, reporting on a day-to-day basis directly to the Vice-Chancellor.

(18) The Finance Officer observed that whereas he had handed the appointee around four files in 1982, three years later the appointee had made so many contacts, the documentation took up four filing cabinet drawers.

(19) York is a university which prided itself from the outset on having relatively few rules and regulations. It has always given academic staff the freedom to pursue innovative initiatives in curriculum content, teaching style and examination methods, for example, and tried to support their efforts to introduce their innovations. The purpose of the Innovation Fund is to ensure that tradition does not falter for want of money.

(20) The Commercial Activities Committee was wound up in October 1988. It met only three times a year. Because of this, and the fact that the Chairman did not have executive powers, it was not in a position to respond quickly enough to some initiatives or events. Instead of reporting to the Sub-Committee, the Director of the newly established IDU was asked to report direct to the Vice-Chancellor. In practice, for day to day matters he reports to the Deputy Vice-Chancellor or the Pro-Vice-Chancellor, whichever of the two is a scientist.

(21) The working party was chosen by the Registrar. It consisted of the newly-appointed ILO, a Professor from the Chemistry Department, the former Finance Officer, the Registrar and another member of the administration who was acting as a part-time, salaried consultant, all people who were deemed to have some knowledge of or at least an interest in IP.

(22) "University Intellectual Property: Its Management and Commercial Exploitation", UDIL, 1989.

(23) "Intellectual Property - How to Lose It" was a talk given by Kynric Lewis, LL.B, QC, at the Conference of University Registrars and Secretaries, Aberystwyth, 1988.

(24) In the World Intellectual Property Organisation (WIPO) definition, IP includes the rights to "literary, artistic and scientific works, performances or performing artists, phonograms and broadcasts; inventions in all fields of human endeavour; scientific discoveries; industrial designs; trade marks; service marks and commercial names and designations; and all other rights resulting from intellectual activity in the industrial, scientific, literary and artistic fields".

(25) Membership of the Joint Committee for Academic & Related Staff comprises three members of the university appointed by Council, including the Vice-Chancellor and/or his deputy, a lay member of Council and three members of the local AUT, including the President/Vice-President.

(26) During the second half of the 1980s, with the agreement of the Finance Officer, the HoD of the Computer Science Department apportioned any revenue paid to "the investigator" between the grant holder and all researchers working directly on the project which generated the IP. The income was apportioned in direct proportion to the number of years (measured to the nearest three months) each individual was associated with the work. The HoD expressly avoided attempting to make a judgement about the relative importance of the contributions made by the various parties (Source: Memo from the HoD, Computer Science Department, to all teaching staff, Experimental Officers and Research Assistants, 7 June, 1990).

(27) Source: "Planning for the Late 1980s", special supplement to the News Sheet, December 1985.

(28) Built at a cost of £470,000, the first phase of the Institute for Applied Biology (IFAB) was officially opened in March 1990. It was financed by a gift of £150,000 from Rowntree, some support from the university's central funds and a bank loan which will be repaid from the Institute's commercial activities.

Besides housing a number of in-house contract research units, IFAB's building is occupied by the northern regional office of the Nature Conservancy Council, the Swedish Environment Institute in York, the Soil Survey and Land Research Centre and an office of the International Union for the Conservation of Nature.

(29) The new Director of the IDU was the driving force behind the realisation of the Institute for Applied Biology.

(30) Source: Academic & Related Staff Handbook, University of York, January 1989.

(31) Intellectual Property Regulations, University of York, April 1990.

(32) Rounded to the nearest integer, in 1989/90 the aggregate, unweighted staff:student ratio at York was 1:13. This concealed a spread ranging from 1:10 in the Archaeology Department to 1:20 in the Education Department. The aggregate, unweighted staff:student ratio for the science departments was 1:12. This concealed a spread ranging from 1:11 in the Physics Department to 1:16 in the Mathematics Department (Source: The Deputy Registrar, University of York).

These ratios may not give an adequate indication of the teaching load of staff in individual departments. At York, as at Oxford and Cambridge, students in the arts departments in particular are taught in very small, intensive tutorial groups.

(33) University of York News Sheet, Issue no. 188, April/May 1986.

(34) It is difficult to get academics to grasp all the activities which count as disclosure in terms of patent law. In one recent case, for instance, an academic wrote to his *alma mater*, enthusing about his new research project in some detail. His *alma mater* was working in the same field on a rival project and treated this as public disclosure.

(35) For example, the university negotiated a contract with an industrial sponsor to develop a quality control device. The device could be applied to a number of manufacturing situations, but the industrial sponsor had no interest in exploiting it. Due to the way in which the contract had been written, the company was able to prevent the university from exploiting it. In a subsequent contract, the university was able to avoid making the same mistake.

(36) Although the IDU benefits from the fact that its Director is a known quantity and still a practising academic, making it mandatory to report discoveries to the IDU may not suffice. The maxim about leading a horse to water may still apply.

(37) The first issue of the bulletin was published in May 1989, entitled "York Enterprise - The University of York Commercial Bulletin".

(38) The "North East" is deemed to stretch as far south as Middlesbrough, some 40 miles to the north of York. Whereas Durham and Newcastle Universities, the former Middlesbrough and Sunderland Polytechnics *etc* could benefit from public sector grant aid, York cannot.

(39) The Electronics Department, for example, channelled a number of its discoveries to its commercial arm, the York Electronics Centre, which marketed them without benefit of patent protection.

(40) Having said that, the IDU has not found it easy to locate a patent agent. York's rural location means that there is not the kind of infrastructure which urban universities take for granted. There are no firms of patent lawyers in York, though there is one freelance patent agent living locally whom the IDU's Director has brought in to draft one particular patent.

(41) It is not clear whether the inventor is included among the "*interested parties*".

(42) A university department has no separate legal status, so patents vested in a department's name are effectively vested in the university's name.

(43) A period longer than three months is allowed only by mutual agreement.

(44) This might include, for example, a joint venture between the university and the researcher(s), between the university and industry, between the university and the public sector, or joint ventures encompassing several or all of these parties.

(45) In one instance, the University got approximately an 8-fold return on its investment within four years.

(46) "Innovation" is published twice a year by Longman-Cartermill, which also manages the BEST Index. It gives brief details of scientific and technological discoveries, their likely applications and an indication of how much development work still remains to be done.

(47) The IDU's Director has a symbiotic relationship with the North East division of the LES. Whilst the Director is keen to acquire licensing skills, he is also actively involved in stimulating his local division to greater activity. It has been considerably less active than its counterpart in the North West. This is perhaps an inevitable consequence of the character of the North East:

"... when you talk about patenting, you haven't got the services. You haven't got the people, the lawyers, the patent agents. You're very much in a desert in terms of IP. Part of what I'm about is trying to [promote] a system which talks and thinks in that particular way ..."

The IDU's Director has helped set up a new committee of LES which is organising monthly meetings to build up awareness in the North East.

(48) Like consultancy work or private professional practice, directorships of/partnerships in outside firms comes under the university's rules concerning work for outside bodies, which are outlined in section 27 of the staff handbook. Academics are required to ask their HoD for permission to undertake work for outside bodies; HoDs are required to seek the permission of the Vice-Chancellor.

(49) In fact, two of York's academics are known to have left the university to pursue their business career full-time. One had tenure, one was an Industrial Fellow on a fixed-term contract.

(50) The Computer Science Department imposed a limit of 20 days per year maximum.

(51) Source: Section 27.2 (e) of the Academic and Related Staff Handbook, January 1989.

(52) Departmental Boards of Study comprise every full-time member of the teaching staff together with any additional members which the General Academic Board cares to nominate.

(53) This Advisory Committee is appointed by the Vice-Chancellor and consists of the Vice-Chancellor, the Deputy Vice-Chancellor, two members of the Professorial Board and two members of the General Academic Board. It submits its recommendations to the Council via the academic Boards.

(54) Preference for granting only a year's partly-paid leave of absence is due to the difficulty of granting longer without harming academics' pension rights under the USS scheme.

(55) These quotes are taken from section 13.2 of the Academic and Related Staff Handbook, January 1989.

(56) Both before and after it was sold on, York's first joint venture operated out of a series of portacabins adjacent to the Department from which it spun out, for instance. Its second joint venture is located off-campus in the adjacent village, but in property owned by the University.

(57) The project was held up by planning difficulties over its proposed use of greenbelt land. It has also been held up by the fact that the university itself has nothing but land to contribute. It has been necessary to put together a joint venture with the public and the private sector to overcome this difficulty.

It is proposed to situate the science park on land adjacent to the Chemistry Department. Planning permission has been sought for 13 new buildings, including small incubator units. It is estimated that the science park will be worth around £18m and will stimulate the creation of over 1,000 new jobs in the next five years.

(58) The exception has been Parkside Commercial Centre, where the local authority has made available units ranging from around 400 sq. ft. to around 800 sq. ft., with initial leases as short as 3 months. The local authority also set up a "Young Business Project" which offered incubator-sized units to people aged under 25. Although these are not suitable for the average academic, a number of York's graduates have set up companies in its units.

(59) Source: Innovation and Research Priming Fund Committee guidelines, August 1986.

(60) A member of the Biology Department received a grant to cover the cost of biochemical analysis of particular fluids. The grant led indirectly to the discovery of a method of sexing cattle embryo, which has considerable commercial value. The Milk Marketing Board subsequently financed further work.

(61) Perhaps the most striking example was the academic whose entrepreneurial activities led to the University's first joint venture. Both 3i and the University agreed to the academic concerned assuming the role of Managing Director, but each reserved the right to appoint a director. However, this was a right which neither felt the need to exercise and when the company was sold on, it yielded the University an eight-fold return on its investment. The academic concerned had no previous experience of running a business, nor a family background in small business.

(62) York Enterprise Ltd is a joint project between the local authority and the public sector. It provides free advice to clients and has established a small business association.

A P P E N D I X F

A P P E N D I X F

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BRISTOL UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

Bristol is one of a group of British universities commonly referred to as "civic" universities. Founded as a University College in 1876, at the request of the citizens of Bristol the University College was upgraded to full university status in its own right by Edward VII in 1909.

1.2 Size

By the 1980s Bristol had matured into a medium-sized university by UK standards ⁽¹⁾. In 1981 the UGC advised Bristol to reduce the number of home student registered in 1979/80 by 4 per cent within three sessions. As Figure 2 showed, this was fractionally below the national average. At the same time the UGC announced that Bristol's recurrent grant would be cut by 16 per cent by 1983/84. As we can see from Figure 2, this, too, was slightly below the national average.

In 1986 the UGC indicated that Bristol should increase its student numbers by just over 1 per cent over the next four sessions; this was well below the national average of an increase of 5.02 per cent in student numbers by 1989/90. By the end of the decade, the University had around 5 per cent more students than it had at the beginning ⁽²⁾. Due to unforeseen circumstances, this was somewhat lower than it might otherwise have been ⁽³⁾ and these had the effect of reducing Bristol's size relative to some UK universities. Between the beginning and the end of the 1980s, Bristol managed to increase its full-time academic staff by 10 per cent; during the same period, the number of part-timers increased three-fold ⁽⁴⁾. By most methods of reckoning, Bristol was one of a middle group of universities which were treated neither particularly harshly nor particularly leniently by the UGC.

Structurally, the University ended the decade much as it had begun, with six Faculties comprising nearly 70 Departments. Bristol closed only one Department as a direct result of the cuts announced in 1981, though the size or status of several other Departments changed ⁽⁵⁾.

1.3 Science Base

Bristol has a particularly comprehensive science base, incorporating not only the physical sciences and engineering, but also medicine, dentistry and veterinary science. Whereas at most universities a Faculty is a fixed grouping of Departments, at Bristol it is more a grouping of courses. Whilst courses in the Faculty of Engineering are provided almost exclusively by the engineering Departments, the Faculties of Science and Medicine are far more fluid in terms of the Departments which contribute courses. Some Departments, like Anatomy, run courses in both the Faculties of Science and Medicine, for example. Others, like Geography and Psychology, run courses in both the Faculties of Science and Social Sciences. The Departments which - wholly or partially - contribute to courses in the science base are listed in note ⁽⁶⁾. It is difficult to put a figure on the the proportion of the University's total academic staff which the science base represented in 1989/90, since this

would entail categorising the research activities of individual members of staff in Departments such as Geography and Psychology, which contribute to the social science base of the University as well as the science base.

As we can see from **Figure 6a**, in the UGC's 1985/86 assessment of universities' research strengths in the natural sciences, engineering and technology, Bristol was ranked 8th best in the UK. A peer review instigated by the Times Higher Education Supplement rated Bristol as 5th best ⁽⁷⁾. Four subject areas were rated as outstanding, twelve as above average, six as average and three as average ⁽⁸⁾. It was suggested that if the ABRC's recommendations were implemented, Bristol would have been assigned to the 'R' category ⁽⁹⁾; accordingly, the University would be funded to conduct high-level research across a wide range of subjects.

Figure 6b In the 1988/89 research selectivity exercise, five "units of assessment" were awarded a "5", four received a "4", eight received a "3". Only one received a "2" and none a "1" ⁽¹⁰⁾.

1.4 Research Grant and Contract Income

As **Figure 41a** shows, in 1984/85 Bristol ranked 9th in terms of £ earned in external research grants and contracts, but 15th in terms of the percentage of its total recurrent income which this external revenue represented, namely 17.5 per cent ⁽¹¹⁾. The science base generated close to £7.5m, accounting for 85 per cent of the University's total income from research grants and contracts ⁽¹²⁾. As we can see from **Figure 41b**, by 1988/89 the science base had increased its 1985 earnings by 70 per cent, generating over £12.5m, but still accounting for 85 per cent of the University's total income from research grants and contracts ⁽¹³⁾.

The pattern of sponsorship which the science base attracted was marginally different from the pattern four years earlier. Whereas industry/commerce provided only 7 per cent of its research grant & contract income in 1984/85, by 1988/89 this had risen to 11 per cent. This was largely at the expense of income from central government, local government and various overseas organisations. As **Figures 345-346** show, Bristol was the only university participating in this study to maintain the proportion of Research Council and charity funding which it was used to receiving - 70 per cent in 1988/89, compared to 71 per cent in 1984/85. Research Councils and charities funded the four science Faculties to the tune of £8.9m. In most cases, ownership of any resulting IP rested with the University.

2 HISTORY OF IP EXPLOITATION

2.1 Background

Bristol is a University which has traditionally obtained its research funding from the Research Councils and charities. At the beginning of the 1980s, it was attracting virtually no contract research income from industry/commerce. This was not a situation which troubled either the administration or the majority of the academic community. Individual academics who occasionally spoke in favour of establishing an IL office, with a view to increasing the level of support from industry, found their arguments fell on deaf ears ⁽¹⁴⁾. The University saw no need for an ILO, either to promote the University to industry or to

handle IP. It was seldom beholden to industrial sponsors and if academics did generate exploitable research discoveries, the IP had to be offered to the NRDC/BTG. If the NRDC/BTG did not see fit to exploit the IP, the University tended to assign the IPR to industry, if partners could be found. Occasionally, if so requested, the University would waive its rights in favour of the academic inventor(s).

Sporadically, academics generated IP which was not obligated to sponsors. If they were keen that it should be exploited, the University sometimes paid for an initial registration. What happened then was often upto the researchers concerned. In some cases, the University retained ownership of the IP which was then licensed. In others, ownership was assigned to an industrial partner. The administration did not look for a significant financial return on its investment. Since it had no particular need of the income, it was happy for the academics concerned to reap the rewards, particularly as they frequently took charge of the exploitation process. Equally, if IP was assigned to the NRDC/BTG, the inventor usually kept the bulk of the income. In one such case, a generic patent led to a number of follow-on process and applications patents ⁽¹⁵⁾. These generated around £0.5m during the patents' lifetime, of which the University received only around 5 per cent.

This attitude changed almost overnight in 1981, when the UGC announced a 16 per cent cut in the University's recurrent grant. Bristol has fewer reserves than many civic universities, with the result that in the event of a disaster, its realisable assets would sustain it for no more than ten days. In the wake of the UGC announcement, two working parties were established, one to examine ways of making savings, the other to consider ways to generate income. The latter identified a number of ways to generate income, including selling the University's expertise more productively, exploiting IP and creating a science park. Some of these proposals were accepted by the Senate, but although there was talk about producing a policy document on IP based on the CVCP's 1978 report, in fact, no such document appears to have been produced.

2.2 Incentives

Senate did agree, however, to changing the manner in which the revenue from IP was distributed. Whereas before, most of the revenue was channelled to the academics concerned, from 1983 the net revenue was split equally between the inventor, the Department and the University centrally, after deductions for costs.

This change did not occasion immediate comment, except among the few academics who were likely to find themselves benefitting far less in the future than they had in the past. In fact, the AUT was keen that a greater proportion of the revenue from exploiting IP should be channelled into central University funds than the administration itself had proposed ⁽¹⁶⁾.

2.3 Structures

By 1984, Bristol was almost unique among British universities in not having at least a part-time industrial liaison officer ⁽¹⁷⁾. This meant that IP which was flagged by academics in response to the new policy was handled by the Deputy Secretary, as an extension of his existing financial responsibilities ⁽¹⁸⁾. This administrator's lack of experience in exploiting IP meant that despite the University's interest in getting a good return on its IP, in practice nothing changed except the way any resulting revenue was distributed. Through ignorance of alternatives ⁽¹⁹⁾, the Deputy Secretary usually offered non-obligated IP to the

BTG. If the BTG had no interest in it, Bristol was still happy to let the researchers concerned take charge of the exploitation process. If academics took the trouble to notify the administration of their discoveries before publishing, the University was usually prepared to pay for an initial patent registration. Exploitation usually entailed the academics concerned identifying and approaching potential licensees, although in some cases, the University simply assigned its IP to companies identified by the academic(s) concerned. If researchers proposed founding/co-founding spin-off companies to exploit the IP they had generated, the University had no objection and this is known to have occurred at least once during this period ⁽²⁰⁾. These were the only options which the University seriously contemplated at this time. If thought was given to setting up a campus company to exploit its IP, it was soon dismissed as impractical. Licensing or assigning was seen as the solution, given the University's lack of experience of evaluating, developing, manufacturing and marketing its IP. It was also seen as less disruptive, taking up less of the administration's time and resources. For the same reasons, Bristol did not contemplate joint ventures with members of the academic staff.

By late 1984, however, academics who were in favour of appointing an ILO found that they had support in principle from the UGC ⁽²¹⁾. The CVCP had also set up a number of working parties to look into the opportunities and problems presented by university/industry relations which were due to report ⁽²²⁾. In November 1984 Bristol's Senate established a joint Committee of Senate and Council "*to initiate discussion of arrangements for improving and defining the scope of industrial liaison*". Chaired by the Acting Vice-Chancellor ⁽²³⁾, it managed to make more headway than the first committee, despite the reservations of traditionalists, a number of whom were to be found in key roles in the administration itself. In 1985 the committee recommended, among other things, that a Director of Industrial and Commercial Affairs should be appointed ⁽²⁴⁾. During the course of 1985/86 it was decided that the new director should be a Grade IV appointment (Other Related Staff), on a professorial salary - minus a professorial title - with the possibility of an annual bonus ⁽²⁵⁾. It was felt that the IL office should have quasi-Departmental rather than administrative status. This was motivated by a perceived need to bridge the gulf between the academic community and the administration. The new director was to report directly to the Vice-Chancellor.

This was the situation when the Kingman letter arrived: the decision to appoint an ILO had been taken, the structure and the job specification were in the process of being agreed, but as yet no ILO had been appointed.

3 THE KINGMAN LETTER

The arrival of the Kingman letter triggered a series of discussions at the Committee of Deans. It was this group which made the decision in principle to seek to assume rights and responsibilities relating to the exploitation of inventions arising out of Research Council-funded projects.

By the time a reply to the letter had been drafted, Sir John Kingman had become Bristol's new Vice-Chancellor. As a result, he ended up replying to his own letter, although the substance of the reply had been agreed before he took up his appointment.

Bristol, together with 32 other institutions, had its proposals accepted by the Scrutiny Group in the first round of deliberations. The letter of authorisation was sent on 26 July

1986.

4 CURRENT POLICY AND STRUCTURES

4.1 Structures

Although the decision to establish an IL office had been taken in 1985, its head was not appointed until February 1987 ⁽²⁶⁾. Bristol was looking for someone with considerable "real-world experience" as well as academic respectability, yet someone who would not be associated too strongly with one particular discipline. It took over a year - and innumerable interviews - to identify someone whom the University regarded as suitable.

The remit of the new Industrial Liaison Office was to consolidate the University's existing relationships with industry and cultivate new relationships, delivering whatever is required (services, R&D, short courses, *etc*). Its remit also involved overseeing the commercialisation of the University's IP. The job specification emphasised the need for the head of the IL Office to have a grasp of "*the range of means whereby products and services may be exploited commercially and a knowledge of company and patent law ...*" ⁽²⁷⁾. The ILO's remit explicitly excluded responsibility for the University's relationship with the Research Councils and charities, Local Authorities, Government Departments and the EEC, except where the exploitation of IP is concerned.

The IL Office was set up with two full-time officers, one of whom concentrated on the EC, plus secretarial support staff. The IL Office as a whole was "*expected to be self-financing from additional net income generated over [a 5-year] period taken as a whole*", with the bulk of its income coming from "*selling of rights in inventions, manufacture of products, payments for services rendered [and] rentals*". The ILO himself felt that the University had a naive and over-optimistic view of what its IP might yield in such a short time-span, however. Although he inherited a portfolio of IP, including around 20 patents, only two discoveries were big earners. This was partly due to the nature of the IP which had been protected and partly due to the University's lack of experience in exploiting its IP effectively. One of the two big earners was due to expire, with the bulk of the income having been channelled to the inventor, not the University. The other had been licensed in a way which yielded a high proportion of the projected income up-front, with the possibility of relatively little to follow. Although the costs of protecting the University's IP were almost covered by the revenue it yielded, it was not in a position to carry the IL Office's other activities. As a result, although becoming self-financing was still the ultimate objective, in 1989/90 there was no projected date for achieving it.

The Senate committee whose deliberations led to the establishment of the ILO recommended a number of actions which should be taken, but did not concern itself with policy, let alone the minutiae of policy implementation. Since there was no standing committee in 1989/90, and since the ILO reported directly to the Vice-Chancellor, in practice it was the ILO who began to reconcile recommendations, attitudes, custom and practice in an effort to develop a more coherent and comprehensive policy, particularly with regard to the identification, evaluation, protection and commercialisation of IP ⁽²⁸⁾.

4.2 Rationale

Despite the fact that the revenue from IP is unlikely to cover the cost of the IL operation within five years, as originally intended, the ILO believes that the University has the capacity to generate a considerable amount of exploitable IP ⁽²⁹⁾:

"... Looking at the resources we have, the range of activities which we're now involved in ... I'm quite sure that if this University and others had taken the same attitude as it is taking now, today's income would be five or ten times more [than] it is ..."

However, the ILO is more sceptical about the potential of discoveries arising out of Research Council-funded projects, estimating that at best only half the University's exploitation agreements will be based on Research Council-funded research. Moreover, most of those will have reached the exploitation stage as a result of additional funding from other sources.

The ILO recognises that, whatever the University's potential, its actual success in generating a healthy income from IP will depend very much on its policy and the manner in which it attempts to implement that policy. The University recognises that some academics regard relations with industry and the exploitation of IP as "*striking a Faustian bargain which threatens the very nature of the institution*" ⁽³⁰⁾. The Senate committee which recommended the establishment of the ILO observed that the term "University" is partly shorthand for the individual scholars who make it up and added:

"... The experience of Cambridge suggests that part of the reason for the success of its industrial links has been the relatively relaxed attitude of the University and Colleges to external industrial commitments..."

The committee did not recommend the completely *laissez-faire* approach associated with Cambridge. It recognised there could be a conflict between the best interests of an individual and the best interests of the University. Accordingly, it recommended that guidelines should be developed, rather than all-encompassing rules, for fear of "*imposing reporting requirements of a rigidity that no group of scholars would readily accept*". It also commented:

"... even the most sensible guidelines depend on how they are regarded by the Faculty members to whom they apply. Only if [they] are widely understood, warmly supported and wisely interpreted are they likely to prove successful..."

4.3 Regulations and Documentation

The policy which was emerging in 1989/90 dictated that, although Departments and individuals were not obliged to consult the ILO regarding their relations with industry and were free to conduct their own negotiations, academics were required to notify the ILO if their research discoveries seemed exploitable. Moreover, the ILO decided that he should have the final say as to how discoveries are exploited, feeling that since the University had assumed the rights to any IP arising out of Research Council-funded projects, it must also assume the responsibility of ensuring that they were exploited "*in the way which appear[ed] most advantageous in the circumstances*" ⁽³¹⁾.

By 1989/90 the ILO had not produced a free-standing, written version of the University's policy *vis-a-vis* IP. However, he did introduce amendments to the terms and conditions governing the appointment of full-time members of the academic staff. For the first time the terms and conditions of appointment indicated that the University claims ownership of inventions, citing the 1977 Patent Act and the 1988 Copyright, Design & Patents Act. Employees are required to discuss their discovery with the ILO; "*such consultations must include technical matters relating to patentability with particular reference to the non-publication or disclosure of inventions before patenting*". If there is reason to believe their discovery may be commercially exploitable, academics are required to report it to the University Secretary via their HoD. The terms and conditions also require academic staff to consult the Secretary about computer software "*in order that appropriate arrangements are agreed which take into account the particular circumstances and may involve questions relating to ownership of copyright*". However, they make it clear that the University "will not in normal circumstances seek to benefit from any rights it may have as an employer in the academic publications of members of the academic staff". These amendments were approved by Council in March 1989.

The terms and conditions of appointment also outline the way in which IP revenue is likely to be distributed.

4.4 Incentives

The ILO paid particular attention to the question of incentives, believing that the incentives which the University offered between 1983 and 1987 were neither generous nor comprehensive enough:

"... what one needs is a package, not something which is the panacea. The package includes visible justice, potential financial benefit, ability to publish safely without getting told off by the University and the belief that good performance in that area of the academic's role will contribute to - and certainly not damage - their progress ..."

In the opinion of the ILO, this means positive incentives, rather than negative incentives:

"... What [we] want is willing co-operation, not grudging duty ..."

(i) Financial

In keeping with the terms of the 1977 Patent Act, academics are not rewarded financially for bringing IP to the ILO's attention. They are rewarded only if the IP is successfully commercialised, and they may be able to influence the decision as to how to commercialise it.

In 1989 a fairly standard formula ⁽³²⁾ was introduced to regulate the way that income from IP is shared out, replacing a wide variety of schemes which appeared to be operating previously. The ILO opted for a sliding scale whereby the inventor(s) receive 100 per cent of the first £2,500, 70 per cent of the next £10,000, 50 per cent of the following £40,000 and 33 per cent of any income in excess of £50,000 net. The balance is split equally between the University and the Department which generated the IP.

This is considerably more generous towards the inventors than the scheme which the University introduced in 1983. The ILO believed that by 1989/90 - only a year or so later, this was already beginning to have a positive effect:

"... The University takes less proportionately but already, I think, more in total. It takes a smaller share [of something] which is much more likely to grow ...

"Since most of the active researchers are those with a number of children and a significant mortgage, its a real incentive to give some thought whilst driving home to whether anything they have done in the past year might be [exploitable].

"People say to me - well, if I can see the University is being fair about this ... yes, I am prepared to give it some thought.

"With several of the dozen or so patents that I've been involved in filing, the possibilities have come to me because people have heard that the University is now taking a more enlightened view to sharing the benefits..."

The income which the Department receives is believed to act as a strong incentive to the HoD to identify IP. It also acts as an additional incentive to the researchers who generated it. Although HoDs have the right to determine how such money is spent, they are encouraged to channel it back to the research group concerned, to fund further research. Whether or not they adhere to this particular recommendation, they are certainly likely to spend the money, rather than keep it in reserve, since otherwise it may be taxed to support less fortunate Departments ⁽³³⁾.

Over the past two or three years there have been several instances of individual researchers and their Departments benefitting from a share in the revenue which the exploitation of their IP yielded; Bristol's incentives are certainly more than hypothetical. However, the benefits have not always been widely publicised. When the University received £25,000 as an up-front payment on a licensing deal, for instance, a Department in the Faculty of Engineering received close to £5,000. However, the licensee imposed restrictions on publicising the deal, with the result that the ILO has only been able to pass on the information in a restricted form by word of mouth.

(ii) Career Progression

The ILO felt that the University had given out inconsistent messages about the non-financial value it places on academics flagging IP. In Appendix B of the 1985/86 Annual Report, for example, academics' publications were listed in their entirety, but patents were not mentioned. This is an issue which the ILO quickly addressed:

"... I have pointed out to the University ... that if we are expecting [academics] to identify exploitable, protectable know-how, we may be asking them to divert some effort from producing papers ... I have got the University to agree that patents filed will now be included as a record of academic achievement. Therefore, it [should] add up to brownie points for internal promotion ..."

In fact, the criteria for promotion to Senior Lecturer make no explicit reference to patents. Promotions to Senior Lecturer at Bristol are based on competitive merit in:

- scholarship and research;
- teaching;
- management and administration;
- general contribution to the University and the community within which the University operates.

For promotion to Reader, the greatest weight is given to scholarship and research, but for promotion to Senior Lecturer, the relative weight given to these four criteria may vary appreciably, in recognition of the fact that candidates may not have had equal opportunity to excel in all four.

The failure to mention patents explicitly may not necessarily indicate that they have no value as a criterion for promotion. The memorandum dealing with criteria ⁽³⁴⁾ stressed, under the heading "Scholarship and Research", that articles in refereed journals are not necessarily the main form of communication of research findings in some subjects. It recognised that today research findings are disseminated in increasingly diverse ways.

Given that exploiting IP in the most advantageous way often requires the involvement of the researcher, the ILO is concerned that the University should give clear messages about this use of their time. He believes it is now generally appreciated that time and effort spent on exploitation will not damage people's academic position, but:

"... that is not quite the same as saying that it will positively [enhance] it ... It's dealing with the fear first, rather than starting with a positive incentive ..."

There are indications that involvement in the exploitation process, particularly entrepreneurial involvement, may actually be positively rewarded in terms of promotion. Under the heading "Management and Administration", the criteria for promotion include "entrepreneurial activities". It is clear that "entrepreneurial" is interpreted here in its widest sense, including, for example, "*establishing working relationships with universities elsewhere*". However, this paragraph also indicates that account will be taken of income generation activities. Moreover, under the heading "General Contribution to the University and the Community", involvement in "*enterprises directed at the economic development of the region*" is also listed as a criterion for promotion.

4.5 Sanctions

The ILO is fairly sure that there are some academics at Bristol who have failed to bring potentially exploitable research discoveries to the University's attention. Some may even have transferred technology in a way which did not benefit the University, and may or may not have benefitted themselves:

"... It's almost certain that this has happened, in the same way as people bend the truth when filling in Inland Revenue forms. I think its quite unlikely that there has been a major, knowingly dishonest act, though ..."

Even if there were, the ILO does not believe the University would seek redress via the courts:

"... It's not the style here to do so ... The emphasis would be on recovery. Recovering ownership, if possible, recovering rights. But actually suing the employee would be such a unique situation, I couldn't say how the University would act ..."

The ILO believes the University would be more likely to deal with it within the framework of conventional disciplinary procedures, although minor abuses might be dealt with less formally. Academics might be quietly told that they had damaged their chances of promotion, for example. This is not something which the head of the ILO feels he should tackle:

"... it [is] very important that I remain trustable and credible ... I think I would be breaching any trust if I said to someone - You've blown it, we can't let this go ..."

In the view of the ILO, this should be delegated to the HoD or the Dean or even Senate.

5 THE EXPLOITATION PROCESS

5.1 Interpretation of Government Statements

It is difficult to know exactly how Bristol interpreted Sir Keith Joseph's statement concerning the role of academics in the exploitation process. Although Sir John Kingman was later installed as Vice-Chancellor at Bristol, and he effectively responded to his own letter, he was not involved in the discussions which the arrival of his letter and Sir Keith Joseph's statement triggered. If detailed notes of those discussions were kept, no record of them is now to hand, because the relevant file cannot be traced. Since the ILO has effectively assumed responsibility for reconciling recommendations, attitudes, custom and practice into a coherent policy - and he has never seen a copy of either document, it is not surprising to learn that the policy he has formulated takes no account of the government's wishes in this respect.

5.2 Identification

The ILO chose to concentrate his efforts for the first two or three years on the first stage of the exploitation process: identifying promising research discoveries. He was not privy to research proposals submitted to funding bodies other than industry. Nor is he necessarily privy to every proposal which is submitted to industry, since Departments have the right to conduct their own negotiations. In theory, at least, this could place the ILO at a considerable disadvantage. In practice, however, Departments are increasingly opting to involve the ILO in their negotiations - and since many applications to the Research Councils involve collaborative schemes with industry, the ILO is aware of some of these submissions, too. Moreover, a list is circulated roughly once a month detailing successful grant applications to every type of funding body.

Academics who have been at Bristol since the early 1980s are unlikely to be completely unaware of the University's sudden interest in asserting its rights in employee inventions in order to generate income for the University. When Bristol thought about formulating a policy on IP in the wake of the 1981 cuts, both the University's ownership of employee inventions and the University's desire to assert its rights were discussed in Senate on a

number of occasions. These discussions were duly reported in the University's fortnightly newsletter. Staff who joined the University more recently - particularly researchers on short-term contracts - present the ILO with more of a problem, however. There is no documentation other than Bristol's terms and conditions of appointment, which were amended in 1989 to incorporate the terms of the 1977 Patent Act and the 1988 Copyright Act, and a set of Senate guidelines on IP, outside work *etc* which is supposed to be displayed in every Department.

Recognising the problem, the ILO offered in 1988 to make a presentation on IP at the annual induction course for new members of staff. By 1989/90 the Personnel Office had not taken up his offer ⁽³⁵⁾.

Irrespective of when they joined the University, the ILO feels that some academics are not sufficiently aware that the University's policy has been extended to include IP arising out of Research Council-funded projects. The "Newsletter" did mention the removal of the BTG's monopoly in May 1985, but it was buried in the small print of a long report ⁽³⁶⁾. This same report mentioned in the broadest terms that British universities were being approached by patent agents and patent brokers as a consequence, but did not spell out the fact the Research Councils had offered exploitation rights to the University. Equally, it failed to report on the University's response to the Research Councils or on the authorisation which the University subsequently received from the Research Councils ⁽³⁷⁾. The ILO believes it was the Vice-Chancellor's practice to despatch an annual memo to some members of staff to remind them of the University's responsibility *vis-a-vis* discoveries arising out of Research Council-funded projects ⁽³⁸⁾. However, despite such memos and the best efforts of the ILO, it is still possible to encounter academics whose first instinct is to offer their discoveries to their long-standing contacts at the BTG.

Others are aware of the change, but question the wisdom of the University accepting responsibility for exploiting IP. The ILO has sometimes had to play an evangelising role, persuading doubters that:

"... exploitation is largely to do with producing further income to do what the University is here for, rather than shifting towards [becoming] a commercial institute ..."

On the whole, though, people's attitudes to IP and its exploitation are closely correlated to how easy it is for them to imagine commercially viable applications of their research:

"... Within Physics, for example, there are groups working very near the frontiers of knowledge who are honestly convinced both that what they are doing is not readily exploitable and that it would require a diversion of their efforts to even spend time thinking about it.

"They are probably right that their work is much further from the market than some people's. I don't think they are right [to] get doctrinaire about it ..."

The ILO's strategy is to raise awareness of IP in the broadest sense, rather than to focus specifically on research funded by the Research Councils. Tactically, the ILO prefers to rely on face-to-face rather than written reminders. Reminders may be spontaneous or planned, addressed to individuals or to groups. Casual conversations provide an opportunity to leave a trail of "triggers" which will encourage individual researchers to

contact the ILO before doing anything which might prejudice the ability to protect their IP. Departmental meetings provide a more formal opportunity to impart the same message to larger groups and the ILO tries to solicit invitations to speak. The ILO has also organised several events designed to raise awareness of IP⁽³⁹⁾. In 1989/90, he arranged for a local patent agent to hold a regular, on-campus surgery for each of the three science-based Faculties, at no cost to the University.

In theory, the ILO should be helped in his search for IP by the HoDs. Since 1983/84 it has been University policy for HoDs to scrutinise outgoing research reports for potentially exploitable IP. However, it is not clear how - or indeed, whether - HoDs are carrying out their responsibilities in practice, or whether those who are doing so remember to pass on their findings to the ILO. This is not a gap which the ILO plans to plug in the immediate future, partly for pragmatic, political reasons - the ILO is still in the process of establishing himself - and partly for principled reasons:

"... a new bit of bureaucracy is often a major demotivator. It could well be that we [devise] an efficient system which is so under-utilised that we would be better with the old method.

"The fact that there is a fairly widespread lack of concrete systems may well be the way that this University should continue. It may well be the best way to get [people's] free co-operation.

"That relates to the high level of Departmental differences and the high degree of academic freedom which is traditional here. [That] carries other advantages [which] we don't want to lose ..."

For similar reasons, the ILO would not consider asking academics to submit drafts of papers before submitting them to journals:

"... [We would] not wish to give the impression of any restriction on the dissemination of knowledge. There's a very strong stand [against that] at Bristol ..."

The ILO is not keen on allowing outside organisations into the University to trawl for IP unless they have "*earned respectability*". The two exceptions are the BTG and 3i Research Exploitation Ltd. By 1989/90 Bristol's enabling agreement with 3i Research Exploitation Ltd had not yet led to any exploitation deals, however, and in the previous year or so, the BTG had not made any visits.

5.3 Evaluation

By 1989/90 the ILO had paid less attention to evaluating potentially exploitable IP than it had to identifying it in the first place, even though his remit stated: "*one major responsibility ... will be to help assess the commercial potential of inventions made within the University ...*". Faced with a need to prioritise his activities, the ILO felt he could rely to some extent on his own judgement in this area, given his previous experience. As a result, he concentrated on assessing the scientific and novelty value rather than the market value. He did this by means of discussions with the researcher and, to gain greater objectivity, with his peers within the Department.

The working party which approved the establishment of the ILO recognised that evaluating IP would present the University with a problem. Instead of creating a budget heading with funding to commission private sector market analyses, the University opted for a patents review panel which could act as an in-house resource to give an indication of the likely market value. The panel, consisting in 1989/90 of a financier, a retired industrialist who is a member of Council, an IP specialist and representatives of two high-tech companies had its first meeting in September 1989 ⁽⁴⁰⁾ and was scheduled to meet at least twice a year. Given that the decision on initial registration sometimes needs to be made within a matter of days, rather than weeks or months ⁽⁴¹⁾, it is likely that the panel's expertise will be reserved for the more expensive decisions, such as whether to proceed with a full application when commercial interest in a discovery is uncertain.

Although there is no budget heading dedicated to commissioning a market evaluation of academics' discover universities, in practice the ILO has virement between budget headings. If it was necessary, the requisite sums (estimated at around £750 minimum) might be found. However, the ILO is sceptical about the value of such exercises: they require considerable effort to set up and monitor and the results inevitably fall considerably short of the kind of evaluation which the BTG would provide. The ILO acknowledges that the BTG itself sometimes makes money available for a market analysis, but does not regard this as a particularly useful option:

"... For a start, you have to ask for it, and they don't always say yes. They've only said yes to us once, so far. Secondly, a market analysis is generally more appropriate when there is something more mature. At the stage [that] we are considering filing patent applications, we're quite likely to have something that needs another year before one can take the sensible industrial view, anyway. The option of not filing until then and keeping very quiet, preventing leakage and not publishing is sometimes too high a risk. So we tend to file quite substantially before the work is sufficiently mature for a good market assessment ..."

There is a conspicuous absence of public sector agencies in the Bristol area which could provide a worthwhile, independent and free market evaluation when the time was right.

5.4 Protection

(i) Philosophy

The ILO makes every effort to ensure that potentially exploitable IP is protected at the earliest possible opportunity. This may entail an initial registration, copyrighting or simply keeping it secret. Despite the ILO's qualms about the risks involved in keeping a discovery secret, he recognises that this is sometimes necessary as a strategem "*to delay the start of the clock ticking*" - it allows more time for development work before having to submit a full application. This often yields a stronger, broader patent. In situations where secrecy is considered too risky, the ILO recognises that premature initial registrations may yield a patent of lower quality or may, indeed, have to be withdrawn and resubmitted a year later.

Secrecy on a long-term basis is a different issue. If an industrial partner is insistent that it wants to use IP on the basis of secret know-how, rather than be granted a license to exploit a patent, Bristol's decision will depend on the partner agreeing to two things: that the University has free use of the know-how for its own teaching and research purposes,

and that any embargo on publishing should not exceed one year. The ILO has no sympathy with either companies or universities which negotiate embargoes of up to five years:

"... If five years were really necessary, I might find it easier to swallow. But generally an outside funding body that requires five years is really just trying to make their own life easy, rather than asking for something that's absolutely necessary ..."

Bristol's reluctance to accept delays on publication is a long-standing phenomenon. Developing this into a policy with hard and fast numbers is something which the ILO has done, guided by his knowledge of what industry can be persuaded to accept. Despite the general ethos, naive academics are sometimes willing to accept a longer delay than the ILO would regard as necessary:

"... It's rather interesting, because one would expect it to be the ILO who would try to encourage them to waive their academic interests, but sometimes it is the other way around.

"If an academic is keen to go ahead, after having pointed out the disadvantages of the delay and [tried] to get it to a minimum, ultimately it would be the academic's decision as to whether it complies with the Senate guidelines or not.

"... If I felt sufficiently strongly, I would make sure it was dealt with at sufficiently high academic levels. I'd say - I think we ought to get your Dean to check there's going to be no problem with academic guidelines. Just saying that may be enough to make somebody think - well, yes, it is a bit long ..."

Ideally, Bristol would like to retain ownership of all the IP generated by its staff, protect it on a fairly world-wide basis ⁽⁴²⁾, find one or more active partners who are prepared to pay a substantial sum upfront or generate an ongoing revenue stream, and still have reversion rights to the IP. In practice, the University has not always been able to retain ownership. In two or three cases, the IP has been assigned in return for a lump sum:

"... [we] know that we could regret it later but ... we just cannot have an unlimited number of patents which we continue to support even though there is no prospect [of a partner] ..."

(ii) Practicalities

If it is possible to protect a discovery via a patent application, financially feasible - and the academic agrees to it ⁽⁴³⁾ - the ILO brings in a patent agent to draft the specification. Academics are simply asked to discuss their discovery with the patent agent and review the resulting specification. Although this is more costly, the ILO regards it as essential:

"... the patent agent knows everything that needs to be included and has the experience and know-how to be able to extend into other fields that the University might not have thought of. In any case, if he's doing his job properly, he is going to add quite a lot.

"Academics are much more likely to write a patent specification as if it were a paper, perhaps not including things that they would include after cross-examination, but wouldn't include, just sitting and writing ..."

The ILO also sees this approach as less distracting to academics. It means, too, that the cost of filing patents is more easily quantifiable.

(ii) Finance

Bristol's budget for filing new applications was £6,000 in 1989/90. Ongoing costs like renewal fees do not come out of the ILO's budget but are borne centrally, with £12,000 set aside for this purpose in 1989/90. The ILO felt that £6,000 was sufficient to cover the cost of employing a patent agent to draft and file all the patents it can handle in any one year:

"... It is dictated not by the ultimate need, but by what I could see us being able to handle, year on year. Perhaps we should be identifying 30-50 patentable inventions a year [but I don't envisage] suddenly being able to build up to that level ..."

On the other hand, if there was a sudden flurry of promising discoveries, the ILO has virement between budget headings. It is also likely that he would be allocated a mid-year budget supplement if his case were strong enough.

So far, Bristol has managed to keep supporting only two long-term, more speculative patents. In both cases, the inventions concerned have such a breadth of application in a number of industries that the ILO feels it can justify the considerable costs involved. In the long-term, the ILO would like to support a higher proportion of speculative patents and to a certain extent, this objective influences its approach to commercialising IP.

The ILO recognises that there may be occasions when it cannot justify patenting a discovery - or paying the renewal fees for a patent which has been granted but not exploited:

"... We are prepared to be less risk averse [than the BTG] with the first few hundred pounds. We then diverge quite rapidly from the BTG. Once they have committed themselves, they are prepared to spend £millions, if necessary. Once we've committed ourselves, we might jump out if more than the odd £1,000 were involved ..."

(iv) Ownership

It is the University's practice to vest patent ownership solely in its own name, not in the joint names of the University and the member/s of staff who generated the IP. Where students are concerned, Bristol has agreed to joint ownership in two cases, however. Neither practice has yet been formally articulated as a policy decision. The ILO is in the process of addressing the complex issues of ownership together with the Secretary, the Director of Personnel and the Patents Panel.

In a situation where the ILO does not feel he can justify patenting a discovery, or paying renewal fees, if the researcher felt it was worth continuing, the University would consider issuing a **conditional waiver/assignment**. This has not happened since the ILO was appointed, but the University occasionally issued a conditional waiver in the preceding years. It retained a modest interest in the IP as recompense for the resources it had invariably contributed ⁽⁴⁴⁾. Despite his own reluctance to pay the patenting costs, in this situation the ILO would prefer that researchers did not use the "DIY route" to protect the IP:

"... having seen some amateur proposals, I'm pretty disillusioned with them ..."

In this situation, the ILO would hope that the Department concerned might cover the cost of some input by a patent agent, unless the IP showed no promise at all. The ILO is confident that his cautious approach to protecting IP will generate sufficient income to enable it to adopt a more speculative stance within a relatively short period. Even if it is proved wrong, it does believe that the University will demand a change of policy:

"... I don't think it would alter the way we behave very much, because quite a lot of what is going on through the ILO is a University act of faith rather than simply a hard-nosed, we'll-see-year-by-year-if-it-pays-and-decide-whether-to-continue [approach] ..."

5.5 Commercialisation

Where it retains rights to its IP, Bristol has no **principled** objection to exploiting it via licensing to a third party, a University company, a joint venture ⁽⁴⁵⁾ or even an independent academic spin-off company.

(i) University Companies

In 1987 the University took the decision to set up a holding company, with a view to forming subsidiary companies to exploit equipment, expertise and IP in different areas, as opportunities arise. In practice, however, by 1989/90 it has not elected to exploit IP by any of these more entrepreneurial routes ⁽⁴⁶⁾. IP has only been assigned or licensed to a third party. There are a number of reasons for this, not least the fact that - in the view of the ILO - Bristol is a fairly risk-averse organisation:

"... [If] we put in a commercial proposal which might involve a company or something similar, generally, the major question the University is interested in is - if things go badly, what is the worst it can do to us? - rather than - if things go well, what is the best it can do for us?"

"[There are] three sorts of risk: investing money and never seeing a return, ie. a simple financial risk; the risk to the University's reputation as a scholarly institution; and finally, the risk of litigation from others.

"If all of these are well under control, then the University is prepared to be quite entrepreneurial in principle about investing money in new activities ..."

In this equation, Bristol is particularly concerned about its reputation as a scholarly institution:

"... the University is not wanting, in principle, to be seen as a go-getting, commercial whizz-kid University which might give the impression of putting academics ends into second place. It is very important to Bristol to be seen as an academically high-class University. Anything that might hint that that was being eroded would be [vetoed] ..."

At the moment, the ILO also prefers assigning or licensing IP to more the entrepreneurial exploitation routes, though for more pragmatic reasons:

"... It goes back to [the question of] short, medium and long-term. As we build up our portfolio of first of all short-term revenue via divesting ourselves of ownership, and secondly setting up commercial licenses, then we will have a stronger basis on which to do some long-term work which might include hanging onto ownership and investing substantial sums of money in patenting and/or setting up companies to exploit them. That really needs a stronger base ..."

The ILO is confident that this could happen in the not too distant future, though it will always be the exception, not the rule ⁽⁴⁷⁾:

"... As of next year (1990/91), if a potential goldmine came along where there was a product champion - an in-house product champion - then [we] would seriously consider and perhaps recommend that the University went ahead [and founded] a University company, for example.

"It would have to be lower-risk than most, it would have to have a clearly identified person who is going to pull it along to make it fly - not just hope to find someone. If all that came together within the next year, yes!"

(ii) Academic Spin-Off Companies

The ILO adopts much the same approach to academic spin-off companies. This does not necessarily mean that Bristol is full of thwarted would-be academic entrepreneurs, however:

"... It's fairly common for somebody to say - I've got this brilliant idea, I know it's a winner, I want to set up a company so that I can make lots of money. Questioning reveals they actually do understand that its not that simple, but they've sublimated that to their enthusiasm ..."

In the cold light of day, it is unusual for them to want to continue. Since February 1987, only one academic spin-off company has been founded to exploit IP - with the ILO's blessing ⁽⁴⁸⁾, and nobody has challenged the ILO's decision as to how their IP should be exploited. If someone did, the ILO would ask why ...

"... if there was any way of adapting the University's route so as to deal with that objection, fine ... It would not be right for the University simply to say that because the academic preferred another route, ok! ..."

If there were still disagreement, the Vice-Chancellor would probably make the final decision, taking account of the fact that the head of the ILO has 15 years commercial experience whereas the academic may have none.

(iii) Licensing

In practice, at the moment Bristol's IP is almost invariably exploited by licensing - or occasionally assigning - it to existing companies with a track record. With the one exception detailed, academics' contribution to the exploitation process has been limited to helping identify companies to whom the IP can be licensed or assigned, making the initial approach, supporting the ILO in any subsequent negotiations and providing scientific/technical support once agreements have been signed. Experience to date suggests that Bristol's academics are generally keen to become involved in this way. Given that at present the ILO has chosen to concentrate on the beginning of the exploitation process, he sees the researcher's contribution as particularly valuable ⁽⁴⁹⁾:

"... In engineering, especially, the academic input in terms of finding potential partners is very, very important ... It is likely to be important in all areas, because the inventor is quite likely to know the most likely application for what he has got ..."

Academics can sometimes be a mixed blessing, however:

"... There are certainly instances where the University's negotiating strength has been prejudiced by things being said or implied offers being made by academics, where we have had to try and recover [lost ground] ..."

This has not deterred the ILO from involving academics. In the rare instances where researchers are not immediately interested, the ILO persuades them to co-operate:

"... [we] mainly take account of how much involvement is needed from the academic, rather than how much they want ..."

(iv) BTG

Their assistance in identifying industrial partners is particularly necessary, since the ILO has largely dismissed the idea of offering research discoveries to the BTG:

"... In the last nine months or so, I've involved them less because of the lack of success with maybe five, six, seven, even eight examples in my first eighteen months here.

"I've developed the feeling that the BTG has become much more oriented towards looking for a pyrethrin or a cephalosporin replacement. They are looking for high certainty ..."

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy

Bristol has not had sufficient experience of academic entrepreneurship to cause it to formulate an explicit, comprehensive policy. What it has is a general view, which holds that academic entrepreneurship is "a good thing". Bristol's attitude was influenced by what it perceived was happening in other civic universities ⁽⁵⁰⁾. It discovered this largely through

chance conversations with fellow Vice-Chancellors, Secretaries, Finance Officers *etc*, rather than through UDIL, which it did not join until 1987/88. This general view received a fillip when Sir John Kingman was made Vice-Chancellor in 1985. The ILO feels that where entrepreneurial activities are concerned, he has given "*unusually unlimited moral and other support which other Vice-Chancellors might not have done*".

The administration's enthusiasm derives largely from its belief that spin-off companies create opportunities for synergy, as staff move between University and company. Many academics are sympathetic to this view - in principle, at least. In practice, though, some of them would prefer not to suffer the disruption of technology-transfer-by-movement-of-people in their own Department. There are academics who have a principled objection to activities such as academic entrepreneurship, moreover, seeing it as an unwelcome sign of the University's acceptance of government policy ⁽⁵¹⁾. Others feel threatened by the concept:

"... There are individuals and little pockets of individuals who really want to be left alone to do their own research in their own corner ... Some have expressed it [in terms such as] - I didn't come here to a University to do what I could have done in industry ..."

Despite the disquiet which academic entrepreneurship provokes in some quarters, over the years a number of academics have become involved in entrepreneurial activities of various types. For some, this has meant operating within the system, setting up institutes/centres/units which have a partial or complete self-funding requirement ⁽⁵²⁾. On the initiative of these entrepreneurs some of these quasi-academic organisations are likely to be converted to limited companies - wholly-owned subsidiaries of a University holding company - operating on-campus and managed in many cases by the academics concerned. Whilst most of these are currently exploiting equipment and/or expertise, all have the potential to exploit "hard" IP and one already does ⁽⁵³⁾. By 1989/90, however, none of Bristol's academics had proposed a joint venture with the University, though in 1989/90 the framework was set up for one such venture on the initiative of the ILO ⁽⁵⁴⁾.

A not insignificant number of Bristol's academics have founded independent spin-off companies - usually to exploit "soft" IP in the form of expertise, though there are two known cases of academics exploiting "hard" IP. Given the administration's *laissez-faire* attitude to such activities up until 1983, it is not surprising that there is no central record of academic spin-off companies having been founded. This is something which now concerns the administration and it has been suggested that the ILO should make every effort to identify as many as possible ⁽⁵⁵⁾. It is felt that this may yield a record of successes and failures, and even wasted opportunities. Several of Bristol's academics have entered the Academic Enterprise Competition but failed to win prizes ⁽⁵⁶⁾. There is no record of what subsequently happened to their discoveries.

6.2 Making Time

Academics who want to do outside work "*of an occasional and minor nature*" are not required to ask permission at Bristol, but those wanting to do outside work "*of a more continuous or substantial nature*" are expected to ask permission - unless it is consultancy or contract research negotiated by the Department ⁽⁵⁷⁾. Asking permission involves academics consulting their HoD before sending their request in writing to the Secretary; HoDs are expected to ask permission of the Vice-Chancellor. Although there is no

reference to company start-up, this would presumably be defined as outside work of a more continuous or substantial nature. However, given its attitude to academic entrepreneurship, the University is unlikely to withhold permission. This would enable academics to devote around 20 per cent of their working week to their business activities provided they did not neglect their primary academic commitments ⁽⁵⁹⁾. On the same basis, they could also devote evenings and weekends to business activities.

If the University felt that an academic's commercial activities complemented the work of his Department, the ILO believes s/he might be allowed to devote significantly more time to them, irrespective of whether s/he was involved in the commercial arm of the Department, a campus company, a joint venture with the University or an independent spin-off company. Moreover, s/he might even be allowed to do this on full pay for a limited period, if her/his Department had sufficient funds to buy in a part-time replacement ⁽⁵⁹⁾. If the Department in question were in deficit, this might mean having to negotiate a part-time contract or arrange for a year's leave of absence, however. It is felt that leave of absence for company start-up activities would be granted "on the nod", though using a sabbatical for such activities might be more controversial.

Although the University does not have a comprehensive policy regarding academic entrepreneurship, its willingness to assist would-be academic entrepreneurs for a limited period by giving them time was minuted by Council in the mid-1980s ⁽⁶⁰⁾. In principle this offer is open to academics from any Department, but by 1989/90 only science-based Departments ⁽⁶¹⁾ had taken advantage of it. In practice, it may depend very much on the attitude of the HoD whether or not exploitation of expertise or IP are seen as being complementary to the Department's main activities. It also depends on the company satisfying the demands of the Safety Officer and the Finance Office, if it is planning to operate from the campus ⁽⁶²⁾.

After a year or so, academics are expected either to become full-time entrepreneurs or revert to being full-time academics, dedicating no more than a day a week to running the business. With one exception ⁽⁶³⁾, the ILO knows of no academic entrepreneurs who elected to leave the University completely in favour of becoming full-time businessmen.

6.3 Other Resources

(i) Equipment/Instrumentation, Support Staff, Communications

In principle, the University is in favour of allowing would-be academic entrepreneurs access to such resources, irrespective of whether they are involved in an in-house commercial arm, a campus company, a joint venture with the University or an independent spin-off company. This willingness to help applies equally to academics exploiting expertise and to those trying to exploit "hard" IP and it applies whether the University profits from the academic's activities or not.

In practice, the extent to which entrepreneurial academics get access to resources depends entirely on the local situation in their Department. The overall demand for any particular resource obviously influences the situation, as may the attitude of the HoD. This is also likely to determine whether or not they have to pay for the resources used, despite the dictat of the Finance Office, which requires academics to keep a log of resources used for personal work so that a charge can be levied. If the Department's equipment/instrumentation has spare capacity, and the HoD approves of an academic's

entrepreneurial activities, he is likely to turn a blind eye for the first 6 to 12 months, while the academic "tests the water". Similarly, if the academic needs the assistance of technicians or secretarial staff, the HoD may try to find ways to subsidise the cost from other operations. Only materials or telephone calls are likely to be charged at cost from the outset ⁽⁶⁴⁾.

(ii) Accommodation

In principle, Bristol also tries to help its entrepreneurial academics by allowing them to set up - and in some cases - actually run their businesses from University accommodation. This applies equally to academics involved with an in-house commercial arm or a campus company, to those involved in a joint venture with the University and to those whose spin-off company is completely independent of the University. In practice, there are some businesses which the ILO has preferred to see locate off-campus, however ⁽⁶⁵⁾. Although the University perceives itself as being short of space, UFC norms suggest that Bristol is under less pressure than many other universities. If an academic is able to conduct his business from existing Departmental space, he is unlikely to be charged for it in the start-up period. Where academics have been allocated additional space by the administration, they are liable to have to pay for it, however, and they will also have to pay once the company is up and running. Bristol looks for no return over and above charging for space, unless a profit-sharing arrangement has been negotiated because the academic is exploiting the University's IP.

The University's relaxed attitude to the use of its accommodation for commercial activities may change during the 1990s, when or if the proposed science park is built ⁽⁶⁶⁾; academics may then be encouraged to move out to one of the incubator units.

(iii) Finance

Bristol has not set up any kind of seedcorn fund, innovation fund or development fund to support the entrepreneurial activities of its members of staff. Despite being increasingly prevalent in other universities, the concept is quite new to Bristol. To date, the University has only made a small loan to fund a negative cash flow on two in-house commercial projects. In one case, the commercial arm of a Department has been registered as a company, in the other, the commercial arm may become a company in due course. The ILO has no plans to buy equity in an independent spin-off company. Any joint ventures to date are joint ventures by virtue of the University demanding an equity stake *in lieu* of routine payments for the use of its IP.

6.4 Business Start-Up Advice

If academics decide to become entrepreneurs, the University does not consider it has a responsibility to ensure that they go about it the right way. On the other hand, it does not take a totally *laissez-faire* attitude. The ILO has established a resource centre with numerous publications on obtaining funding, setting up in business *etc.* Time permitting, the ILO will always try to answer any further queries which academics might have - or refer them to appropriate sources of assistance.

At the moment, these are likely to be outside the University since the ILO has not had time to research the kind of assistance which is available in-house. Although the University does not offer Honours courses in business studies or marketing, it is one of

Britain's nine Regional Enterprise Centres. The Industrial & Management Services section of the Department of Extra Mural Studies runs the Graduate Enterprise Programme and a number of other small business training programmes. Moreover, the Faculty of Law has substantial knowledge of commercial law and business liability. It runs a variety of evening classes, half-day and one-day courses on IP law, company law, personal and corporate taxation *etc.* The ILO recognises that there may be scope for a directory of in-house resources, but this is not an immediate priority. In the meantime, fellow-academics who have more experience may be the next best in-house resource.

7 EXPLOITATION SCRUTINY GROUP ASSESSMENT

In August 1990 Bristol was informed that the Exploitation Scrutiny Group was satisfied with the exploitation arrangements which the University had established. A formal document was scheduled to follow confirming the University's rights to IP arising out of Research Council-funded projects for an indefinite period. Henceforth, Bristol was required only to report inventions to the Exploitation Scrutiny Group.

CITY UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

City is one of a group of ten British universities commonly referred to as an "ex-CAT" - that is to say, a former College of Advanced Technology. City started life in 1894 as the Northampton Polytechnic - named not after the town but after a square to the north of the City of London. In 1966, the Northampton Polytechnic was given university status, at the same time as Salford, Bradford, Surrey *etc.*

1.2 Size

At the beginning of the 1980s City was the smallest monolithic university in England, measured in terms of student FTEs. Nevertheless, in 1981 City was advised by the UGC to reduce the number of home students registered in 1979/80 by 5 per cent by 1983/84. This was very close to the national average, as **Figure 2** revealed. However, City was already recruiting 20 per cent of its students from overseas. As we can see from **Figure 2**, this was the third highest percentage in Britain and almost double the national average. This was therefore a bigger blow than is immediately obvious. City had already been put under considerable financial pressure in the late 1970s, as a result of being required to charge overseas students full fees; the proportion of overseas students had already begun to diminish. This was compounded by the UGC's 1981 announcement that City's recurrent grant was to be reduced by 20 per cent between 1980/81 and 1983/84. As we can see from **Figure 2**, this was somewhat above the national average. City had no endowments and by most methods of reckoning, this concatenation of events place it in the worst afflicted group of universities in terms of resulting hardship.

In 1986 the UGC indicated that City should increase its student numbers by 15.39 per cent over the next four sessions ⁽¹⁾. This was around three times the national average - but in fact, student FTEs increased by 19 per cent between the beginning and the end of the decade ⁽²⁾. By 1989/90 City had the highest percentage of postgraduate students of any university in Britain. Moreover, City managed to increase its full-time academic staff numbers by 11 per cent in the course of the 1980s; at the same time, the number of part-timers employed increased by a factor of seven ⁽³⁾. This expansion almost brought City out of the bottom size quartile, as UK universities go, and its size relative to many other universities increased somewhat. However, it is still the smallest university to participate in this study.

Structurally, City ended the decade with one less Department than at the beginning, though this is not directly attributable to the cuts. In the mid-1980s, as a result of City's own decision, the Physics Department was subsumed into the Engineering School. As a direct result of the UGC's Chemistry Review, City's Chemistry Department was due to close in 1990, with the majority of the staff being made redundant.

1.3 Science Base

Being an ex-College of Advanced Technology, City's science base consists predominantly of engineering and applied science disciplines more than pure sciences ⁽⁴⁾. This bias will be reinforced by the closure of the Chemistry Department. City will be left with Departments of Civil Engineering, Electrical, Electronic & Information Engineering (grouped together as the School of Engineering), Mathematics, Actuarial Science & Statistics (grouped together as a School), Computer Science, Information Science, Business Systems Analysis, Optometry & Visual Science, Clinical Communication Studies and Systems Science.

On the basis of student numbers, these Departments represent a sizeable proportion of the University: the School of Engineering accounts for roughly a quarter, as do health-related subjects. The Business School also accounts for roughly a quarter. On an aggregate basis, staff in these Departments represented about 54 per cent of the University's total academic/academic-related staff in the 1988/89 session ⁽⁵⁾. They appear to have been responsible for 67 per cent of City's undergraduates, 68 per cent of registered research students and 36 per cent of City's taught postgraduates, who numbered close to one thousand ⁽⁶⁾.

As Figure 6a revealed, in the UGC's 1986 assessment of universities' research strengths in the natural sciences, engineering and technology, all of City's subject areas were rated as below average. It was suggested that if the ABRC's recommendations were implemented, in common with seven of Britain's ten ex-Colleges of Advanced Technology, City would be assigned to the "T" category; accordingly, the University would be able to offer some postgraduate work, but without advanced research facilities ⁽⁷⁾. City's ranking was not a reflection of poor research so much as little or no research. Traditionally, City has been a strongly vocational University which channelled its energies into producing engineers who would be first-class practitioners. Research, particularly the type of research funded by the Research Councils, has had little place in this tradition. This is a deficiency which City has been striving hard to overcome. It has founded a number of research centres which are dedicated predominantly to academic rather than commercial contract research ⁽⁸⁾, though some undertake collaborative research. As Figure 6b showed, City's ratings in the 1989 research selectivity exercise suggest that it is embarked upon a long, slow process. No "units of assessment" in the natural sciences, engineering & technology were awarded a "5" or a "4"; two were awarded a "3", four received a "2" rating and three a "1" ⁽⁹⁾. City's management has reason to believe that perseverance eventually pays dividends, however ⁽¹⁰⁾.

1.4 Research Grant and Contract Income

As Figure 41a indicates, in 1984/85 City ranked 43rd in terms of £ earned in external research grants and contracts, and 47th in terms of the percentage of its total recurrent income which this external revenue represented, namely 7.5 per cent ⁽¹¹⁾. There is no surviving record of the proportion of City's £1.7m which was contributed by the science base in that year. However, in the following year, as we can see from Figure 41a, the science base generated just over £1.5m, accounting for 81 per cent of the University's total income from research grants and contracts ⁽¹²⁾. Figure 41b shows us that in 1988/89 the science base generated over £2.2m, accounting for only 74 per cent of the University's total income from research grants and contracts ⁽¹³⁾.

The pattern of sponsorship which the science base attracted differed considerably from the pattern three years earlier. Whereas industry/commerce provided 13 per cent of its research grant and contract income in 1985/86, by 1988/89 this had risen to 21 per cent. This was largely at the expense of income from central government, local government and various overseas sources, which dropped from 45 per cent in 1985/86 to 36 per cent in 1988/89. Figures 345-346 reveal that City was the only university participating in this study to increase the proportion of funding it received from Research Councils and charities, but only by 1 per cent.

2 HISTORY OF IP EXPLOITATION

2.1 Background

Despite its technological background, City does not have a history of actively seeking out IP with a view to exploiting it:

"... There wasn't ... a distinct policy of encouragement, help or support ..."

If IP was identified and flagged prior to the 1980s, it was invariably on the initiative of the academics concerned. Whether or not this happened seems to have been less a question of subject area than the attitude of the individuals concerned. Inevitably, opportunities were missed, even when individuals were alert to the possibilities:

"... They died - withered on the vine because there were more important things to do - or there seemed to be at the time: teaching students and all the other University activities ..."

On the other hand, once possibilities were drawn to its attention the management ⁽¹⁴⁾ was generally supportive, providing encouragement and money if it appeared a discovery was both patentable and exploitable and not obligated to the NRDC or a sponsor. A rough and ready evaluation of its potential would be obtained in-house, often from the HoD. If it looked promising, the management would cover from central funds the cost of a patent agent to make an initial registration. The academics concerned would be encouraged to try and identify an industrial partner who would help develop, manufacture and market the IP.

This *laissez-faire* approach to the exploitation of IP began to change in 1978. It was not particularly motivated by an increased interest in IP in its own right; it was rather part of a global change of approach which followed the arrival of a new Vice-Chancellor and the beginning of City's financial difficulties. City began to take a more entrepreneurial interest in exploiting its IP. The outgoing Vice-Chancellor had played a part in this, when he agreed in 1977/78 to City founding City Technology Ltd (CTL), a wholly-owned University company dedicated to exploiting "hard" IP ⁽¹⁵⁾. The highly successful activities of this company served to reinforce this new approach over the years: within five years it had generated an income of around £0.3m with no strings attached to it. In the process the company had won the first of three Queen's Awards to Industry ⁽¹⁶⁾. In 1983/84 City founded a second wholly-owned company, which has been modestly successful ⁽¹⁷⁾.

City's courage to exploit its IP itself is generally attributed to the attitude of two Vice-Chancellors and the Director of Finance:

"... [These people all had] a background which ... encouraged them not to be averse, when it seemed right, to take risks ..."

This same group of people has influenced City's whole approach to IP, together with the current Secretary, who was appointed in 1983 after twenty years at the University of Surrey, culminating in four years as Deputy Secretary and Bursar. His interest in Surrey's business activities led to him helping formulate that University's patent policy in the early 1970s ⁽¹⁶⁾. Despite the insights and knowledge which this experience afforded, initially he discouraged City from formulating its own formal policy *vis-a-vis* IP:

"... I felt we didn't have enough orthodox or conventional research, mainstream research, enough track record actually, on which to build a policy. I think policy to some extent needs to reflect experience, because universities do differ. It seemed to me that we needed to build up a stock of knowledge and collate our custom and practice.

"Something also said to me: CTL is a one-off, so we don't allow that to determine our approach to everything else. We've been exceedingly lucky. Lightning doesn't strike in the same place twice ..."

Round about the same time as the Kingman letter arrived, City started to take a more proactive approach to identifying IP. Again, this was part of a global change of approach:

"... Half-way through the decade there was a change in the balance of our approach. We knew we had to work more at seams we were already working at ... but there was a year or two [between the two restructuring periods] during which we realised we would have to be much more businesslike about the whole spectrum of University activities ..." ⁽¹⁹⁾

This "change of gear" helped City to focus on its handling of IP, among other things.

2.2 Structures

City's belief that "*lightning doesn't strike in the same place twice*" and its consequent lack of policy coloured the University's approach to the way in which it handled IP which academics flagged from time to time: City saw no need for a dedicated structure. The Secretary's office had always had the job of dealing with IP - in the sense of doing whatever was necessary legally ⁽²⁰⁾. This continued with the appointment of the current Secretary. However, he had not only an interest in the subject, but also some experience.

2.3 Incentives

During the 1970s when the management relied on members of the academic staff to find an industrial partner to develop, manufacture and market their discoveries, it was usual to split the resulting income equally between the University and the inventors, with no upper limit. The more proactive, entrepreneurial City of the 1980s continued to divide the income in this way - until July 1989.

2.4 Regulations and Documentation

None of this was formally articulated anywhere; it was "*in the air*", a question of custom and practice rather than a formal policy. In fact, City had no detailed documentation relating to IP until 1989; the Terms and Conditions of Employment simply stated:

"... Regulations shall be made from time to time by the Council, after consultation and agreement with The City University Association of University Teachers with regard to inventions and discoveries ..."

This was the situation when the Kingman letter arrived in 1985. City had an entirely reactive approach to identifying IP, but if academics took the trouble to flag discoveries with commercial potential, the University was prepared, if the circumstances warranted it, to be very entrepreneurial about exploiting it. City had already generated a not inconsiderable income from exploiting its own IP, unlike the BTG which was handling ten or so patents on City's behalf; none of those had produced a net income. However, City rated its experience in exploiting IP as modest: "*we were the parents, really, of one child*".

3 THE KINGMAN LETTER

City was not surprised to receive the Kingman letter because the Secretary had been on the steering committee of the Conference of Registrars & Secretaries' Industrial Forum since 1984. Despite being forewarned, and despite having successfully exploited its own IP, City did not at once feel able to respond positively to the Research Councils' offer:

"... the immediate reaction was - we are not ready to respond. We don't have sufficient volume coming through for it to make sense even to have a prescriptive policy. We're also dealing with [low] levels of awareness out there.

"... We thought - this is something we take slowly. We hadn't a policy. We had a way of dealing with things but we hadn't written it out, it hadn't gone to Council [and] we hadn't talked to the AUT. So, all the circumstances encouraged us to say - we'll take it slowly ..."

City's reply indicated that the University would approach the Exploitation Scrutiny Group once it had had time to devise a considered policy which would apply to all IP, however it was generated. Nonetheless, on several occasions the Exploitation Scrutiny Group "*chivvied*" City to respond. After the third letter, City felt obliged to respond affirmatively, even though it was still considering the details of its policy:

"... We did not want to be seen as totally contumacious or [as not] caring, because that was wrong ..."

The Exploitation Scrutiny Group then took nearly a year to respond to the University's reply; City's letter of authorisation was not sent until 1 April 1989 ⁽²¹⁾. In the meantime, City continued to ponder its policy *vis-a-vis* IP. This did not involve a formal consultative process; no working party or sub-committee was set up, and neither were the unions formally consulted at this stage:

" ... it is very difficult for these groups to get their minds round this ..."

The Secretary alone determined City's policy and embodied it in a draft Code of Practice. Since it made claims and sought to impose requirements on staff which exceeded any previous (unwritten) claims, it was put to the AUT and the MSF ⁽²²⁾. Once minor changes were made, the draft was circulated to members for comment. The resulting Code of Practice Relating to Intellectual Property was put to Council and endorsed on 3 July 1989.

4 CURRENT POLICY AND STRUCTURES

4.1 Rationale

The rationale underlying City's Code of Practice is that the management - in the shape of the Secretary - has a good grasp of what constitutes IP and how it might be exploited, whereas members of the academic community do not:

"... It is written for [academics] who are aware of an area which says, you know - here big dragons, IP. They know little or nothing about it except that it exists ... They need, in a sense, some expert advice. That is the one-eyed approach, taking them by the hand in a fairly friendly way to explain how things are likely to turn out, what the alternatives are, what the factors are.

"Its encouragement for them to come and talk to someone centrally, so that things will be identified, set up and dealt with in a case-by-case way which is appropriate for their level, the kind of investment that might be required and such that no-one disadvantages themselves individually, as a possible inventor, or the Department or the University ..."

City's primary objective in accepting the Research Councils' offer was to turn the identification, evaluation, protection and exploitation of IP first into a self-financing activity and then into a profitable activity, generating additional revenue for the University centrally, the Departments and the researchers concerned. Doing this in a way which most benefits the UK economy was a secondary objective. However, it feels that profitability is a long way off:

"... Given our knowledge and experience of CTL, we ... take a long view. We know [that] ... other than in a very exceptional case, the pay-back is bound to be long ..."

Since 1985 City has acquired the rights to some of the IP which it originally assigned to the NDC/BTG. City has opted to develop discoveries which it believes have marked potential, despite BTG's disinterest.

4.2 Structures

This largely explains why City still prefers not to set up a dedicated structure which would combine responsibility for IP with the conventional IL function:

"... it would be a snare and an illusion and would eat up our resources, too ... Because our research even now, even though it has grown considerably, is still very modest. And a lot of our research will not be in the technological field. It is in social statistics, business-related areas, where the methods of pay-back and applicability are quite, quite different from the manufacturing industry.

"We could easily set up something which would eat up resources and not really be a very satisfying job to those who were doing it. How much content [would there be] to the activity? It would be a misrepresentation, both internally and externally, as to the capacity of the University ..."

City has arrived at this view by dint of experience. In 1985/86 it established the City University Bureau of Industrial Enterprise (CUBIE), appointing an outsider to market the University's spare research capacity. Two years later, CUBIE was closed down with a net deficit of over £60,000. Instead, responsibility for all aspects of IP rests with the management. The person who formulated City's policy - the Secretary - also implements that policy on a day-to-day basis. Given his other commitments, he is not able to attend meetings of UDIL. However, the Director of City Consultancy Services ⁽²³⁾ does, and passes on relevant information to the Secretary.

4.3 Regulations and Documentation

City has not expanded upon the brief reference to IP contained in the terms and conditions of employment since the early 1980s.

Since July 1989, however, there has been a formal Code of Practice which is encapsulated in a nine-page document. This was circulated to all members of the academic and technical staff in summer 1989. It defines different types of protectable IP and makes it clear that the University claims ownership of all these types ⁽²⁴⁾, not simply patents, ie. its claims are wider than those covered by the 1977 Patent Act. The Code outlines the University's policy objectives *vis-a-vis* IP and indicates what is required of researchers in order to achieve those objectives. Exploitation of IP is presented as a partnership between the University and members of staff. Various exploitation routes are discussed, including licensing/assigning, University companies and the use of technology transfer agencies, but there is no reference to independent academic spin-off companies. Finally, the Code shows how the revenue generated by exploitable discoveries will be divided between the University and the researcher(s).

In case academics lose, throw away or forget about the Code of Practice, there are references to it in the latest Supplements to the Staff Handbook ⁽²⁵⁾, but it is not reproduced in full. Unlike some universities', City's Staff Handbook is intended to do no more than give a brief overview of how the University works.

4.4 Incentives

In recognition of the key role played by researchers in identifying and exploiting IP, City has introduced a variety of incentives. Two are for the direct, personal benefit of inventive researchers. Another is intended to assist researchers do their work. A fourth is directed at HoDs.

(i) Financial

In keeping with the terms of the 1977 Patent Act, academics at City are not rewarded financially simply for bringing IP to the management's attention. They are rewarded only if the IP is successfully and profitably commercialised, and they may have some say in the decision as to how it is commercialised. In July 1989, City introduced a sliding scale to regulate the division of revenue from IP. After deductions for costs, researchers receive 100 per cent of the first £5,000, 75 per cent of the next £45,000, 50 per cent of the following £50,000 and 25 per cent of any income over £100,000. These percentages apply whether there is a single inventor or multiple inventors. This is a direct, personal reward for flagging IP - and probably helping to get it exploited. This division of income is considerably more generous than that which applies in many of the other participating universities, as Figure 33 showed. It is intended to be generous towards inventors, and to convey that the University has no wish to "screw every last penny out of them" ⁽²⁶⁾.

There is also an indirect financial incentive. The University channels only 25 to 40 per cent of the residual income into central funds. As with overheads, between 60 and 75 per cent of the residue is returned to the research team which generated the IP, rather than to the HoD. This money is earmarked for academic purposes: to finance overseas conference visits, new equipment, additional Research Assistants etc. This income in turn brings additional benefits to the Department as a whole: a Department's grant is enhanced each year proportionate to its earnings during the previous year. This is an incentive for HoDs to take a positive, proactive stance towards identifying IP and to encourage members of the Department to do likewise.

(ii) Kudos

There is another incentive for HoDs to do this: in 1987 City introduced its own, in-house version of the UGC's research selectivity exercise. The Research Committee receives an annual report on each Department's research performance. This is assessed by aggregating the scores of every UFC-funded member of staff in the Department. In this scoring system five points are awarded for books/independent publications, two are awarded for articles in refereed journals and full patents and one is awarded for other articles and provisional patents ⁽²⁷⁾ ⁽²⁸⁾. The Research Committee reports its findings to Senate each year; it is a matter of public knowledge if Departments are rated as above or below average.

This system of scoring patents on a par with publications has not been entirely successful to date. Only those publications/patents which are listed in the University's Annual Report score points. Some members of staff have not understood that they should list patents as well as publications in the Annual Report; City is now trying to communicate this more effectively.

(iii) Career Progression

The problem may arise from the fact that although IP is deemed to count as a criterion for promotion, it is not explicitly mentioned in the memorandum which is circulated to HoDs each year. City assesses applicants under four, equally weighted headings:

- * contribution to research;
- * contribution to teaching;
- * contribution to Departmental administration and the internal work of the University;
- * general external contribution and professional standing.

The format specified for applicants' curricula vitae does not include a dedicated heading for IP which has been identified and protected - and/or exploited - though it could, perhaps, be included under item 14: additional relevant information. In the detailed list of criteria under each of the four main headings, there is no mention of patents. If they are equated with publications, as in the Departmental research performance exercise, this is not made clear. "Innovation" is listed as a criterion under the heading "research", but since it is also listed under the headings "teaching" and "administration", it is not clear whether this might include devices/products/processes ⁽²⁹⁾.

The Academic Registrar is not concerned by the failure to mention patents explicitly, or to indicate whether they are an integral part of the research process or an external activity:

"... I don't think it is right that there should be a ruling because the weighting is done by the individual members of the salary review committee. It is really upto them how they assess under the four headings, to give a total figure ..."

City works on the assumption that the sheer size of its salary review committee ⁽³⁰⁾ will allow a variety of weightings but yield "a reasonable statistical result when you average [it]".

There is no mention of the effort which academics may have put into facilitating the exploitation of patents, though consultancy is mentioned under the heading "external". Technology transfer in a manner which benefits the UK economy is one of the University's stated policy objectives with regard to IP. It is not clear, however, whether founding an independent spin-off company to exploit one's discoveries would count as a criterion for promotion, whether it is irrelevant, or whether it could, in fact, impede promotion prospects. The management believes this would depend on whether it was "purely a money-making activity for a member of staff" or whether it brought benefit of some sort to the University itself.

4.5 Sanctions

City is confident its incentives will ensure that discoveries made by its academics will be generally be identified and exploited in one way or another. If, on occasion, researchers are not particularly aware of commercial possibilities, discoveries may be exploited intellectually by means of a publication, rather than commercially. The management believes that the wilful, deliberate withholding of information out of vested interest would be "very rare" - no more than one in a hundred times ...

"... and your system cannot legislate - and nor should it - against that one time in a hundred ..."

5 THE EXPLOITATION PROCESS

5.1 Interpretation of Government Statements

City has not concerned itself unduly with government statements - such as Sir Keith Joseph's - to the effect that academics should be encouraged to become more actively involved in the exploitation process. The University regards such statements as:

"... a piety which needs to be uttered. It can and should mean more than that ..."

This "*piety*" has done little to influence City's policy on the identification, evaluation, protection and exploitation of IP:

"... You take it on board, but you don't give it a specific meaning ..."

In any case, for ten years or more, City has felt it appropriate in principle for academics to become involved in the exploitation of their discoveries. This is seen as a logical extension of the University's strong professional and vocational bias. In practice the extent to which individual researchers become involved is the result of a careful balancing act between the exigencies of the exploitation process and their own interests and commitments. City sees it as a partnership between the University and the individual member of staff.

5.2 Identification

Since City has no structure dedicated to the identification, evaluation, protection and commercialisation of IP, it inevitably relies to a considerable extent on researchers themselves coming forward and flagging potentially exploitable discoveries. In 1989/90 it was felt that existing members of the academic staff should have been very aware of the University's general policy objectives with regard to IP, given that the Code of Practice was circulated to all members of staff in the summer of 1989. It was also routinely sent to all new members of staff. However, the Code of Practice makes no reference to the removal of the BTG's monopoly or to the University's authorisation to exploit IP arising out of Research Council-funded projects. Existing members of staff were possibly aware of these changes; the management reported that the academic community at City was kept informed about the Research Councils' offer *vis-a-vis* IP, the University's response and the subsequent authorisation via articles in the newsletter ⁽³¹⁾ - though, in fact, no items could be found which covered these events - and through the University-wide Research Committee. It is less clear how new members of staff might learn about these specific changes. There is a compulsory induction programme for all new academics which examines documents such as Supplements to the Staff Handbook and discusses various aspects of research. IP is certainly mentioned during the induction programme but the management would not claim that the subject was "*covered*".

City has not yet formally considered how to ensure that levels of awareness achieved in 1989/90 are maintained in the future. Informal suggestions include notices in the University newsletter or a mailshot from the Research Grants and Contracts Office together with the monthly statements which it sends to principal investigators. City has just set up a staff development programme which could possibly examine IP matters under the broad heading of research. However, attendance at the staff development programme is voluntary, not compulsory. There are no plans at present to organise University-wide or

Department-based seminars on IP.

In the event that awareness levels slump globally or individually, the management believes it has an effective back-up mechanism in the shape of the Research Grants and Contracts Officer. It is his task to scrutinise all proposals to check for financial probity and legal probity where the clauses relating to IP are concerned. This same officer scrutinises outgoing reports at the interim and final stages.

City recognises that at some point it may have to take a more proactive role *vis-a-vis* identifying IP. It is envisaged that the Research Committee could act as a "filter" and possibly conduct a technical audit of the University's potential, too. City has no plans at present to bring in outside bodies to do this. The BTG comes in response to specific requests from individual academics, but it no longer appears to make regular, 6-monthly visits as it used to.

5.3 Evaluation

Researchers who bring potentially exploitable IP to the management's attention are asked to discuss it with their HoD. This gives an in-house evaluation of the scientific potential and also ensures that everyone who has contributed to the discovery - including students - is identified. If the HoD agrees that the discovery looks promising, the researcher submits a short report to the Research Administrator in the Finance Office. He in turn consults appropriate members of the Research Committee and then refers to the Secretary "*those cases where there appears to be commercial potential such that a prima facie case exists to seek protection, whether through a patent application or other means*".

As the Code of Practice indicates, "*in normal circumstances the University will refer the invention or discovery for detailed evaluation to the British Technology Group or the Research Corporation Ltd, with both of whom it has enabling agreements*". This is done with a view to obtaining a market evaluation and possibly a development grant.

In "*exceptional circumstances*", City will organise its own market evaluation. This may be done by offering it under the seal of a confidentiality agreement to a company with which the University has had some contact. Alternatively, the University may pay for a market evaluation to be made by known and trusted independent consultants whose services they have been able to acquire at below the market rate:

"... We have used an 'uncle', an ex-GEC man, as an external assessor appointment ..."

In every case, the researcher concerned is expected to contribute to the evaluation process by making time to "*discuss the invention or discovery, its nature and applications*".

The Research Committee ⁽³²⁾ is supposed to make the final decision as to whether or not the discovery is worth protecting and exploiting - "*for the sake of good practice, so that [protecting IP] can't be seen [as] slightly dilettante or arbitrary*". The Research Committee meets as and when necessary, but can also deal with items informally by circulation of members, or by chairman's action. As yet, however, the Research Committee has not performed this function. The final decision has been made by the Secretary in the form of a recommendation to the Vice-Chancellor.

5.4 Protection

(i) Philosophy

IP can be protected by copyrighting it, where appropriate, patenting it, where possible, assigning ownership to an industrial partner/the BTG/the Research Corporation or treating it as secret know-how. City is not averse in principle to any of these methods. The management believes that secret know-how is unlikely to arise at the "blue sky" end of the research spectrum and cause conflicts over the wish to publish research findings:

"... Secret know-how is likely to arise in work that is close to the development phase, to come out of contracts supported by commercial firms [and] Government Departments ..."

However, in practice very little of City's IP has been treated as secret know-how to date. Most discoveries have been published in one form or another, either as a paper or as a patent. City has assigned relatively little IP which was not obligated to the BTG.

(ii) Practicalities

If a discovery is deemed to have commercial potential and is patentable, City will usually file an initial registration. It does this "*expeditiously*" in order to let researchers disseminate their findings at the earliest opportunity. The management feels that many of the arguments which are advanced concerning the dangers of filing early are "*arguments of hindsight*". It feels confident that it will often be able to file a second patent and preserve its original priority date.

City tries to ensure that the patenting process subjects researchers to the minimum of pressure. The decision to proceed is always a joint one, taken by the management, the researcher - and the HoD, so that he is aware of the pressures on his staff. Researchers are not asked to write the first draft of the patent specification. They provide a 2-3 page summary of their discovery which is given to a patent agent as the basis for a draft specification. They then discuss this draft with the patent agent, who refines it accordingly.

(iii) Finance

City has increasingly found itself using the Patent Co-operation Treaty:

"... Most of the technological things we are into ... you can't simply stop at Europe. You've got to immediately think of the [United] States, Canada, Korea, Japan. One or two of those countries aren't in the Patent Co-operation Treaty and you end up with a hybrid arrangement ..."

This is an expensive process. During the late 1980s City was spending around £10,000 a year on patenting relatively few discoveries. The management believes this figure is likely to increase now that the University is authorised to exploit discoveries arising out of Research Council-funded projects. City has not used the University's central funds - or, indeed, any other funds - to set up a formal patent budget. This was a conscious decision, motivated by a number of concerns. Budgets must either be adhered to, leading to possible opportunity costs, or exceeded. This could lead to problems of a different kind:

"... You could build up a hell of a debt and year after year it simply grows ... It might actually attract an oblatory or an almost dismissive approach to the activity ..."

Instead, City asks the Department concerned whether it is able to cover the cost of an initial patent registration ⁽³³⁾. If the Department is in deficit or has more pressing priorities, the Technological Development Fund ⁽³⁴⁾ pays the cost instead. The existence of this fund has strongly influenced City's attitude to protecting IP:

"... It [is] sufficiently large that it [gives] you confidence: if you backed one or two things and they didn't prove to be winners, you could simply say - well, gentlemen, we've had one sure-fire winner already. We can afford to some extent to cast our bread upon water. As long as we don't do it to an extreme extent, we are safe ..."

Where City licenses its IP to industrial partners, it usually tries to get the company concerned to pick up ongoing patenting costs.

(iv) Ownership

Patents are vested jointly in the name of the University and the inventor(s). If City decides that a non-obligated discovery is not worth protecting and exploiting, the University automatically waives/assigns its ownership rights. This is enshrined in the Code of Practice which states that City will make a declaration to this effect to the member of staff concerned within six months of the IP being flagged. The researcher may then proceed as he sees fit. If he succeeds in exploiting his discovery and makes a profit, City asks only that he reimburse the University for the actual costs which it has occurred in evaluating/protecting that IP. The University has actually offered to waive its rights in one or two cases, but as yet, none of City's researchers have tried to take advantage of that offer.

City may also give up its interest in a discovery if the academic moves to another University before the development work is completed. It is intended that the researcher should then assign the University's share of the ownership to his new employer ⁽³⁵⁾.

5.5 Commercialisation

Where City retains ownership of its IP, it has no principled objection to it being exploited by any route, from licensing to University company, joint venture or independent academic spin-off company. Inventive researchers have "a fair amount" of influence on the decision as to how a given piece of IP is exploited, though they do not have total freedom. The management sees its role as rather more directive than simply facilitative.

(i) Licensing

In practice, as the Code of Practice indicates, the management usually prefers to license rather than pursue a more entrepreneurial route:

"... the usual means of exploitation will be by way of a license agreement or an assignment with [a] revenue sharing agreement ..."

City is motivated largely by financial considerations: licensing gives it control over how the IP is exploited and a reasonable return without costing a great deal in terms of money, time or effort. City tries, however, to reach a consensus with researchers as to how their discoveries should be exploited.

Potential licensees are identified as a result of a joint effort by the Secretary, the Director of Finance, the Vice-Chancellor and the research team concerned. City may also bring in one of the "uncles" whom it retains, for advice. The actual negotiations are generally conducted jointly by the researchers and the management, who may be "*aided and abetted by professional advisors*" at various stages. However, unless the management agrees to the terms which academics are proposing, no contract will be signed. License agreements also require the approval of the Finance & General Purposes Committee. However, since it meets only five times a year, this may entail retrospective approval. In practice, no agreement will be signed without the approval of the Vice-Chancellor, who is a key member of this Committee.

(ii) University Companies

As the Code of Practice also indicates, City will only consider founding a University company to exploit the IP in exceptional circumstances:

"... It is unlikely that the University will wish to divert its energies into setting up a [University] company to market a new product unless a well-researched business plan shows that it is capable of making a minimum of £100,000 profit annually within four or five years" ⁽³⁶⁾.

Once again, City tries to reach a consensus with academic inventors. However, since the setting up of a university company inevitably involves some degree of capital investment on the part of the University, it is the University which has "*quite a large, if not a determining say*". The management takes into account not just the proposed product, but also the person - the academic's perceived standing with industry, his background, contacts, interests, skills - and how applied his research is. Enthusiasm alone is not enough. Academics must demonstrate that they have:

"... at least one foot on the ground and their head screwed on ..."

As the above excerpt suggests, City is not in favour of a single, umbrella company which exploits all appropriate products as well as marketing the University's expertise and equipment. It prefers "*horses for courses*" - dedicated companies to exploit specific areas. To date City has founded three wholly-owned University companies to exploit IP in one form or another ⁽³⁷⁾. One has since become a fully independent commercial company, but the other two are still wholly-owned subsidiaries of the University itself, rather than a holding company. The first is extremely profitable, the second "*modestly profitable*" and the third has temporarily ceased trading, having cost City "*a high, five-figure sum*" ⁽³⁸⁾. However, City has plans to use it as a marketing vehicle for the research activities of a particular division of the Civil Engineering Department. In each case, the company was formed following an initiative from the researchers whose technology it was designed to exploit. In each case, the researchers concerned became Executive Directors of the company, and in two cases, one of the researchers involved took on the role of Managing Director, too.

(iii) Academic Spin-off Companies

So far, none of City's IP has been exploited via a joint venture with members of the academic staff or by an independent academic spin-off company. This is not because the management has rejected such proposals in favour of other routes. It is because, to date, no members of the academic staff have come forward with such a proposal. City's management does not believe it inhibits would-be academic entrepreneurs:

"... I think most of our staff here are sort of aware, if they read the [Code of Practice] that we are prepared to take one of a number of different routes, depending on circumstances. I think they've got sufficient confidence to come to us centrally and say - look, this is it. I suggest this or [that] ..."

However, City does not suggest company start-up as an option to researchers who flag potentially exploitable IP, in case they feel they are being "*pushed down that route*". The local AUT is keen to avoid that kind of pressure.

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy

Academic entrepreneurship is not an activity concerning which City has developed a coherent policy. Moreover, since very few of City's academics are known to have been entrepreneurial, custom and practice will not yet act as a basis for a developing a coherent policy. The management does not know of any academics who have founded an independent spin-off company to exploit "hard" IP. This may indicate that City has a less entrepreneurial ethos than some universities, but equally it could be a consequence of the fact that the university is located in central London, or a consequence of the type of IP which has been generated at City. In several cases, founding a company to exploit a discovery has appeared to be a less than optimal course of action ⁽³⁹⁾. However, the management is not aware of many academics having founded "soft" companies to exploit expertise, either. In any case, City views "soft" companies differently from "hard" companies exploiting protectable IP. It sees the former as an extension of consultancy activities:

"... The idea of setting up a company to do one's own consultancy or to sell [expertise] or to do one's own teaching - all of that comes under the same broad heading. The University - specifically the Vice-Chancellor - would look at it with that kind of approach ..."

Whereas many University Departments have set up hybrid or overtly commercial centres to exploit their expertise and/or equipment, City's research centres have been founded with a view to conducting academic research, to overcome City's poor research ratings. This has given City's academics little opportunity to be entrepreneurial within the framework of their Department. Only a few centres exploit IP in the form of expertise, and it is not really their role to exploit "hard" IP in the form of products/ processes. This would either be achieved by assigning or licensing the IP to an industrial partner ⁽⁴⁰⁾, or by spinning off a dedicated University company, as happened with OTEC.

It is only via the University's wholly-owned companies that City academics have become involved to any extent in entrepreneurially exploiting their discoveries. If, in due course, academics broach the idea of exploiting their discoveries by an independent spin-off company, City will inevitably respond in a fairly *ad hoc* way. The management would try to establish whether company formation was the best route for exploiting the discovery. It would also pay close attention to the proposed timescale:

"... [You] need to commercialise reasonably quickly. Academics may want to improve on something to the point where you are actually losing lead times. There is a kind of academic who will never be satisfied until it is 101 per cent perfect ..."

Researchers would be asked to consider whether they might be better suited temperamentally to exploiting their discovery by means of further research and publications - unless the University had invested sufficient resources in the discovery that it needed a return. In that case, the management might require it to be commercialised - by another route. However ...

"... if someone's real metier is in that direction, we would support that person ..."

In that case, City would try to ensure that the would-be entrepreneur got moral encouragement and practical support - from the HoD to the Vice-Chancellor, with the management in a co-ordinating role. If the HoD was not in sympathy with the idea, the Vice-Chancellor might be asked to mediate. In the early 1980s the management's interest in exploiting IP entrepreneurially could have triggered an obstructive reaction from some HoDs. However, most of these have since reached retirement age or been encouraged to take early retirement ⁽⁴¹⁾. Today it would be unlikely for a HoD to object to academic entrepreneurship as a matter of principle. There could be practical objections, however. Since City prides itself on its long-standing professional and vocational tradition, HoDs would be loathe to let members of their staff take on fresh commitments which might conflict with their existing commitment to students, particularly taught postgraduate students.

6.2 Making Time

For this reason, if would-be academic entrepreneurs felt they needed to devote more time to company start-up than the day per week which City allows for consultancy activities, the management would not be in favour of juggling with their teaching load - or their existing research commitments. It would prefer to arrange a part-time contract or leave of absence when the situation permitted it. Over and above a day a week consultancy time, time given to facilitate company start-up would be without pay; sabbaticals are seen as a period which should be devoted to advancing academics' careers academically, in a way which will subsequently benefit the Department's teaching or research activities.

In the management's view, going without pay has advantages for both parties:

"... We'd want to put them in the position of very realistically trying it out ..."

Leave of absence simply requires a recommendation from the HoD or the Dean to the Vice-Chancellor and to Senate. City usually allows only a year's leave of absence. If it has taken longer than anticipated to establish a spin-off company to the point where the

academic can reduce his input, it may not be possible to extend that year:

"... A lot of our courses are fairly new and they change quite regularly, particularly taught postgraduate courses. [We] would have to see where that person slotted in, how central they were to course development ..."

In any case, sooner or later, City expects academics to make a choice between being an academic and being in business. This is made clear in the Code of Practice:

"... a trading company needs managing in a very different way from a Research management or team and its success will depend much more on the motivation and management ability of those involved than on the intrinsic merit of the product being developed.

"In the event of company being formed the staff originally concerned with the IP will have the right to remain on their existing contracts of employment, but in so doing they may well give up being directly involved in its further exploitation ..."

6.3 Other Resources

(i) Equipment/Instrumentation, Support Staff, Communications

City is happy for would-be academic entrepreneurs to have access to resources where demand permits it, but for a price. Use of equipment and instrumentation would initially be charged at cost plus a small percentage. However, if this involved regular use once the company was established, the charge would be increased to the full market rate. The management feels that staffing levels in most Departments are high enough to allow access to existing secretarial and technical support staff during the start-up period. However, they would have to be paid at the going rate - and if it involved regular use, it might be necessary to bring in a part-timer. Given the scarcity and the cost of secretarial staff in London, the financial implications are not inconsiderable. Similarly, academics would be expected to pay for the telephone calls made in pursuit of their business activities, though the system has no way of independently monitoring such use ⁽⁴²⁾. If they chose to use the telephone surreptitiously, the management believes *"they could get away with it quite successfully for quite some time"*, though it would detect them in the end. It will be less easy to do this once telephone budgets are devolved to Departments; this is planned but there is, as yet, no date fixed for it.

(ii) Accommodation

During the start-up phase, City would allow would-be academic entrepreneurs free use of their office as a base. They would also be allowed to occupy a corner of a laboratory, if space permitted. However, if they needed additional space, the University would almost certainly ask them to relocate their business activities outside the Department. Whilst City has been following a policy of consolidating its freehold space, given that it is situated in central London, there is considerable pressure on accommodation. *Recognising the* problem, in the mid-1980s City tried to convert one of its buildings into a number of incubator units. In practice, these became second generation, light industrial units. This change of emphasis arose because the rents which could be charged on incubator spaces were insufficient to cover the costs incurred in refurbishing the old building in which they are situated.

Moreover, the layout of the building meant that in order to maximise the net space available for rental, the resulting units tended to be larger than those usually required by companies in the start-up or pre-start-up phase. City does not believe it will be possible for it to provide proper incubator units in the future.

The City Innovation Centre is managed by the Secretary. Several of the projects which started out in this space have now grown, relocated and are viable companies. Those which were less successful were asked to leave, including a company which was founded by the ex-HoD of the Electrical Engineering Department:

"... [It] wasn't so successful in using our facilities and working with us that we could keep them here and continue to provide accommodation. I had to give them notice. I'm not sure where they have gone, and because they may not have had access to any more low-cost accommodation ..."

"That was quite a knock for that small company. Whether it has actually knocked the company on the head or not, I couldn't say. [It] was not such a success in our terms to have real links with the University ..."

(iii) Financial Support

If an academic wants to try and exploit his research discoveries entrepreneurially - and City gives its blessing - the University is prepared to give financial support:

"... Almost certainly there would need to be money spent to take it to a development stage such that you had a prototype or documentation or a model or something which you could use to interest [partners] or even venture capitalists ..."

In this situation, City would bring its Technological Development Fund into play. The money would probably be provided in the form of a development grant. The Director of Finance would set up a budget heading, specifying spending and time limits. The recipient would have "a fairly free hand" but would be required to report back regularly. The HoD would be required to monitor his progress.

City might also consider providing money in the form of equity, or possibly even a "soft" loan. This has never yet happened, and the management believes that the University would be more likely to contribute second-round funding rather than start-up funding. City might require academics exploiting IP by means of independent spin-off companies to give the University a first-round equity stake as a token of its contribution to the discovery. Since it lacks experience, City is not sure what kind of stake the University would buy, over and above that, though it sees little point in having 5 or 10 per cent. It is prepared to be fairly speculative:

"... rather than looking for an income stream that we might get from a royalty arrangement, a better arrangement for a particular development would be to have a share in it but postpone any rewards that might come out of it. One wouldn't be expecting dividends in the early years. They might be pretty paltry anyway. [This] might be a way for the University ... to take a risk. It would then either have worthless shares or very valuable shares five years into the future ..."

If City opted for an equity stake in place of a royalty arrangement, this would, of course, affect the personal income which the researcher derived from the exploitation of his discovery, since there would be no immediate income to split.

6.4 Business Start-Up Advice

City would want to ensure that academics trying to exploit their discoveries entrepreneurially had access to the relevant advice, in the interests of protecting its IP. Moreover, even if academics were founding completely independent spin-off companies, although this does not legally constitute a joint venture, the University feels that **morally**, it has the flavour of one.

Since the University can only provide limited advice in-house, it would refer academics to external sources of advice like the BTG, the Research Corporation, the University's commercial solicitor, patent agents, the University's bankers, venture capitalists and possibly an enterprise trust ⁽⁴³⁾. If the academic was founding an entirely independent spin-off company and the University was likely to see no return beyond a royalty stream, this might be the full extent of City's help. If the University had an equity stake, however, it might look for an experienced businessman to "*nurse*" the project, paid for by the University ⁽⁴⁴⁾. Moreover, if City had an equity stake, it would want to nominate someone from the Finance Office as a non-executive board member, both as a safeguard and as a means of providing financial advice.

7 SCRUTINY GROUP ASSESSMENT

City will not learn the Scrutiny Group's view of its arrangements until 1992 at the earliest, because it received its initial 3-year authorisation nearly three years later than the majority of its contemporaries.

DURHAM UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

Efforts were made during the reign of Henry VIII to establish a university in Durham, following the dissolution of the monasteries. A similar project was proposed in 1657 during the Commonwealth, but it came to nothing after Oxford and Cambridge objected to the idea of other institutions being allowed to grant degrees. A third - and successful - attempt was made by last the Prince Bishop of Durham, whose objective was to found an institution which could secure for the inhabitants of the north east of England "*the advantages of a sound yet not expensive academical education*". The University was finally established in 1832 and granted a Royal Charter in 1837, making it England's third oldest university. Strictly speaking, Durham does not belong to any of the recognised classifications of British universities. However, since it took Oxford and Cambridge as its model, for the purposes of this study it was characterised as a quasi-ancient university.

1.2 Size

Measured in terms of student FTEs, Durham is now medium-sized compared to other monolithic universities in Britain. In 1981 Durham was advised by the UGC to reduce the number of home students registered in 1979/80 by 4 per cent within the next two or three sessions. As **Figure 2** showed, this was very close to the national average. At the same time the UGC also announced that Durham's recurrent grant was to be reduced by 10 per cent by 1983/84. As we can see from **Figure 2** this, too, was close to the national average. By most methods of reckoning, Durham falls into a middle group of universities which were treated neither particularly harshly nor particularly leniently by the UGC.

In 1986 the UGC indicated that Durham should increase its student numbers by a little over 7 per cent over the next four sessions ⁽¹⁾. In fact, by the end of the decade, Durham had 11 per cent more student FTEs than it had at the beginning ⁽²⁾. By the end of the decade, Durham also had nearly 5 per cent more full-time academic/academic-related staff than it had at the beginning; there was a six-fold increase in the number of part-time staff over the same period ⁽³⁾. The academic community underwent considerable structural changes during the 1980s. The seven Faculties with which the University began the decade were reorganised into just three - Science, Social Science and Art - encompassing 19 Departments and five Schools. In the process, several Departments were either merged or closed.

1.3 Science Base

In its latest incarnation, the Faculty of Science groups together the Departments of Chemistry, Physics, Mathematics, Geography, Geological Sciences and Biological Sciences; the *School of Engineering & Applied Sciences also belongs to the Faculty of Science*. In 1988/89 staff in these Departments accounted for close to 39 per cent of the University's total academic/academic-related staff ⁽⁴⁾.

As Figure 6a revealed, in the UGC's 1986 assessment of universities' research strengths in the natural sciences, engineering and technology, one subject area was rated as outstanding, two as above average, four as average and one as below average ⁽⁹⁾. It was suggested that if the ABRC's recommendations were implemented, Durham would be assigned to the "X" category; accordingly it would have been able to offer teaching across a broad range of fields and substantial research activity in particular fields, in some cases in collaboration with others ⁽⁹⁾.

Figure 6b showed that in the 1988/89 research selectivity exercise, no "units of assessment" at Durham were awarded a "5", three were awarded a "4" and four were awarded a "3". None received either a "2" or a "1" ⁽⁷⁾.

1.4 Research Grant and Contract Income

As Figure 41a indicates, in 1984/85, Durham ranked 31st in terms of £ earned from external research grants and contracts, but 38th in terms of the percentage of its total recurrent income which external research grants and contracts represented, namely 11 per cent ⁽⁹⁾. The Faculty of Science brought in just over £2.2m, accounting for 77 per cent of the University's total income from research grants and contracts ⁽⁹⁾. By 1988/89, as Figure 41b shows, the Faculty of Science had nearly doubled its 1985 earnings, generating just nearly £4.4m and accounting for 74 per cent of the University's total income from research grants and contracts ⁽¹⁰⁾.

The pattern of sponsorship which the science base attracted differed considerably from the pattern four years earlier, as we can see from Figures 345-346. Whereas industry/commerce provided 16 per cent of its research grant and contract income in 1984/85, by 1988/89 this had risen significantly - to 30 per cent. This was largely at the expense of income from central government, local government and various overseas sources - down from 26 per cent in 1984/85 to just 16 per cent in 1988/89. The proportion provided by Research Councils and charities was down slightly at 54 per cent, compared to 58 per cent four years earlier.

2 HISTORY OF IP EXPLOITATION

2.1 Background

Durham has not had a history of actively seeking out IP arising out of research with a view to commercialising it. When IP was identified prior to 1983/84, it was invariably on the initiative of the academics concerned ⁽¹¹⁾. The outcome was often unsatisfactory. The University had no patent budget and did not feel it could justify an *ad hoc* payment from central funds. As a result, "hard" IP was generally unprotected; the University does not seem to have thought of drawing up a confidentiality agreement and marketing the IP to potential industrial partners. As a result, when trying to obtain development funds from industry, the University often found itself losing its rights in the IP. A second consequence was that the financial return on such IP was very limited. Despite perceiving problems, the University did nothing about it. Prior to 1983/84, there was little or no formal discussion of IP. Durham took very little notice of the CVCP's 1977 report on IP matters.

In 1980, however, Durham appointed a new Vice-Chancellor, a zoologist who was interested in the University's relations with industry and in IP. In 1983/84, when the CVCP sent documentation aimed at developing a computer users' agreement, the Vice-Chancellor encouraged the administration to pose itself questions about IP in the broader sense. These deliberations found an echo in parts of the academic community following the conscious appointment of two new Professors who were interested in pursuing "*the sort of research which attracts industrial backing*" and in exploiting IP ⁽¹²⁾.

In May 1984 a working party was set up to consider amendments to academics' Standard Terms and Conditions of Appointment, in the light of the University's growing interest in IP ⁽¹³⁾. Reporting to both Senate and Council, the working party met infrequently, with the result that its progress was inevitably slow.

2.2 Structures

At the same time there was a minor change in the way in which the University dealt with IP flagged by academics. Where previously the Treasurer ⁽¹⁴⁾ had been responsible, from 1984 the Assistant Treasurer took over. The rationale underlying this change was that, although both had numerous other responsibilities, on balance, the Assistant Treasurer had fewer. This change did not signify a more proactive stance. The University's policy at this time was to take charge of commercialising its IP if it was asked to:

"... We were not actively engaged in promoting University policy and resources ..."

The new Vice-Chancellor addressed the problem of protecting IP which had commercial potential - and the problem of obtaining funding to support the development of prototypes. He was instrumental in setting up a fund, the objective of which was to pay for patent protection and to reduce academics' dependency on outside funding until the development work had reached a more promising point - giving the University a better bargaining position in subsequent negotiations for additional development funding. This fund paid almost immediately for a patent application in the area of electric motors and control. However, its target value of £150,000 within 3 years was never realised, due to the cuts announced by the UGC in 1981.

This was the situation when the Kingman letter arrived. Having invariably assigned its rights to industrial partners prior to the establishment of the fund, Durham had only just begun to build a patent portfolio. The University's experience in exploiting IP was negligible:

"... We were in a learning situation. We had begun to start learning before the letter came. We hadn't got very far ..."

As yet, Durham had no policy on IP, no regulations or documentation and no incentives to encourage researchers to flag potentially exploitable IP.

3 THE KINGMAN LETTER

The arrival of the Kingman letter in mid-May 1985 did not come as a surprise to Durham University, which was waiting for it, having closely followed the press coverage which

preceded it. The University had no hesitation in accepting the offer, seeing the exploitation of discoveries arising out of Research Council-funded projects as an extension of the policy which it was already in the process of evolving, via the working party. It was encouraged to accept by the fact that "*nobody had been very impressed with the way the BTG operated*" ⁽¹⁵⁾.

It was also seen as politically advisable to accept the offer:

"... [Refusing the offer] didn't seem to us to be a sensible thing to do, partly for reasons of prestige ..."

"... We didn't want to be a second-rate University which wasn't allowed to do it ..."

There was also a desire to increase the University's revenues, but this played a very minor part in the decision, since Durham has never been very optimistic about generating a significant income from its IP.

The arrival of the Kingman letter had a number of consequences. The working party had been formulating policy in "*a very slow, ineffectual way*"; it was further handicapped by unforeseen and unavoidable delays ⁽¹⁶⁾. The letter galvanised the administration ⁽¹⁷⁾ into taking decisions quickly. The University's response to the Kingman letter represented a swift distillation of the documentation sent by the CVCP, recommendations of individual Council members with industrial experience and insights which the Deputy Secretary had gained from informal discussions with fellow administrators. It also owed something to the documents accompanying the Kingman letter:

"... In a sense, the ... letter was an exam paper which gave hints on how to answer the questions ..."

Despite this, Durham's reply did not initially satisfy the Exploitation Scrutiny Group. It was more a problem of detail than substance, however, and a more detailed response was accepted a year later at the second round of deliberations. Durham was one of twelve institutions whose letter of authorisation was sent on 3 November 1986.

Given the lack of publicity, it is perhaps not surprising that neither the policy nor the authorisation from the Research Councils generated any adverse reactions in the academic community ⁽¹⁸⁾. The administration believes there is a more fundamental explanation for the lack of controversy:

"... We're a quiet University..."

4 CURRENT POLICY AND STRUCTURES

4.1 Rationale

Durham's policy and the manner in which it is implemented reflects the administration's expectations vis-a-vis IP. The administration has very limited expectations, for three principal reasons. The first relates to ethos:

"... The nature of the University means that the number of things coming forward is not as great as we would like ..."

The second relates to the subject distribution within the science base. This was emphasised repeatedly during the interviews:

"... The distribution of subjects is such that we don't have that many members of staff involved in work that has got immediate commercial potential. We're not at the hot end, as perhaps we ought to be ..."

"... If we had a lot of applied science Departments, there would be more that we were doing which was of direct interest to industry ..."

The third reason for having low expectations *vis-a-vis* IP relates to the pattern of funding which the science base attracts. As **Figure 345** showed, in the year the Kingman letter arrived Durham's science base attracted the third lowest proportion of funding from the Research Councils and charities of the nine universities participating in this study. Durham's position had not changed by 1989 - in fact, the science base attracted an even lower proportion of funding that year.

The administration was not happy with the situation as it perceived it:

"... It is a concern to us that we haven't more exploitable material ... We would welcome more business ..."

4.2 Structures

However, the way in which the administration has elected to handle such "business" on a practical, day-to-day basis owes more to its perception of the *status quo* than to its aspirations for the future. On financial grounds, Durham has chosen not to set up a separate structure which is dedicated or even partly dedicated to exploiting IP. This is still the responsibility of the Assistant Treasurer, whose remit includes helping to negotiate and administering the University's research grants and contracts. The administration does not believe it generates enough exploitable IP to enable a separate structure to become self-financing, and it is not prepared to subsidise it to any great extent from general funds ⁽¹⁹⁾.

No formal attempt has been made to assess what administering IP costs the centre, but it is generally assumed that since the Assistant Treasurer's position is justified by "*lots of other things to do*", this is the most cost-effective approach. If it could be demonstrated that it was missing a great deal of business, the University might consider a different approach, but to date the authorisation from the Research Councils has led to only a slight increase in the amount of IP to be evaluated and no noticeable increase in the number of patent applications. This tends to confirm the administration's beliefs.

The person responsible for overseeing the exploitation of IP is not the University's UDIL representative. That role has been allocated to the director of the University's Industrial Research Laboratories (UDIRL) ⁽²⁰⁾. No thought has been given to transferring responsibility for IP to UDIRL, even though UDIRL could find itself playing a part in the commercialisation of discoveries (see section 5.5). The rationale for this is that UDIRL has a bias in favour of materials science and technologies. Effectively, this results in an administrative divorce of the person who deals with "hard" IP in the form of patents from

those who deal with "soft" IP in the form of expertise.

4.3 Incentives

The administration believes it has instituted three incentives to remind researchers of their obligations to "flag" potentially exploitable IP. They are: money, status and "*making life more interesting*".

(i) Financial

In keeping with the terms of the 1977 Patent Act, academics at Durham are not rewarded financially for bringing IP to the administration's attention. They are rewarded only if the IP is successfully and profitably commercialised, but they have little or no say in the decision as to how to commercialise it. Despite being pressed by the Exploitation Scrutiny Group, Durham refused to institute a fixed revenue-sharing agreement:

"... We felt each case had to be looked at on its own merits ... [to assess] what is brought in, what the contribution was and the extent to which [researchers] were dependent on the University for facilities ..."

This could lead to wide variations: for example, where a new member of staff brought most of the background IP with him, the University might require 5 per cent, by way of an administrative charge. If, on the other hand, a researcher used University facilities and perhaps received an equipment grant from the Research Initiatives Committee, the University might take 90 per cent. No account is taken in this calculation of the number of inventors involved.

Although UK patent law does not require the inventor's reward to be determined at the beginning of the exploitation process (so that the size of the reward can be influenced by the income realised), Durham determines the reward to inventors at the beginning of the commercialisation process, based on the projected income. It is not clear what would happen if the discovery subsequently generated a far higher income. In the Deputy Secretary's opinion, inventors could appeal to the Vice-Chancellor. In the view of the Assistant Treasurer, however, inventors should seek redress via the courts:

"... the inventor has the right to go to court. He has a legal safeguard ..."

The University believes it also provides an incentive to encourage HoDs ⁽²¹⁾ to remind staff of their obligations to flag IP. The revenue which accrues to the University from IP is split 50:50 between the University centrally and the budget centre which generated it, *ie.* in most cases, the Department. In theory, this represents an injection of funds with no strings attached, which Departments are allowed to vire. Given that there is no fixed revenue-sharing agreement, however, the return that Departments will get on IP which is commercialised is likely to vary considerably. This compares unfavourably with the (fixed) proportion of income from overheads which Departments receive. To date, it is also a fairly hypothetical incentive, since none of the IP which Durham has tried to commercialise has brought in a significant income. Even if it had, this would not be widely publicised. It is not seen as appropriate for "Password" to carry details of individual gain:

"... That is regarded, rather like salary, as confidential. It may be that we are tying our hands unnecessarily. On the other hand, it is only fair to the individual. It could create jealousy. But also, why should anybody know how much X is getting?"

(ii) Career Progression

Promotions to Senior Lecturer at Durham are based on competitive merit in:

- teaching, course preparation and examining;
- research and scholarship;
- Departmental and other management and administrative responsibilities.

However, the annual letter to HoDs ⁽²²⁾ is more concerned with procedures and documentation than with providing examples of activities which might be included in each of these broad categories. There is, therefore, no reference to IP until the tenth and final page, a page which presents the AUT's view of factors to be considered when assessing promotion to Senior Lecturer. Stressing that its views do not represent the formal view of Academic Staffing Committee, the AUT suggests that performance in teaching should carry equal weight with research; administrative duties should carry somewhat less weight. It adds, however, that discussions with the Academic Staffing Committee (Promotions) identified *"the sorts of factors to be taken into account" under each of the above headings. For example, "Evaluation of Research might include ... patents held ..."*. It is not clear what weight might be attached to patents in comparison to publications in refereed journals or books and monographs - indeed, as the AUT emphasises:

"... The relative weight given by each member of the Committee to a number of these and other factors in order to reach a decision is a matter of personal choice ..."

There is no indication of how involvement in the process of exploiting IP might be treated when it comes to promotion. The only overt reference to outside work is to *"Academic work outside the University (eg. external examining, invitations to speak at conferences and other institutions)"*. The only reference to industry comes in the final paragraph, which states: *"Other factors which might be taken into account ... work in industry in a teaching company scheme ..."*. It is not clear whether the local AUT views the identification, evaluation, protection and commercialisation of IP as an integral part of the research process or as a separate process altogether.

(iii) Interest/Self-Determination

In the view of the Deputy Secretary, Durham provides researchers who "flag" IP with an additional incentive: the opportunity to cultivate new interests and take charge of their own destiny. It does this by providing opportunities for consultancy which the exploitation of IP might require and opportunities to be entrepreneurial, if academics wish to:

"... If you are your own boss, I suppose you are a bit freer than the next man ..."

However, as section 5.5 will show, the manner in which the Assistant Treasurer implements the University's policy on IP would seem to differ somewhat from the apparent intention of the Deputy Secretary, who helped formulate that policy.

4.4 Regulations and Documentation

It was the specific remit of the working party set up to redraft the Standard Terms and Conditions of Appointment of academic staff at Durham in a way which included appropriate, explicit references to IP. The amendments agreed with the local AUT were duly incorporated into the contracts of new members of staff and applied retrospectively to existing members of staff by means of. Under section 4 (Duties), it is indicated that Lecturers are expected to engage in research in their subject. Section 8 (Commercial Exploitation & Publication of Work) states:

"... Members of the academic staff shall not, in connection with any invention, patent, process or manufacture, have authority to make representations on behalf of the University or to enter into any contract in the like behalf, or to be concerned in the like behalf in any transactions whatsoever relating thereto without the express consent of Council ..."

Notwithstanding this, Council ...

"... retains the right to require members of staff to assign their interests in any valuable rights arising from the financial exploitation of any work with commercial potential ..."

Section 8 concludes by requiring all members of academic staff to notify the Treasurer in writing ...

"... of any device, materials, product or process, computer software or other result developed or obtained in the course of his or her employment which it is considered might have commercial significance, whether patentable or not ..."

Furthermore, academics are required ...

"... to ensure that the notification takes place in good time before publication or other disclosure and to withhold publication for a limited period if required to do so by the Council of the University ..." ⁽²³⁾

The University's position *vis-a-vis* patents is reiterated in the University Calendar and the current edition of the Staff Handbook refers researchers with queries about IPR to the Assistant Treasurer. (Durham's policy also covers students, both post-graduates and under-graduates. It is effectively a condition of registration, in that students must agree to observe the general regulations, one of which requires them to assign their IP to the university.) However, Durham has not encapsulated the details of and reasons for its policy on IP in a comprehensive document. Nor are the incentives to adhere to the policy well publicised.

4.5 Sanctions

If, through lack of awareness, researchers missed an opportunity to exploit IP which they had generated, the administration at Durham would "*express pain and displeasure*", but would take no further action. However, if a researcher was discovered to have passed IP which the University owned to another body, Durham would be concerned. If it transpired that the academic concerned had benefitted financially from doing this, the University believes it would try to seek financial redress; this is not known to have happened, to date ⁽²⁴⁾.

Beyond seeking financial redress, it is unlikely that Durham would apply any sanctions against a member of the academic staff who breached his Standard Terms and Conditions of Appointment in this way:

"... There are very few sanctions that you can impose on a member of staff, except draw attention to the breach of duty and embarrass them. Because unless it was a very serious breach, you wouldn't want to take legal or other proceedings against them ..."

Durham feels that disciplinary procedures would be neither appropriate nor effective.

5 THE EXPLOITATION PROCESS

5.1 Interpretation of Government Statements

Sir Keith Joseph's statement - in which the Secretary of State expressed the hope that universities would encourage academics to exploit their discoveries themselves and give help and guidance to those who wished to do so - was interpreted at Durham as:

"... encouraging those who do come up with something to exploit it ... by assisting us with patents: whether they are worth taking out and so on, by being involved in the licensing agreement ..."

Despite comments about the incentive of letting academics become their own boss, Durham did not interpret the Secretary of State's statement in terms of more entrepreneurial activities, such as company start-up on the part of academics:

"... I don't think we took it as literally as that ... I don't think it is feasible ..."

Accordingly, Durham's policy is to lean heavily on the contribution of the academic at certain stages in the exploitation process, but to limit his/her involvement to certain, well-defined activities.

5.2 Identification

Durham's administration did not directly inform members of the academic community about the removal of the BTG's first right of refusal or the 1985 offer from the Research Councils to assume the rights and responsibilities previously held by the BTG. In 1986/87, when the University was authorised to assume those rights and responsibilities, the information was transmitted only to Deans and HoDs, who were "*urged to pass on the news*". The opportunity of publicising the fact that University, not the BTG, was

henceforth responsible for commercialising discoveries arising out of Research Council-funded projects was not exploited when the University's Standard Terms and Conditions of Appointment were amended, either. Although all staff were notified of the changes, they were not told the reason for the them.

Less formal opportunities for publicising the change were also missed. The University newsletter, "Password", came into being in January 1987, just two months after Durham's authorisation was granted by the Research Councils. Despite its remit to inform staff about what is happening at the University, no issues of "Password" have devoted any column inches to the fact that the University has taken charge of exploitation in place of the BTG. The administration concedes that it may not have made the reasons for the change sufficiently clear at the time. It has tried to make up for that in the intervening years, but once again, it has done this indirectly:

"... Every year now we are repeating injunctions via Deans and HoDs, because our examples of exploitation are still not in the Research Council field, by and large ..."

However potentially exploitable research discoveries were funded, Durham relies almost exclusively on academics themselves coming forward to notify the administration. The administration itself does not directly try to solicit IP. The Assistant Treasurer has neither the time nor the expertise to conduct an in-house technical audit. Durham delegates that responsibility, as it made clear in its submission to the Exploitation Scrutiny Group ⁽²⁵⁾. Durham expects HoDs - and research group leaders in larger Departments - to shoulder the responsibility of reminding staff of their obligation to "flag" IP. It reminds them of this responsibility in an annual memo to Deans and HoDs, seeking information which forms the basis of its annual report to the Research Councils; this is a mechanism which Durham has found useful and would continue to use, even if it were no longer required to. The administration also seeks to remind Deans by means of "pep talks" at meetings of the Research Committee:

"... The Deans hopefully go back to their Faculty committees and pass it on ..."

Formal mechanisms for doing this have been neither instituted nor proposed by the administration, however:

"... there would be a great deal of resistance to any formal arrangements of that nature ..."

The administration is aware neither of any new mechanisms having been introduced nor any existing mechanisms having been annexed by Departments or Faculties to formalise this procedure.

Durham has also reached agreements with the BTG and the Research Corporation ⁽²⁶⁾. It would be happy to reach agreements with other technology transfer agencies, but finds that they tend not to follow up their introductory letters. Accordingly, only BTG and the Research Corporation have the right to conduct periodic trawls for IP, but the timing is left entirely to their initiative. The University does not keep a check on their activities - indeed, it often discovers only some time afterwards that they have made a visit.

The only direct contact which the administration makes with members of the academic staff to publicise its interest in IP is at the induction course for new staff. Since January 1987 Durham has **required**, rather than encouraged, new staff to attend the Conference for New Members of Staff. Since 1988, the Treasurer has used this forum to give new staff a short presentation on IP in general and the University's policy in particular. The Assistant Treasurer has also suggested that IP would make a suitable topic for the University's staff development programme. This may happen once Durham's new Staff Development Officer becomes a full-time appointment ⁽²⁷⁾.

5.3 Evaluation

Once the administration has been notified of research discoveries with commercial potential, evaluating them is not seen as a particularly problematical task at Durham. This is principally because the University relies heavily on the extensive links which its academics have with industry:

"... There can't be many researchers around the University, even the most junior ones who started last September, who - if they are working in a particular area - haven't already got some links with a commercial company who will know what to do with it ..."

Durham's standard procedure is to locate what looks like an appropriate company, draw up a confidentiality agreement and let the company evaluate the discovery. If the researchers had no suggestions as to who to contact, the Director of UDIRL might be called in - but this has never yet been necessary.

It is very unusual for Durham to consider any other means of evaluating a discovery:

"... A person would have to be pretty convincing that it was going to generate a lot of money for us to consider doing something else ..."

In 1988, when a member of the Chemistry Department suggested that they could easily manufacture and distribute a new chemical which he had synthesised, the University contacted the BTG. However, Durham has never conducted or commissioned its own market evaluation:

"... We have never come to the third instance, where somebody [was] so convincing in his argument ... that we evaluated it ourselves ..."

5.4 Protection

(i) Philosophy

If a discovery is considered to have market value, it is Durham's policy to try and get the discovery protected. Although the University has not formulated a policy relating to secret know-how, it prefers not to use this as a means of protection:

"... we have a policy to publish things and make them public. So, I think we would be unhappy about that ..."

The University also feels constrained by the VAT legislation, which allows research contracts exemption from VAT as long as the results are made publicly available. Where there is sufficient novelty to warrant a patent, Durham prefers to have its IP protected in this more formal way. It is also motivated by financial concerns:

"... [A patent] increases your chances of getting any money out of it ..."

Despite its concern about having foregone many of its rights in its IP during the 1970s and early 1980s, today Durham usually protects its IP by assigning it to an industrial partner. By holding discussions under seal of a confidentiality agreement, the University feels it has more control than it used to.

(ii) Finance

Not long after it was set up, the fund which was intended to cover the cost of patents *etc* was discontinued, primarily because of the effect of the cuts imposed by the UGC. The University not set up a formal patent budget to replace that aspect of the Fund's remit. Durham's philosophy is that it should spend as little as possible on IP and leave its partners in the commercialisation process to absorb all the costs. Where that is not an option, Durham covers the cost of patenting from the general administration allocation. However, in the five years following the arrival of the Kingman letter, the University applied for only 3 patents in its own name, each arising out of projects funded by the Research Councils. Direct patent costs have been limited to around £300 per year, with an additional £3,000-£4,000 per year in solicitors' fees. However, other discoveries made by Durham's academics have yielded an additional 12 to 20 patents per year, taken out by industrial partners.

Durham has an upfront approach to generating revenue from its IP: it prefers to net an immediate £5,000 for the right to take out the patent in exchange for lower royalties at a later date. It believes this is a sounder strategy, since most patents do not become significant earners.

(iii) Practicalities

This practice has implications for academics wishing to publish their findings. The Standard Terms and Conditions of Appointment give the University the right to require academics to delay publication in the interests of filing a patent application, although the same document seeks to reassure by stating that ultimately it is the University's policy that all results shall be published.

The administration gives neither a written nor a verbal indication of the kind of delay which might be involved:

"... Taking a patent out can be done fairly quickly, but ... we don't go that way. We go to a company. And so there might be six months of negotiation before [we] tie in the company ..."

"... it might [take] any length of time. Because our preferred route is to go to a company, it is actually likely to be more than a year ..."

In the event of an academic disagreeing with the administration's requirement to delay publication, the Treasurer and the Vice-Chancellor would probably make the final decision. This is not articulated anywhere, however, and to date it has not happened.

When the decision is made to patent, researchers are expected to write the first draft of the patent specification; this is then re-drafted in the appropriate "register" by a patent agent. Staff are generally expected to simply find the extra time to carry out this obligation. Where existing commitments make this impossible within the required timescale, the centre would be willing to help negotiate with the HoD for a temporary adjustment to the researcher's schedule, but this has never yet been necessary.

Where Durham assigns its rights, the industrial partner selects the countries in which to apply for a patent; on the three occasions where the University has filed in its own name, applications have been restricted to the UK, since Durham has only contemplated breaking into UK markets:

"... We are certainly not geared up to operating [in] other markets, so there's a risk ... that the patents we're sitting on at the moment could be taken up by somebody in Japan or wherever ..."

This is a risk which Durham feels it has to take at the moment.

The decision whether to proceed with a full application or to let the claim lapse is generally determined by the researcher's success in identifying potential licensees:

"... In most cases we are not actually going to think of producing ourselves. We are going to think of licensing to other people ..."

Durham's approach is essentially pragmatic and short-term at present. The centre recognises that some universities are moving towards a more speculative, long-term approach and would like to build up a more comprehensive portfolio itself. It is concerned that its own researchers may be infringing patents held by industry because the University has not built up portfolios of "strategic" IP ⁽²⁸⁾. At present, if the researcher could convince them that further work would lead to additional patents:

"... it is conceivable that ... we would just be happy that the patent was on file ..."

but this has not happened yet.

(iv) Ownership

Durham's policy is to vest patents in the University's name alone. It pursues this policy to the extent of asking appointees who bring with them rights to IP they have generated elsewhere to assign those rights to the University if they form the basis of follow-on discoveries which might be commercially exploited.

To date, Durham researchers have never challenged the administration's decision not to protect a discovery, or not to continue protecting it. If they did, the administration would ask whether their Department was prepared to pay the cost of protecting/continuing to protect the IP concerned - and to reap a greater reward in exchange for taking all the risk.

If not, Durham might consider waiving/assigning its rights to the researcher. This has not yet happened, but if it did, the administration believes it would issue a conditional waiver/assignment, retaining a small percentage interest as a *quid pro quo* for the resources already provided.

5.5 Commercialisation

Durham's policy permits University-owned IP to be exploited by any route, from licensing to a University company, joint venture ⁽²⁹⁾ or academic spin-off company.

(i) University Companies

Durham's Council has laid the groundwork for the University to take a more entrepreneurial approach to commercialising its IP: in 1988 the University founded the wholly-owned company, Applied Durham Research Ltd ⁽³⁰⁾. This was intended to act as a holding company. The initiative for this came from certain lay members of Council. Their motive was to provide a legal framework which could spawn subsidiaries dedicated to exploiting specific IP opportunities as and when the need arose. These lay members were in favour of Durham being more entrepreneurial, provided it kept such activities at arms' length from the University and ensured it could reap those benefits of a company structure which are denied to universities ⁽³¹⁾. They also felt that a company structure would overcome the constraints of paying academic staff on University salary scales. By the end of 1989, the holding company had still not formed any subsidiaries, however, and it was wound up shortly afterwards. The administration attributed the lack of subsidiaries to a lack of IP which was "*appropriate for company formation*".

(ii) Joint Ventures

From a policy point of view, Durham does not rule out the possibility of participating in joint ventures with members of the academic staff. Policymakers see this as a means of putting a damper on:

"... particularly entrepreneurial member[s] of staff who might set up [their] own company and cut us out and leave ..."

However, there have been no joint ventures to date.

(iii) Academic Spin-Off Companies

Durham has granted a license to only one academic-spin-off company wishing to exploit "hard" IP; the Assistant Treasurer, an accountant by training, prefers to license to existing companies. He also believes that if the University agrees to license an academic spin-off company, it should drive as hard a bargain as it can get:

"... they are in the driving seat, because they have a full knowledge of what the worth is and they are the people who really know what the University's input was. If it is the individual's own IPR, obviously they are in a stronger position ..."

(iv) Licensing

Not only does Durham prefer in practice to license to existing companies, it also prefers to license to large companies. It is guided by three concerns: safeguarding the University's image, minimising the risk and expenditure incurred by the University and maximising the financial return:

"... we wouldn't want to get involved in what might be described as a get-rich-quick method ..."

"... We would choose the route which gave the best financial result consistent with the image of the University ..."

If it was more rewarding financially to license a large company, Durham would be reluctant to follow any other course. Since it is obligatory for IP to be exploited in the way which the administration determines ⁽³²⁾, this could limit - and probably has limited - the number of legal academic spin-off companies exploiting "hard" IP. On the other hand, if it were possible to license both a big company and an academic spin-off company, Durham would see that as a way of reaching a compromise. Since the University prefers to grant non-exclusive licenses, there is no intrinsic obstacle to this solution.

Whereas academics at Durham have played almost no part in entrepreneurially exploiting "hard" IP which they have generated, the University depends almost entirely on the researchers to identify licensees and make the first approach, armed with a confidentiality agreement. At that point, however, the Assistant Treasurer usually steps in and conducts the license negotiations, with the researcher providing little or nothing more than technical support. This was not always the case - Durham's most successful license agreement to date owed at least as much to the negotiations of the academic whose work was being licensed as to the University's input. However, it is the way in which the Assistant Treasurer prefers to work. He is not a member of the UK Licensing Executives Society nor does he call on them for help, relying instead on the University's commercial solicitors if he feels he needs assistance. He believes he has learned considerably from experience:

"... I've no reason to believe that Durham University is any worse than most universities. At least I'm a qualified accountant, so I'm fairly happy that the financial arrangements are correct ..."

He is concerned that the only people in the University with any experience of conducting license negotiations are the Treasurer and himself; this leaves Durham very vulnerable in an emergency. It does not seem to have occurred to him that the academics he consigns to a technical support role could, like him, learn from experience and therefore increase their skills.

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy

Durham has not formulated an explicit policy governing the activities of academic entrepreneurs. Although the Outside Work rules refer only to "consultancies", would-be

academic entrepreneurs are expected to understand that setting up and running a company is subject to the same requirements. Accordingly, they should seek permission from the Vice-Chancellor. In practice, this usually means simply declaring their activities to the Vice-Chancellor. If they propose to exploit "hard" IP as opposed to "soft" expertise, they should not do this unless the University grants their company the requisite license, of course.

The absence of a policy may reflect a lack of consensus in the administration about academic entrepreneurship. In some quarters, the prospect of academics with businesses leaving the University to pursue their business activities on a full-time basis causes concern. These members of the administration are less worried about established academics whose goal is a Chair than they are about the next generation of academics: members of research teams who do not have tenure and confront a future consisting of 5 or even 3 year temporary contracts. At least two academics in this situation have left Durham already, preferring to concentrate on their business activities; both were winners in the 1982 Academic Enterprise Competition ⁽³³⁾. Furthermore, a long-standing member of staff with tenure eventually left to become a full-time entrepreneur after working part-time for two or three years. The academic concerned had particular teaching skills which were hard to replace:

"... [The Department] was anxious to hang onto his knowledge for as long as possible ..."

Other members of the administration feel that Durham's academics are enterprising rather than entrepreneurial and there is therefore no need for a policy:

"... maybe we don't take it seriously enough. But I think the real reason is that the scope for academic entrepreneurship is not as great as it might be. Most of the enterprising activity is carried out within traditional University Departments ..."

This may be an accurate assessment - or it may be a false impression, occasioned by the fact that, like consultancy, spin-off company formation is regarded at Durham as a personal activity which academics are required to report only to the Vice-Chancellor. It is a tradition at Durham that Vice-Chancellors keep such information to themselves. While it is generally felt that the previous Vice-Chancellor was "*much stronger at keeping it all under wraps*", this information is still treated as confidential. If the University has incubated many academic entrepreneurs, it is not common knowledge within the institution. Moreover, the Director of the University's science park knows of only one member of Durham's academic staff who has started a technology-based spin-off company since 1986 ⁽³⁴⁾:

"... I don't think the academic culture at Durham at the moment is tending towards academic entrepreneurship ... The majority of academics that I've spoken to are quite happy to deal with industry and deal with industry in a very effective manner by taking research contracts and accepting time targets and performance targets ... But none of them seem to want to take that jump into actually going it alone ..."

Paradoxically, Durham University Business School is one of Britain's nine Regional Enterprise Centres and is renowned for its evangelistic zeal in promoting small business start-up in the north-east of England.

6.2 Making Time

Parts of the administration support the idea that academics trying to exploit promising IP should be allowed to devote some time to the project. This is not policy, however, and if researchers require more time than the half day per week which they are allowed for outside work, arrangements would depend on individual circumstances:

"... It [would] be our aim to assist somebody in the exploitation of something promising and if the only way to do that is to let them off some of their normal workload, then we'll try to arrange that ..."

However, at present the administration has no formal mechanism which allows it to influence that decision-making process. The decision would be taken by the Departmental Board of Studies, which effectively means by consensus of the whole Department ⁽³⁵⁾. Since Departments were turned into budget centres ⁽³⁶⁾, it has become less easy to be flexible:

"... if they try to get Y to do some of X's work, they'll want to make sure they can manage it within their budgets. It is not going to be easy. But if the idea is good enough and the return is likely to be good, I guess they would do it ..."

At present, the administration has no budget which could be used to compensate Departments for the partial loss of staff time ⁽³⁷⁾. The administration believes that Departments are even less likely to be flexible where the researcher is proposing to exploit promising IP by means of an independent academic spin-off company. At present, short of an eventual royalty income from IP which is successfully exploited, the University gets no return on the activities of academics who become entrepreneurs. This is because academic entrepreneurship is treated on the same basis as private, personal consultancy: Durham does not levy a percentage tax on the resulting income. Would-be academic entrepreneurs would probably have to agree to an *ad hoc* arrangement whereby the University - or at least, their Department - got some additional return as a *quid pro quo* for rescheduling their workloads.

Alternatively, they could opt to work part-time pro-rata or ask for leave of absence without pay; where complete leave of absence is concerned, Durham usually imposes a two-year time limit. Provided that part-time academics are not "*so obsessed with entrepreneurship*" as to neglect their teaching and research commitments, the administration sees this arrangement as a bonus to the University:

"... He (sic) would be bringing in money, he would be a useful example to the students, his teaching ought to benefit ..."

However, the administration recognises that individual Departments may have a different perspective - and part-time arrangements and leave of absence are also in the gift of the Departmental Boards of Studies, effectively ⁽³⁸⁾:

"... I don't know whether they would get it ... It wouldn't be automatic ... You couldn't afford to do that for too many people ..."

The administration believes Departments would be concerned both about academic entrepreneurs' ability to maintain a sense of identity and about where their loyalties lay. At least one member of staff has been allowed to work part-time pro-rata; after two years he left the University to pursue his business career full-time.

6.3 Other Resources

(i) Equipment/Instrumentation, Support Staff, Communications

Senior members of the administration also support the idea that academics who are trying to exploit promising IP should have access to University resources, where demand permits it. In their view, researchers in the process of setting up a company might be allowed free use of equipment and instrumentation initially, though the University would want a return if use were protracted. However, even then academics are liable to be charged less than the full market rate. Similarly, in the start-up phase, they might be allowed free local telephone calls. Use of technical and secretarial support staff might be more problematical:

"... Durham is not over-populated with technicians or secretaries ..."

Using University facilities in pursuit of any sort of outside activities does not meet with the approval of certain, more junior administrators:

"... Obviously it's difficult for [academics] to separate their University activities from their external activities. The fact that somebody is director of a company and uses the University's phone is in theoretical terms no different to the one who happens to be chairman of the local civic trust, who takes a phone call at work in relation to that.

"... there is no University policy that says that one is more acceptable than the other ..."

(ii) Accommodation

It is unlikely that academics using their offices in the pre-start-up phase would be charged rent for use of that space. However, use of additional space already allocated to the Department is a matter for the HoD to determine. Requests for additional non-allocated space are decided centrally. The administration ...

"... would be unhappy if somebody wanted to set up a company for it to be operating for any length of time in University premises, because we are desperately short of space ..."

The University feels it is able to take a strong line on this, because Durham has a science park on campus which incorporates a number of incubator units ⁽³⁹⁾. However, unless they have a backer, academics with start-up companies could be penalised by the requirement that tenant companies should be "*financially sound*" ⁽⁴⁰⁾. Moreover, since Easter 1989 there has been a waiting list and there is only one other suitable "parks" within a 20 mile radius ⁽⁴¹⁾. Recognising the problem, towards the end of 1989 the University started to negotiate for a building in which to house the second phase of its science park.

(iii) Finance

Would-be academic entrepreneurs may be able to get limited financial assistance from the University. Since the discontinuation of the exploitation fund, the nearest equivalent is an equipment fund allocated by the Research Initiatives Committee at the beginning of each academic year. In 1989/90 the fund had £210,000 to disburse. Like the much smaller general purposes fund, it gives only a proportion of the sums required, to encourage academics to locate other sources of funding. Since commercial exploitation is not its main objective, the equipment fund does not look for a return on its "investment".

The University has no principled objection to putting up seedcorn money to support academics trying to exploit promising IP in the pre-company stage. There is no such fund at present, though in theory, one could be set up from the general, non-earmarked income which the University generates from overheads, for example. However, in the view of one administrator, this would be an unlikely way to employ the general income.

Durham has never formally discussed the question of holding or acquiring equity in academic spin-off companies, and it has not yet done either on an *ad hoc* basis. However, in the view of one administrator, the University should not have to buy itself an equity stake; academic entrepreneurs should volunteer to give the University an equity stake in their companies, as a *quid pro quo* for the many resources which the University is certain to have contributed to that start-up. Another felt that in an ideal world, the University should acquire equity in suitable academic spin-off companies through first-round funding ... it should act as a mini-venture capitalist. This should not be motivated by a mission to transfer technology but by the drive to maximise profits:

"... It would have to be treated as an investment, like any other investment ... We don't have money to throw around ..."

However, this administrator did not anticipate the University doing this in the foreseeable future:

"... if we had more resources, I'm not sure that academic entrepreneurs would be our top priority, to be honest ..."

6.4 Business Start-Up Advice

The structure which Durham has chosen to deal with IP on a day-to-day basis is not equipped to provide would-be academic entrepreneurs with business start-up advice. In theory, this should not matter, given the presence of the Business School. However, attitudes vary as to the role which the Business School should play. One administrator felt:

"... We [should] probably push them in the direction of the small business section of our Business School. They are getting a lot of Government money to help small business start up in the north east of England ..."

Another was quite opposed to this idea unless the academics concerned paid for the advice:

"... I see no reason why we should help academics to set their own company up. I see no reason why we should discourage them. Well, there might be circumstances where we encourage them to do it, but I see no reason why any University resource, financial or non-financial, should particularly go towards helping them ..."

It is part of the remit of the administrator in question to implement the University's policy on the identification, evaluation, protection and exploitation of IP. An expert on VAT, his response to a would-be academic entrepreneur with a VAT inquiry was:

"... I told him the answer - and that if he was coming back again, he'd better tell me how much fee he was [prepared to pay], because I'm certainly not going to get into advising people about their own companies if it is nothing to do with the University. I'm prepared to be ruthless about it ..."

If, at a future date, academics participate in joint ventures with the University, this administrator will ensure they get advice, however. In that context, entrepreneurship would be seen as "*a University activity*", on the basis that the company would covenant its profits back to the University.

7 SCRUTINY GROUP ASSESSMENT

In August 1990 Durham was informed that the Exploitation Scrutiny Group was satisfied with the exploitation arrangements which the University had established. A formal document was scheduled to follow, confirming the University's rights and responsibilities to exploit IP arising out of Research Council-funded projects for an indefinite period. Henceforth, the University was only required to report inventions to the Exploitation Scrutiny Group.

GLASGOW UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

1.2 Size

In recent years Glasgow has frequently had the distinction of being Britain's largest monolithic university, its main rival for this position being Manchester ⁽¹⁾. 1981 the UGC advised Glasgow to reduce the number of home students registered in 1979/80 by 3 per cent within the next three sessions. As Figure 2 showed, this was below the national average. At the same time the UGC announced that Glasgow's recurrent grant was to be reduced by 11 per cent by 1983/84. As we can see from Figure 2, this was also well below the national average. The Principal had "*read the signs well*", however, and had already shed a number of posts in advance of notification from the UGC. Academic staff numbers at Glasgow have changed very little over the 1980s; there has been only a 1 per cent increase in the total ⁽²⁾. In 1986 the UGC indicated that Glasgow should further decrease its student numbers by 0.5 per cent over the next four sessions ⁽³⁾. Nonetheless, by the end of the decade, Glasgow had around 11 per cent more students than at the beginning ⁽⁴⁾.

By most methods of reckoning, Glasgow falls into a group of universities least afflicted by the UGC's decisions. Structurally, the University ended the decade as it had begun - with eight Faculties, comprising around 120 Departments ⁽⁵⁾. There was a "*fairly radical*" reorganisation of the Faculties of Divinity, Law & Financial Studies. However, there were no changes to the Faculties of Engineering or Veterinary Medicine and only two changes to the Faculty of Natural Science ⁽⁶⁾.

1.3 Science Base

Glasgow has an extremely comprehensive science base. In 1988/89 the Faculty of Science itself grouped together the Departments of Physics & Astronomy, Biology, Cell Biology, Biochemistry, Genetics, Microbiology, Pharmacology, Botany, Zoology, Geography & Topographic Science, Geology, Chemistry, Computing Science and Mathematics. The Faculty of Engineering comprised the Departments of Civil Engineering, Electronics & Electrical Engineering, Aerospace, Mechanical Engineering and Naval Architecture & Ocean Engineering, two of which were pioneering departments when they were founded ⁽⁷⁾. For a comprehensive list of departments in the Faculties of Medicine and Veterinary Medicine, see note ⁽⁸⁾. There were also Departments of Agriculture and Dairy Science which appeared to defy classification by Faculty.

Glasgow's Departments vary enormously in size; in the Faculty of Medicine, in particular, there are numerous departments which have only two or three - and in several cases only one permanent academic member of staff, backed up by a relatively large number of honorary lecturers. On an aggregate basis, staff in the four Faculties making up the science base represented about 73 per cent of the university's total academic/academic-related staff at the end of the 1980s ⁽⁹⁾. They were responsible for around 52 per cent of Glasgow's undergraduates and 78 per cent of registered research students ⁽¹⁰⁾.

In the UGC's 1986 assessment of universities' research strengths in the natural sciences, engineering and technology, Glasgow was ranked tenth best in the UK ⁽¹¹⁾. As Figure 6a showed, three subject areas were rated as outstanding, eleven as above average, nine as average and three as below average ⁽¹²⁾. It was suggested that if the ABRC's recommendations were implemented, Glasgow would be assigned to the "R" category; accordingly, the University would be funded to do high-level research across a wide range of subjects ⁽¹³⁾.

As Figure 6b indicated, in the 1988/89 research selectivity exercise, one "unit of assessment" in the natural sciences, engineering and technology received a "5" rating, seven received a "4", six received a "3", one received a "2" and three received a "1" ⁽¹⁴⁾.

1.4 Research Grant and Contract Income

As we can see from Figure 41a, in 1984/85, Glasgow ranked 5th in terms of £ earned in external research grants and contracts, but 19th in terms of the percentage of its total recurrent income which this external revenue represented, namely 15.7 per cent ⁽¹⁵⁾. Departments in the Faculties of Science, Engineering, Medicine and Veterinary Science brought in close to £11m, accounting for 93 per cent of the University's total income from research grants and contracts ⁽¹⁶⁾. By 1988/89, as Figure 41b shows, these Faculties had nearly doubled their 1985 earnings, generating close to £21m, accounting for 93 per cent of the university's total income from research grants and contracts ⁽¹⁷⁾.

The pattern of sponsorship which Glasgow's science base attracted was noticeably different to the pattern four years earlier, as Figures 345-346 show. The proportion of funding received from the Research Councils and charities fell from 73 per cent in 1984/85 to 58 per cent in 1988/89. This was not due to increased funding from industry/commerce - indeed, the proportion of funding from this sector fell marginally, from 9 per cent in 1984/85 to 8 per cent in 1988/89. Glasgow significantly increased the proportion of funding received from central government, local government and various overseas organisations - up from 18 per cent in 1984/85 to 34 per cent in 1988/89.

2 HISTORY OF IP EXPLOITATION

2.1 Background

During the 19th century, Glasgow University was renowned for its innovative Professors, who transferred their discoveries into the economy not only through consulting relationships with existing companies but also through their own start-up companies ⁽¹⁸⁾. This entrepreneurial activity seems to have taken place on their own initiative, rather than the University's, in a situation where salaries, if they existed at all, were often little more than token. It was expected that salaries would be supplemented, whether by private

income or additional, paid activities.

The University assumes that in the intervening years, academics from Glasgow continued sporadically to found spin-off companies or to make independent arrangements with industry to exploit their discoveries. The University sometimes sanctioned these activities, if its opinion was sought, but it made no great effort to ensure that its opinion was sought. By the end of the 1970s, however, the University began to take an interest in the IP over which it now appeared to have unequivocal rights. Glasgow responded fairly promptly to the documentation sent by the CVCP in the wake of the 1977 Patent Act. In 1978 the Principal, the Vice-Principal (Industrial Liaison) and a group of senior officers drafted a set of guidelines on the subject.

2.2 Regulations and Documentation

The 2-page "Guidelines ..." ⁽¹⁹⁾ were issued to every existing member of staff in all Faculties and subsequently to every new member of staff. Updated in June 1982, they set the scene by reproducing Section 39 of the 1977 Patent Act in a bold footnote on the opening page. Despite this demonstration of the University's legal rights as an employer, the tone of the document is far from legalistic. In the first section, headed "Inventions", the Court **encouraged** researchers to furnish it with a 2-page description of their invention prior to publishing their findings. Attached to the guidelines was a form on which researchers were asked to give an estimate of development costs, possible sources of funding, an indication of companies likely to be interested and an estimate of the annual volume of gross sales in years one to three. The guidelines indicated that if the Court decided against patent protection, inventors would be informed in writing that they might proceed on their own account, if they wished - unless the research was supported by the Research Councils.

In the second section, headed "*Licence Agreements*", researchers were again:

"... encourage[d] ... to make their inventions, whether patented or not, available to industry for commercial purposes ..."

The Court reserved the right to negotiate the terms of any license agreement, with appropriate legal assistance. There appears to have been an implicit assumption that exploitation of IP (and computer software) would be accomplished via licensing. This was not motivated by disapproval of academic spin-off companies *per se*. Section 5 of the guidelines, headed "*Businesses Carried On By Members of Staff*", indicated that the Court might grant permission for full-time members of staff to carry on business either on their own account, or in partnership, or through limited companies:

"... The Court considers that such activities are to be encouraged, particularly as the University is collaborating in ventures such as the West of Scotland Science Park for the exploitation of academic expertise in industry and commerce ..."

Taken together with the apparent assumption that IP would be exploited via licensing, use of the term "expertise" suggests an assumption that academics would or should restrict themselves to "soft" R&D-based businesses, rather than "hard" companies exploiting "hard" IP. This may be imputing to the guidelines a more discriminating use of terminology than was actually the case; in some quarters, the document has come to be seen as "*somewhat opaque*" ⁽²⁰⁾. On the other hand, this could be the embryonic version of

a policy which has recently been firmly laid down ⁽²¹⁾.

Whichever it was, Glasgow placed the exploitation of "soft", expertise-based IP under similar strictures to the exploitation of "hard" IP: the University's terms and conditions of employment ranged somewhat wider than the terms of the 1977 Patent Act. Business activities were treated in the same way as consultancy; both were subject to the "outside work" provisions. Attached to the guidelines was a form on which academics were expected to give a detailed account of their proposed activities ⁽²²⁾. Those wishing to start a business were asked to state the registered name and address of the business, the nature of the business, the names and addresses of the directors/partners and details of shareholdings or profit-sharing ratios. Once given, permission expired after three years unless an application for renewal was made before the expiry date.

Glasgow was not keen for businesses to be run from University premises, but the guidelines indicated it was prepared occasionally to consider it on certain terms, viz:

"... Where, in an exceptional case, the Court grants permission to staff to carry on a business from University premises, the Court may stipulate for any or all of the following requirements:

- (a) to participate in the business by means of a shareholding or otherwise;*
- (b) to charge for all overheads and administrative facilities provided by the Court;*
- (c) to reserve the right to withdraw permission in the event of any change in the ownership of the business;*
- (d) to require that University employees and not others be used in connection with the business".*

2.3 Incentives

The front page of the guidelines indicated that the Court would generally apportion 50 per cent of the income from exploitation of IP to the researchers concerned, after deduction of costs, with no upper earnings limit. The remaining 50 per cent would generally be split equally between the centre and the Department concerned. This income was to be disposed according to the HoD's recommendations "*... for Departmental purposes including the need to support new work in related areas*".

2.4 Structures

Though reference is made throughout the guidelines to the Court, in practice, until 1982 IP was handled on a very part-time basis by the Registrar ⁽²³⁾, with reference to the Secretary to the Court, when necessary. This meant that Glasgow's approach to IP was inevitably reactive rather than proactive. By the early 1980s, the centre recognised that it was paying a price for this approach:

"... We had a feeling that there was a lot happening out there which we didn't know all that much about. Where it was successful, that was fine, but it was important that the University should know about it.

"[We needed] the ability to actively present the University with a profile which accurately reflected the nature of our industrial contacts, when the figures tended to show that we had almost no contact, which was not true..."

Medics, for instance, had long been bridging the gap between their academic work and the application of that work. They were used to dealing with companies and generating income for their Departments which the centre knew nothing about and therefore failed to include in the University's statements of external revenue. In a dawning era of performance criteria, the centre lacked the requisite management information.

At that time, the centre had no desire to control such activities:

"... The feeling was, certainly in the early days, that there was a lot of activity going on already and it was not our job to control or co-ordinate the people who were already active. The intention was to spread the net of activity wider ..."

In 1982, in an attempt to give a higher profile to its industrial collaboration, Glasgow made a full-time, dedicated administrative appointment; originally a grade 3 appointment, it became a grade 4 appointment in October 1985 ⁽²⁴⁾. The new ILO was expected to develop the University's industrial contacts, to identify opportunities for collaboration and, in a softly-softly way, to generate enthusiasm among the academic community:

"... to spread interest and involvement and as far as possible to keep out of the hair of the people who were already actively involved ..."

His remit had not been fully fleshed out, but it was assumed that responsibility for IP would form part of it, for the time being at least. The appointment was seen as the first of a number of future appointments:

"... [We recognised] that other places, like Strathclyde, were much further down the road and already had much larger numbers of people involved, when we were just making our first appointment ..."

The University was less clear about the function of those future appointments, or about the framework in which they would operate:

"... We had no real base to start from ... We knew, broadly speaking, which direction we wanted to go in, which was to develop that side of the University's activities. [We had] recognised the need to make one post, but that ... was a first step in building a larger organisation.

"What kind of larger organisation we might want, whether we should go for a company structure like Aberdeen, or whether we should go for a straight industrial liaison office as part of the central services of the University, we were not at all clear about ..."

These questions became all the more pressing when it was realised that the University's initial appointment was not a success:

"... the lesson of our first appointment was that somebody who was drawn from an industrial background and didn't know how universities worked was going to struggle desperately, trying to understand ..."

Having identified this as the problem, early in 1986 Glasgow made an internal appointment, replacing the industrialist with a member of its Finance Office. This choice was dictated largely by the belief that the financial implications of the steps it was taking were going to become increasingly important.

2.5 Guidance

Having made one mistake already, Glasgow felt it needed guidance on how it could best achieve its long-term objectives. The University had a fairly detailed grasp of the general structure and scale of neighbouring Strathclyde University's approach, and the Vice-Principal (Industrial Liaison) made it his business to find out what the other Scottish universities were doing ⁽²⁵⁾. In the end, however, Glasgow decided to embark on a strategy which Strathclyde had employed. The Court voted to provide funds to engage professional consultants, with financial assistance from the Scottish Development Agency (SDA), which was promoting the use of consultants at the time. Segal, Quince, Wicksteed, co-authors of "The Cambridge Phenomenon" ⁽²⁶⁾, were hired to guide Glasgow towards a solution which suited its own particular needs.

This was the situation when the Kingman letter arrived in May 1985. Influenced by the senior officers and one particular Vice-Principal, the centre had moved away from its traditional disinterest in the transfer of its expertise and "hard" IP into the economy. Its new policy was to capitalise on the University's strengths, both in expertise and "hard" IP, to encourage the academic community to embrace this philosophy more widely and to monitor progress by means of suitable management information procedures. However, its initial tactics had failed to bear fruit: by the end of 1985, Glasgow had very few patents to its name, and the University's experience in exploiting them was "*not far short of negligible*" - though there was reason to believe that individual academics acting on their own initiative over the years had been more successful. Accordingly, Glasgow was in the process of seeking professional guidance on how to achieve its long-term objectives.

3 THE KINGMAN LETTER

Glasgow was not specifically expecting the Kingman letter, but its arrival did not occasion much surprise, in view of what the University perceived to be a constant stream of new, externally-inspired initiatives and increasing demands for management information:

"... nothing, by 1985, would have surprised anyone in [British] universities..."

Since the Research Councils' offer was entirely in keeping with the University's evolving policy, the centre had no hesitation in accepting it. A Vice-Principal whose portfolio included industrial liaison drafted a reply, indicating the steps which the University had already taken and its objectives for the future. The Exploitation Scrutiny Group accepted the University's response without comment at its second round of deliberations. Glasgow was one of twelve institutions whose letter of authorisation was sent on 3 November 1986.

4 CURRENT POLICY AND STRUCTURES

4.1 Rationale

The tactics which Glasgow has since adopted to achieve its long-term objectives owe more to its aspirations for the future than its current expectations, particularly where the Research Councils are concerned. In the short-term, the centre does not have particularly high expectations, despite the level of Research Council funding which the four science-based Faculties regularly attract. This has less to do with disciplinary spread - Glasgow's is particularly comprehensive - than with its view of what Research Council-funded projects might yield in the foreseeable future. It believes there is unquestionably potential, though not to the extent which either the Government or the Research Councils imagine, because their criteria for funding relate more to the "upstream" scientific value of a project than "downstream" applicability. More than anything, however, the centre's expectations are influenced by what it perceives to be the ethos of the University:

"...traditionally, there has been a belief here that the way forward is through peer review, Research Council grants ... Traditionally, people were ... less susceptible, less likely to be involved in exploitation than in getting [their findings] to the stage where they got publications out of [them] ..."

"... there are lots of other universities where the instinctive reaction from some academics would have been to see what was in it ..."

Given this general caveat, the centre concedes that individual Faculties exhibit different attitudes to the exploitation of expertise and IP and that "*natural preconceptions of where a Faculty might stand [don't] necessarily apply*". In May 1989, for example, the University ran a series of Faculty-based seminars on income generation. These were used as a forum to explain new statements on IP, research contracts and consultancies. The presentation was:

"... greeted by some quite aggressive questioning. Hostile, if not aggressive, at least. Hostile to the approach ..."

Hostility was expressed by members of all Faculties, but whereas on the whole, medics appeared to take a relatively pragmatic stance, members of the Faculty of Science saw the new policies as liable to lose them valuable research opportunities, if other universities made fewer demands of their industrial partners. On the other hand, social scientists have shown a high degree of interest in patenting and exploitation following joint projects with medics, for example.

At a Departmental level, there are one or two HoDs within the science-based Faculties whose attitude is not as positive as the centre would like. Since the University moved in 1976 to a system of rotating headships every three years ⁽²⁷⁾, this is not an intractable problem; most of the HoDs appointed for life prior to 1976 have now retired or left and few HoDs have stayed in post for longer than two 3-year stints. Moreover, increasing inter-departmental collaboration means that the parentage of IP is much more mixed than was historically the case.

In any case, there is evidence that attitudes may be changing. There has been a significant increase in the amount of IP which has been flagged by academics since 1986, but this has arisen largely from projects funded by the University itself, from the research element of its recurrent grant. When the income generation seminars were repeated in December 1989, around 10 per cent of the academic/academic-related staff attended and the hostility appeared to have evaporated. The centre was "*very favourably impressed*" by the general attitude and the "*very sensible*" questions which were asked, though it was uncertain whether to attribute this to a genuine change of heart or a feeling of resignation. Whichever it was, it did not prevent some academics from voicing concern about the University marketing sticks of rock in its Visitors Centre ⁽²⁸⁾.

Glasgow believes there is a widespread misconception about the timescale involved in achieving its objectives with regard to the exploitation of IP, many of which it broadly shares with the Government and the Research Councils:

"... making people more aware in this current phase may take a number of years to come through the system as potentially patentable, exploitable things ..."

Glasgow's tactics are geared to speeding up that process as far as possible.

4.2 Structures

On receipt of the consultants' report in autumn 1987, Court set about implementing many of its recommendations, both structural and regulatory. An *ad hoc* group, the Central Policy Review Group, was established. Consisting of the replacement ILO, the then Vice-Principal (Industrial Liaison), his designated successor and a lay member of Court, its remit was to investigate and progress issues such as IP rights and exploitation of IP. In 1988 this *ad hoc* group became a formal committee, meeting whenever necessary and reporting to Court ⁽²⁹⁾.

The consultants' report also made a number of recommendations about the staffing and the role of the industrial liaison office, which was named the Industrial and Commercial Development Service (ICDS). The recommendations were implemented on a step-by-step basis: in 1988/89 an extra two officers were taken on, bringing the total to 5, including 2 secretaries. Two contracts clerks were scheduled to arrive in 1990. It was planned to consider the recruitment of a fourth officer once the ICDS' performance had been assessed late in 1990.

As the staffing profile indicates, responsibility for research grants and contracts was transferred from the Finance Office to the ICDS, which was able to offer more detailed advice on sources of funding and on the legal, pricing and costing aspects of negotiating research grants and contracts. The ICDS feels that this recent change has made it much more alluring in the eyes of the academic community. Since it is involved in research grants and contracts from the very beginning, the ICDS is able to ensure that the University's IP is protected ... "*which gets the bricks and mortar right*".

As its title suggests, the ICDS is still conceived of as a central, administrative service, and it has no global self-financing requirement. To date, only its research contract function has been set financial targets, not its technology transfer function or its liaison function.

4.3 Regulations and Documentation

Acting largely on the consultants' recommendations, the Commercial Policy Review Committee drafted a new "Statement on Intellectual Property", which was approved by Court in April 1989, together with a "Statement on Research Contracts & Consultancies". Combined in one document ⁽³⁰⁾, these were sent to every member of the academic staff in October 1989, with a request to read them in conjunction with the Conditions of Employment, which had duly been amended.

Where IP is concerned, the new policy document is less opaque and more comprehensive than the 1982 guidelines. It explains that IP can exist in many different forms and that the form generally dictates whether it is protected by patent, copyright or registered design. It explains that in some cases, maintaining confidentiality may be the only way to protect it. It establishes the University's ownership of IP as an employer (quoting section 39 of the 1977 Patent Act in full in an appendix) but indicates that the University will not claim its rights of copyright in books or articles for learned journals. The document goes on to discuss the exploitation of IP in terms of patenting and licensing/formal confidentiality agreements where secret know-how is concerned. It concludes with an indication of the way in which the resulting profits are shared between the inventor and the University.

The new document makes no reference at all to company start-up as a route by which IP might be exploited. This is perhaps because entrepreneurial activity comes under the aegis of the outside work provisions, which were still under review at the time when the commercial policy statements were finalised.

Although the document stresses the facilitating remit of the ICDS, in fact it is now obligatory for the ICDS to have a say in how IP is exploited:

"... If you allow people to opt out, the whole thing becomes a bit self-defeating ... We have an organisation which is designed to work for the University and to assist the individual working within the University. Issues arising and opportunities should therefore be channelled through [the ICDS] and that should be expected as the norm of behaviour.

"If we don't, the University is likely to lose out and that is undoubtedly which is much more important now that it has been recognised..."

However, although the document does not overtly say so, the Court has left the right of final decision about whether to delay publication in the interests of obtaining patent protection with the academic:

"... If a company came back to us and said - this is at a stage where we believe we can make an enormous breakthrough and we're willing to sign a deal - I'm sure we would go to the academic and say, look - we need two years but they have guaranteed us X, Y and Z. But its upto the chap. If the chap turned round and said - no way - I don't know what the legal position is, but in reality, nothing is workable if you don't have the academic's agreement ..."

Glasgow came to this conclusion after discussions with administrators from other universities and reference to documentation from UDIL and the CVCP. Although it was not publicised at the time, it became policy in 1987, on the recommendations of the ILO, the then Vice-Principal (Industrial Liaison), his designated successor and an academic member of the Court.

4.4 Incentives

(i) Financial

Glasgow has chosen to concentrate on financial incentives to encourage academics to adhere to its policy on IP. After some discussion, the University opted to keep the revenue-sharing arrangements laid down in the 1982 "Guidelines...". Unlike many UK universities, Glasgow came out against a sliding scale, whereby the split between the inventor and the University increases in the University's favour as the aggregate income grows. The centre believes there are benefits to be gained from being more generous:

"... if you try and draw the bottom line too early, you undoubtedly run into snags. People just begin to think - this guy is going to take us for everything and give us very little. Its better to be generous with something than not to be be generous and find that they get round it ..."

The centre feels that in some areas, for instance pharmacology, it would be very easy for academics to come to secret agreements with companies which cut out the University altogether. This is a practice which the centre believes has already happened at other universities and is anxious to avoid. On occasion, this philosophy leads to the revenue-sharing rules being bent in a way which favours the inventor: for instance, if it looks as though the build-up of cash is going to be particularly slow, the inventor may be given all of the first £5,000, at the expense of the centre and the Department.

In practice, academics do not necessarily accept the financial rewards which the policy has instituted. The ICDS has worked with a number of academics who have rejected their right to royalties:

"... Some of them seem to be genuinely altruistic. Some of them want the money to go back into the Department for research purposes ⁽³¹⁾. Some in the medical field want to be able to say they have no personal interest and are pushing [something] for its scientific value, not for personal gain. It happens in other disciplines as well ..."

The centre still returns 25 per cent of the income from IP to the Department which generated it. Because of the relatively high proportion which it gives the inventor, the return to the Department from IP is considerably less than the return on overheads: 50 per cent is returned to science Departments.

The hypothetical financial rewards which may be derived from adhering to the University's policy are well publicised at Glasgow. There are also a number of examples of academics and Departments which have actually been rewarded: at the end of 1989 the University had around a dozen revenue-earning patents. To take an extreme example, during the life of the patent, the vaccine "Dictol" earned the equivalent of £3m at today's value, of which 50 per cent went to the inventors and a further 25 per cent to the

Veterinary School, which used it to acquire a teaching aid in the shape of its own farm.

The ICDS makes every effort to send out a press release to the media every time a major licensing deal is signed and the Scots media have frequently responded very positively ⁽³²⁾. There has also been close attention to publicity within the University via the newsletter, which details licensing deals, joint ventures with members of the academic staff *etc.* However, the financial return to Departments and to individuals is not covered in the newsletter:

"... We have never ... highlighted anything which says - well done, Department X! They have made the following amount of money and that has gone into the Department's discretionary fund.

"We might consider that, but ... we might get some academics saying - look, I'm, quite happy for you to exploit it, but I don't want you telling every Tom, Dick and Harry how much I'm making ... That would be a perfectly reasonable request ..."

This means that while the Veterinary School's acquisition of a farm is well-known in some circles, that knowledge may not be very widespread. Where the sums involved have been less substantial or the benefits perhaps less tangible, it is unlikely that such a large academic community will know about the IP-related activities of colleagues.

Glasgow has not instituted any "negative" financial incentives. This results partly from the fact that the University has not set Departmental income generation targets, nor has it plans to:

"... that would be most unfortunate. If a HoD came and said - I reckon I could make the University £100,000 a year in free income, or I could get £1m in Research Council grants, but I can't do both - [we] would rather have £1m in Research Council grants, as things stand.

"... As far as the Commercial Policy Review Committee is concerned, we are here to teach and do basic research. We want to encourage income generation, but it must not be at the expense of the other two ..."

(ii) Career Progression

In 1989/90, Glasgow updated its promotion procedures. Applicants now use a standard form, so that the presentation of material is more consistent from one applicant to another ⁽³³⁾. The form solicits information on three areas of work:

- teaching, course preparation and examining;
- research, scholarship and academic standing;
- departmental and other management or administrative responsibility.

Outside work is not considered as a separate category, but divided between these three categories, according to type. Thus, "*consulting practice*", "*provision of technical advice within the University*" and "*service while on secondment to a University company*" are deemed to be part of the research process. "*Industrial liaison*" and "*contributions to the management of a University company*" are seen as administrative contributions ⁽³⁴⁾.

This means that whereas involvement in the exploitation of IP is included among the criteria for promotion, the identification of IP is not rewarded. Nor is the successful protection of that IP in the form of a patent: **at no point in the application forms or in the guidelines accompanying them is the word "patent" used.**

There has been a long-standing dispute at Glasgow over the contribution made by a patent. The local AUT has refused for many years to consider a patent as a criterion for promotion, let alone equivalent to any form of publication. The AUT is not alone in its misgivings. Similar views were expressed by the centre, for different reasons:

"... we are sufficiently generous in rewarding and to be rewarded twice for the same thing seems ... to be particularly lucky ..."

This was tempered by the observation that in any case, academics whose IP generates a lot of revenue are almost always the more active members of the academic community. As such, they are likely to be promoted in any case.

The ICDS is not convinced by this argument and plans to put it on the agenda for the Commercial Policy Review Committee to reconsider:

"... It is a stumbling block ... Some individuals see it that way, because in some cases, people who are upto their eyes are looking at two distinct routes to go and they are definite either/ors. If they see only one of them as assisting promotion ..."

4.5 Sanctions

Glasgow has never applied sanctions against academics who failed to flag potentially exploitable research discoveries, even if this failure appeared to be motivated by personal financial gain at the expense of the University:

"... For those who have done it in the past, we didn't make our position clear enough, or it would be argued that we didn't. [We] don't want to lose any sleep over it ..."

Since the new policy statement has been issued, the University is not aware of anyone having contravened it. Asked to speculate on how it might respond if someone did, the centre's view was:

"... I would not wish the University to quote a situation where it would say: we are going to sack such and such a member of staff or we are going to get an injunction against him continuing to trade.

"... I wouldn't even say we would invoke any disciplinary procedures ... I cannot see the University at the moment going to court, sacking somebody, disciplining them ..."

5 THE EXPLOITATION PROCESS

5.1 Identification

The academic community was first informed that the University had assumed responsibility for exploiting IP arising out of Research Council-funded projects by an article in the newsletter in March 1987 ⁽³⁵⁾. There appears to have been no specific written reminder until November 1989, when a circular was sent to all Research Council-funded graduate students and all academic supervisors, confirming that the University had taken over from the BTG. This is now repeated at the beginning of each academic year. On the whole, the University has tended not to single out its objectives *vis-a-vis* Research Council-funded projects from its objectives *vis-a-vis* IP in general.

Towards the end of the initial three-year authorisation from the Research Councils, the University began employing a number of tactics to ensure that the academic community was aware of these broader objectives. The new policy statements on IP were circulated to all staff as soon as documentation became available in summer 1989. The ICDS also planned to produce a "*user-friendly booklet of DOs and DON'Ts*" to help inventors, which would be circulated to all members of staff and pinned onto noticeboards. In the meantime, the BTG circulated its 1989 pamphlet on patents ⁽³⁶⁾ to HoDs and possibly some research group leaders; the ICDS did not know who received it and who did not.

The ICDS also began employing face-to-face tactics to increase awareness, such as presentations at the income generation seminars, contributions to staff development seminars, and Departmental visits at which the functions of the ICDS are explained. At the end of 1989 it was recognised that new staff needed to be targeted more effectively: although all new staff are given a copy of the relevant policy statements, the staff induction programme did not at that time include a presentation on IP.

Despite its increased staff, the ICDS is obliged to rely fairly heavily on academics responding to its awareness campaign. Since an initial trawl when the ICDS was established, the amount of trawling carried out within the Departments has been "*minimal*". This is due partly to the pressures of exploiting IP which had already been identified and partly to a desire to wait until the new documentation relating to IP was prepared. Lately, trawling has effectively been limited to the BTG's regular bi-annual visits and those occasioned by special initiatives ⁽³⁷⁾.

Despite the fact that ICDS handles both IP and research grants and contracts, research reports are not actively scrutinised for potential IP at either the interim or final report stage. Glasgow has doubts about how cost-effective it would be - and about how academics would react to the idea at the moment:

*"... it is very seldom that somebody else - here or elsewhere - would turn round to an academic and say to them: that's a good idea, why don't you do a, b and c?
..."*

However, the centre does not entirely rule out the possibility in the future, on a voluntary basis:

"... As the service gains in credibility - and it is evident that it is: those who previously wouldn't deal with its forerunner, or found its forerunner so bureaucratic and slow that it wasn't worth dealing with are now quite supportive ...

"...in due time, if we said - well, before you send off your things to journals, why don't you just push them through and let Dr. Bloggs cast his eye over and see if there is anything in it, then I think we'd get people doing it. But I don't think we would ever get a situation where the academics would agree to doing it automatically ..."

The ICDS would be unlikely to undertake scrutinising reports or drafts of papers itself; the responsibility would probably be devolved down to the level of Faculty or Department:

"... We are going through a sea change at the moment, involving at least the potential for a number of areas perhaps being devolved ... Devolved responsibility is very much on the cards, in the widest sense ..."

For it to be a worthwhile exercise, the ICDS feels that the person(s) responsible would have to be able to balance knowledge of the field against an ability to assess commercial exploitability and possible applications.

5.2 Evaluation

The ICDS regards evaluation as the most tricky part of the exploitation process.:

"... At the end of the day, it is not how good the science is, or how clever it is, it is whether it is going to get into the marketplace. That is notoriously fickle and difficult. The number of examples of tremendous science that haven't hit the marketplace for no valid reason! They've been innovative, they've been cheaper, but they've just not caught the imagination ..."

For this reason, although the ICDS uses peer review to assess the scientific value of a discovery, its decision on how to proceed is guided primarily by the market value. In general, academics contribute little to this part of the exploitation process, unless they have industrial contacts, whom Glasgow may involve on an informal basis. The University often uses public sector agencies such as the SDA to evaluate its IP, or private sector consultants. Medical discoveries are the exception to this rule. Since medics are likely to be the end-users of any applications derived from their IP, they are able to contribute to the evaluation process.

5.3 Protection

(i) Philosophy

Glasgow generally prefers to retain ownership of its IP rather than assign it to an industrial partner, unless circumstances are exceptional ⁽³⁸⁾. It is motivated by the desire to retain control over the IP, to prevent the technology being suppressed or under-exploited, and not to lose its IP assets, should industrial partners go into receivership ⁽³⁹⁾.

If a discovery is considered to have market value, it is Glasgow's policy to try and get a discovery protected by a patent, where appropriate. This is not because the centre has a principled objection to treating IP as secret know-how:

"... at the end of the day, if something appears to have the [potential] for exploitation, provided the academic is agreeable to a secrecy agreement (added emphasis), it is probably in the long-term interests of science - and certainly the University - that we get a decent financial reward rather than an immediate publication ..."

but rather that because the ICDS believes industry sees a patent as a yardstick of credibility:

"... There is still sufficient distrust of University-based R&D and Heath Robinson inventions for them to say - we're not interested unless you have got a patent ..."

(ii) Finance

Unless they have considerable skill and experience, Glasgow does not ask inventive academics to draft patent applications themselves. The University prefers to employ a patent agent, even though it is more expensive, believing this yields a better patent. Glasgow's patent budget for 1989/90 was £35,000, to cover all associated costs. If necessary, this budget can be exceeded ⁽⁴⁰⁾; in the previous year, the budget was exceeded as a result of legal fees, for example. This level of funding allows the University to gamble on one long-term project a year; generally, cost dictates a fairly pragmatic, short-term approach, particularly at this early stage in the University's exploitation history:

"... [We are] now struggling in terms of our patent portfolio and [the] ability to service it financially. [We] just don't have licensees involved in enough cases ..."
⁽⁴¹⁾.

Nonetheless, the ICDS can normally cover the initial registration and the first year's costs. Glasgow does not attempt to save money by acquiring UK-only patents; it regards the UK, US and certain European countries as the norm. In order to get the most out of its budget, however, Glasgow generally uses the PCT route: the expenditure is slower and there is a greater chance of identifying licensees before the heavy expenditure occurs. The University also tries to cover the cost of renewal fees for the first couple of years, but would find it impossible to keep protecting technology which was a long way ahead of its time.

(iii) Practicalities

Academics at Glasgow who agree to delay publication rarely find themselves having to do so for more than a few months. If they are committed to giving a conference paper, the delay can be as short as a month - in the absence of a contractual obligation to delay longer. In this case, the objective is simply to establish a priority date via an initial registration. This gives little commercial advantage, however: it may result in a hastily-written patent which is limiting in scope or easy to get around. For this reason the ICDS will often suggest delaying longer, but if researchers disagree, the ICDS has to make the best of a less than perfect situation.

(iv) Ownership

Glasgow vests its patents solely in the University's name, not jointly, in the inventors' names, too. However, if a patent remains unexploited for a long time, the University is prepared to assign its rights to the inventors. Equally, if the University decides not to protect a discovery by filing a patent application in the first place, it is policy to unconditionally waive the University's rights in favour of the inventor(s). This does not happen automatically - only if a researcher requests it. A waiver/assignment would be issued as soon as was practicable, but if a discovery was at a very early stage, the ICDS might recommend waiting another year to see what developed. Glasgow does not subscribe to the six month limit recommended by UDIL. Since the early 1980s, only one researcher has challenged the University's decision not to protect a discovery by filing a patent application. On this occasion, the inventor chose to incur the cost of a patent agent, rather than write the patent himself and pay the minimum fee. He made use of none of the ICDS's resources in the effort to exploit his IP. The ICDS is not prepared to incur any direct expenditure once it has issued a waiver/assignment, but it would be prepared to devote staff time and expertise - in exchange for "*a small slice of the action*" - if it felt the academic was worth backing as a person.

5.4 Commercialisation

Where it retains rights to its IP, Glasgow has no principled objection to exploiting it via licensing to a third party, a University company or a joint venture ⁽⁴²⁾, but it is against independent academic spin-off companies exploiting "hard" IP.

(i) Joint Ventures

In practice, since the early 1980s, around 90 per cent of the University's IP has been exploited by means of licensing. In some cases, company start-up was not the appropriate mechanism; in others, there was simply no option:

"... [we] just don't happen to believe that there is a whole big pile of academics wanting to become entrepreneurs ..."

The ICDS estimates that since the early 1980s, no more than ten academics have seriously considered starting a company to exploit their research discoveries and even fewer have taken the necessary steps ⁽⁴³⁾. Where company formation looks like a viable option, the ICDS does suggest it to researchers. Once the ICDS has outlined the advantages and disadvantages, researchers have tended to reject the idea, however:

"... Very few of them have shown that they have understood the problems, the obligations, the red tape, the paperwork - and very few of them want to take it on board ..."

By the end of 1989, Glasgow had set up three joint ventures, two with members of the academic staff alone and one involving academic staff, the public sector and the private sector. A fourth joint venture was in the process of being set up ⁽⁴⁴⁾. In each case, the academics themselves took the initiative.

(ii) University Companies

In principle, if company start-up is an appropriate way to exploit a piece of IP - yet the researchers concerned are not entrepreneurial, there is no reason why the University should not set up its own campus company. However, Glasgow entered the 1990s without a University company of any kind. Having failed with its first attempt at an industrial liaison office, the centre was keen for the ICDS to establish its credibility with the academic community:

"... We reckoned it was going to be twice as hard if [the ILO] was perceived as being part of an outside organisation, something that they couldn't comprehend ..."

Once the climate changes, a University company may well be formed ⁽⁴⁵⁾.

(iii) Licensing

Glasgow is not unhappy about the fact that most of its IP is exploited by means of licensing. This is generally seen as "*less trouble*" than any other exploitation route ⁽⁴⁶⁾. Setting up a joint venture demands far more of the ICDS than the average licensing deal. The distribution of equity requires delicate handling, it is often difficult to locate a suitable managing director ⁽⁴⁷⁾ and academics do not immediately understand the obligations which they have taken on. Moreover, lengthy procedures are involved if the academic wants to devote more than the minimum time to the company (see section 6.2 for more details).

Non-entrepreneurial academics can still play an important role in the commercialisation of their discoveries:

"... the academic, in a lot of cases, has a better working knowledge of the market - and contacts in it - than outsiders. [We] tend to use them as the first selection point for people to contact. Some of them are very switched on. Some of them, like the vets, are working in a very small marketplace anyway. They know all the contacts ..."

In this situation, the academics usually make the initial contact. It is their job to "*sell*" both themselves and their technology. Once they have done that, the ICDS establishes the University's terms and conditions and finalises the deal, often granting licenses with some degree of exclusivity. Academics are never excluded from this process: they participate in an advisory capacity unless they are unwilling to.

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy

Glasgow has a fairly specific policy with regard to would-be academic entrepreneurs, but it is not one which has been formally written down and circulated amongst the academic staff:

"... [We] would like ... our academics, when they see opportunities for exploitation, to advise us of it. But I'm not sure that we would want to have what I would call a policy (added emphasis) which goes around with a big flag saying, you know, you must all become entrepreneurs. I think that would be counter-productive ..."

The centre would not welcome a significant upturn in the number of would-be academic entrepreneurs. While Court is still prepared to permit independent academic spin-off companies which exploit expertise, it would now be very unusual for an academic to be allowed to exploit IP via an independent spin-off company. This unwritten policy is motivated by a number of concerns. The centre has first-hand knowledge of University companies run by academics which failed dramatically at another University. Moreover, it is "known" that in the past a number of spin-off companies set up by academics from Glasgow have failed, running the danger of leaving the IP unexploited ⁽⁴⁹⁾. A high proportion of all new businesses fail, yet there seems to be an implicit assumption that these businesses failed due to the inexperience of their academic founders.

Glasgow is concerned not only about the viability of academic spin-off companies, but also about the squandering of academic expertise:

"... the concept that one should cut one's teeth as an entrepreneur - in most cases with little or no experience - based on [one's] own scientific project that might of itself be extremely valuable - that ... is a nonsense.

"[People] are in the marketplace because they have those skills. We have skills in a different area. Let's do what we are good at ..."

It is possible that successful academic spin-off companies have been incubated, unknown to the University ⁽⁴⁹⁾; it has certainly incubated a highly successful post-doctoral spin-off company (see note ⁽⁴⁹⁾ for details) - but this would be no consolation to the centre, which would see them as rivals, unless the University had a share in them:

"... We just don't believe we should allow people to go out and start businesses in competing lines to the University (added emphasis) without the University having an involvement. It just takes away business from the University ... That is madness. Any employer who encourages that must want his head examined ..."

The centre seems to expect a higher return from academic entrepreneurs than it expects from third parties who negotiate a license agreement. As things stand, however, structurally the University would get no more than a third party agreement would be likely to yield: an eventual royalty and possibly an up-front payment. This is because the income from spin-off companies is treated in the same way as personal consultancy: Glasgow does not levy a percentage tax on academics' income from personal consultancy.

If academics at Glasgow wish to become entrepreneurially involved with the exploitation of the IP they have generated, they can only do this legally via a joint venture, with the University "in the driving seat" ⁽⁵⁰⁾. They are not allowed to take on the role of **managing** director: the University prefers to put in a managing director who has an established track record. Academics may hold directorships which exploit their scientific or technical ability, however.

A number of centres/institutes/units have been established at Glasgow. With the exception of three ⁽⁵¹⁾ - most of which have sprung from social sciences disciplines - they were established to achieve purely academic objectives. There is no indication that Glasgow's academics have tried to pursue their entrepreneurial interests within the University system, by setting up commercial arms to their Department, explicitly and exclusively intended to exploit expertise/resources.

6.2 Making Time

If the University agrees to a joint venture to exploit IP, it recognises that the project's success depends on researchers' ability to commit time and energy to it. If academics require more than the 30 days a year which is the recognised limit for personal consultancy activities, they must seek formal permission. In principle, the centre is willing to consider any arrangement which academics care to propose, from extending their consultancy limit to temporary part-time employment or leave of absence. In general, decisions about time off are based on a value judgement about the relative merits of the academic's normal contributions to his Department versus the activities for which he requires time off. In theory this could mean that Professors are less likely to be granted a reduced workload than Lecturers:

"... Clearly somebody's worth to you as HoD is much more than if he is a junior Lecturer ..."

However, most of Glasgow's entrepreneurial academics have had the status of Senior Lecturer or Professor. This suggests that their contribution to the exploitation process has been highly valued.

In practice, entrepreneurial academics have not been allowed to devote more than 20 per cent of their time to the company on full pay. Alternative solutions have been found, however. In one case, an academic has been allowed to buy-out additional time on full pay, by paying for a Research Fellow for three years. This was at the academic's initiative:

"... He came along and said - look, I'm spending a lot of time on this. You are still telling me I can't do it and [since] we are both agreed that we like each other ... I would like to pay for a Research Fellow ..."

In another case, an academic who was willing to forego his pay was granted one year's leave of absence. In principle, the centre would be sympathetic to a request to extend previously agreed periods of absence, if it was critical to the success of the company; again, it would assess the relative merit. In practice, though, the ICDS feels that many HoDs would be unhappy if previously agreed terms of absence were to be extended:

"... The reality very often is that the guys who have that commercial edge are the ones who are key to the Department ..."

From the ICDS's perspective, making time for academics' entrepreneurial activities involves procedures which leave a lot to be desired:

"... There is a lot of red tape involved. A lot of people have to agree to it - HoDs, the Staffing Committee, perhaps the Secretary to the Court. The procedure is not as quick as it should be.

"The problem is that it is an iterative process. You're having to consult with the Staffing Committee about time off. There may be matters of policy because ... each new vehicle may bring up points of principle - which may take you to the Commercial Policy Review Committee.

"The actual funding of the company takes you to the Innovation Fund and then the Court has to approve the whole thing. You're going through far too many committees ... To dot the i's and cross the t's [takes] months ..."

These are quite separate procedures which have developed piecemeal over the years to regulate unrelated activities. They have a dynamic of their own which takes no account of the demands of business start-up, and this has already come close to causing serious problems. Moreover, since each decision is taken independently, there is no guarantee that conflicting decisions will not be made.

6.3 Other Resources

(i) Equipment/Instrumentation, Support Staff, Communications

In principle the centre is in favour of allowing academics who are trying to exploit promising IP access to resources. However, as a university, Glasgow feels it is operating under sufficient constraints that it cannot properly resource its primary functions. The centre is therefore keen to get a return on such "extraordinary" use of its resources. That may be a short-term or a long-term return, depending on the circumstances. If an academic wanted use of equipment/instrumentation or accommodation and the University did not have an equity share in his company ⁽⁵²⁾, it would look for a fairly immediate return, charging the market rate per day, per telephone call ⁽⁵³⁾, etc:

"... If you say to somebody - yes, you can set up a company and you can use our spectrometer and we won't charge you, it really is a misuse of the University's funds unless the long-term aim is to add to the University's funds ..."

If the University has an equity stake in the company, it is prepared to look for its return considerably later and in a different form. Academics are unlikely to be charged for phone calls for some time. Their use of equipment, instrumentation and technical or secretarial support staff tends to be overlooked initially, though charges below the market rate are generally levied eventually.

(ii) Accommodation

Accommodation is so scarce at Glasgow that entrepreneurial academics are never allocated additional space, even if the University has an equity stake in the company. However, they are allowed to use their existing accommodation during the start-up phase. Again, would-be academic entrepreneurs are unlikely to be charged for this for some time. This is in recognition of the fact that the University offers no suitable incubator units, despite having been instrumental in the founding of the West of Scotland Science Park, the greater part of which is located on Glasgow University's Kelvin campus ⁽⁵⁴⁾:

"... In conceptual terms, it is not the right place for a start-up company. There are no incubator units in the right sense. They are too expensive. You're talking about a relatively high quality, high facility operation and that's not really for start-ups ..." ⁽⁵⁵⁾.

Since there are no other "technology parks" in the immediate vicinity, it is on the ICDS's agenda to find some space locally where it could set up incubator units, but this is unlikely to happen in the immediate future.

(iii) Financial Support

Although the University would appreciate being given an equity share in an independent academic spin-off company as a *quid pro quo* - something which has not yet happened - it generally puts up the capital for its equity share ⁽⁵⁶⁾. Glasgow does not operate in terms of minimum or maximum percentages or controlling interests; it generally makes an *ad hoc*, pragmatic decision based largely on the funds which it can make available. However, as a rule, academics are given a 5-10 per cent holding in joint ventures, unless they can make a strong case for a larger holding or are prepared to contribute capital. The University has also been known to make loans, both preferential and non-preferential, to the company, rather than the individual academic. These do not usually exceed £20,000.

Financial support of this sort is given via a special innovation fund, which was established in 1985 at the initiative of the Court. An initial £200,000 was diverted into the innovation fund from the University's general funds. A committee, chaired by a retired banker who is a lay member of Court, meets to consider requests for funding whenever necessary. The fund is intended to plug the gap between blue-sky research and the stage at which venture capitalists are prepared to invest, providing "*softer money in more speculative situations*". This can be start-up or second-phase funding. In the view of the University, "*venture capitalists ... are still risk-averse, despite everything they say*". Glasgow sees risk as:

"... an acceptable criterion in relation to the exploitation of University projects ..."

The fund was intended to be regenerated partly through token dividends but mainly through successful companies being sold-on:

"... I don't think we see ourselves as having a 20-year interest in any companies. We would be selling-on once the inventors had got it to a certain stage in the market and it needed another level of money and expertise ..."

At the end of 1989 the innovation fund stood at just £50,000. It may be some time before it can regenerate itself as planned: the University has not yet had a return on its equity holdings - the companies it has financed are all too new - and it will be some years before any of them are ready to be sold-on. Moreover, the committee backed one company which failed before it got its product to the marketplace. This has not acted as a deterrent, however. The University feels it has learned valuable lessons from the exercise.

6.4 Business Start-Up Advice

Since the ICDS is headed by an accountant with commercial experience, it has sufficient expertise to give business start-up advice to the University's would-be academic entrepreneurs. However, this is not a resource which can be made available to all-comers:

"... If they were doing it entirely privately, for their own gain, the question of whether I wanted to [help them] wouldn't apply: we just don't have the manpower ..."

In practice, though, there are few situations where there is a *prima facie* case for a company being entirely independent. Where IP is being exploited, the University generally acquires an equity stake. Moreover, the University is moving in the direction of taking an interest in spin-off companies founded to exploit academic expertise, even if this involves a nominal shareholding:

"... [It] is much easier for all parties if the University has a shareholding. First of all, the guy has credibility on campus ... He also has better marketing potential if he is seen to be linked to the University. Secondly, we've got a handle on his activity ..."

In such situations, company spin-off is treated as a University project and every effort is made to give business advice.

7 SCRUTINY GROUP ASSESSMENT

In August 1990 Glasgow was informed that the Exploitation Scrutiny Group was "*generally satisfied*" with the exploitation arrangements which the University had established. The Exploitation Scrutiny Group noted Glasgow's intention to establish a more formal network for identifying IP in the future. A formal document was scheduled to follow, confirming the University's rights and responsibilities to exploit IP arising out of Research Council-funded projects for a further 2 years. The situation was due to be reviewed again in 1992 after Glasgow had submitted its fifth annual report ⁽⁵⁷⁾.

KENT UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

An abortive bid was made in 1947 to have a university sited in Kent - at Canterbury, specifically - to fill the increased post-war demand for a university education. In the late 1950s a number of towns in Kent drew up plans in preparation for a bid. Kent County Council opted to support Canterbury's bid, which was successful. Kent received its Royal Charter in 1965, making it one of the group of universities often referred to as "plate-glass".

1.2 Size

By the beginning of the 1980s Kent had become one of the larger small universities in the UK, measured in terms of student FTEs ⁽¹⁾. In 1981 the UGC advised the University to reduce by 7 per cent the number of home students registered in 1979/80 by 1984/85. Like many of the south coast universities, Kent already had a relatively high proportion of overseas students, as **Figure 2** showed. At the same time the UGC announced that Kent's recurrent grant was to be reduced by 21 per cent between 1980/81 and 1983/84. As we can see from **Figure 2**, this was somewhat above the national average. This advice was also received with some surprise, since the UGC appeared to have accepted that Kent had been significantly underfunded for years, compared to other universities of a similar size and subject distribution ⁽²⁾. By most methods of reckoning, Kent falls into the group of universities worst afflicted by the UGC's decisions.

Kent's response to the cuts was to reduce staff numbers by natural wastage, rather than by closing down whole subject areas. The area which suffered most was the history division of the Faculty of Humanities; the science base was not so seriously eroded. Kent ended the 1980s with one more Faculty than it had at the beginning. A Faculty of Information Technology was added to the existing Faculties of Natural Sciences, Humanities and Social Sciences. In practice, this represented a restructuring of existing resources, rather than a completely new departure. The previously non-aligned Computer Lab and Institute of Mathematics joined forces to form the new Faculty, to which were added the existing Electronic Engineering Laboratories, previously located in the Faculty of Natural Sciences.

In 1986 the UGC indicated that Kent should increase its student numbers by 5.12 per cent over the next four sessions ⁽³⁾. In fact, by the end of the 1980s, the University managed to increase aggregate student numbers over the decade by 12 per cent ⁽⁴⁾. As a result, Kent also increased its size relative to other universities over the same period ⁽⁵⁾. By the end of the 1980s, Kent had also managed to increase full-time staff numbers by around 14 per cent and had more than doubled the number of part-timers ⁽⁶⁾.

1.3 Science Base

Kent is unusual having no Departments: this was a deliberate ploy when the University was founded, designed to encourage an inter-disciplinary approach to teaching and research. The Faculty of Natural Sciences is organised around the Biological Laboratory, the Chemical Laboratory and the Physics Laboratory, which act as cost centres. Similarly,

the new Faculty of Information Technology is organised around the Computing Laboratory, the Electronics Laboratory and the Mathematical Institute, each of which acts as a cost centre, likewise.

In 1988/89 the combined staff of these two Faculties accounted for 35 per cent of the University's total academic/academic-related staff ⁽⁷⁾. They were responsible for around 27 per cent of Kent's undergraduates and 47 per cent of registered research students ⁽⁸⁾. In absolute terms, Kent has one of the smallest science bases of any monolithic university in the UK. This has led to a spiral of increasing financial deprivation ⁽⁹⁾.

As Figure 6a showed, in the UGC's 1986 assessment of universities' research strengths in the natural sciences, engineering and technology, none of Kent's subject areas were rated as outstanding. Three were assessed as above average, none were rated as average, but four were rated as below average ⁽¹⁰⁾. It was suggested that if the ABRC's recommendations were ever implemented, Kent would be assigned to the "T" category; accordingly, the University would be able to offer some postgraduate work, but without advanced research facilities ⁽¹¹⁾.

Figure 6b revealed that in the 1988/89 research selectivity exercise, no "units of assessment" in the natural sciences, engineering and technology received a "5" rating at Kent; two received a "4", three received a "3", one received a "2" and none received a "1" ⁽¹²⁾.

1.4 Research Grant and Contract Income

Figure 41a shows that in 1984/85 Kent ranked 41st in terms of £ earned in external research grants and contracts, but 32nd in terms of the percentage of its total recurrent income which this external revenue represented, namely 11.7 per cent ⁽¹³⁾. The Faculty of Natural Sciences, the former School of Mathematics and the Computing Laboratory brought in close to £1.4m, accounting for 61 per cent of the University's total income from research grants and contracts ⁽¹⁴⁾. We can see from Figure 41b that by 1988/89 the Faculties of Natural Sciences and Information Technology had increased their earnings for 1984/85 by a factor of 2.5, generating close to £3.4m; this accounted for 74 per cent of the University's total income from research grants and contracts ⁽¹⁵⁾.

The pattern of sponsorship which Kent's science base attracted was slightly different to the pattern four years earlier, as Figures 345-346 the proportion of funding received from the Research Councils and charities fell from 65 per cent in 1984/85 to 59 per cent in 1988/89. This was not due to increased funding from industry/commerce - indeed, the proportion of funding from this sector fell marginally, from 8 per cent in 1984/85 to 7 per cent in 1988/89. Kent significantly increased the proportion of funding received from central government, local government and various overseas organisations - up from 26 per cent in 1984/85 to 34 per cent in 1988/89.

2 HISTORY OF IP EXPLOITATION

2.1 Background

Prior to the 1980s, potentially exploitable, "hard" IP was occasionally identified and patented at Kent ⁽¹⁶⁾, but this happened purely as a result of individual researchers having

sufficient interest to pursue the matter. If the IP was exploited commercially, this was also due to the researcher's efforts. The administration had no interest in actively seeking out IP and arranging for it to be exploited. The administration did not have a great deal of interest in the University's relationship with industry, either.

2.2 Structures

The push to establish some kind of structure to foster the University's relations with industry came not from the administration but from a section of the academic community. In 1979 the Dean of the Faculty of Natural Sciences presented a paper to his Faculty's Board of Studies, proposing that the University should found a company to act as a vehicle for soliciting research contracts from industry and handling the resulting income. The Board of Studies nominated a working party ⁽¹⁷⁾ to investigate whether a company was the most appropriate way to achieve the objectives he had outlined, and if so, to draw up a business plan. The Dean originally proposed approaching the Wolfson Foundation with a view to obtaining funding, but in the event, an approach to the UGC yielded the offer of £34,000 as a pump-priming grant, payable in 1980/81.

Armed with this, the proposal was formally put to Senate and Council and was duly accepted in the 1980/81 session. This did not necessarily indicate a sudden interest in industry on the part of the administration or the rest of the academic community:

"... this was regarded by the University at large as one of those personal hobbies that people in high places in universities tend to pursue and that should, by and large, be humoured ..."

Cynics in the administration saw it as a mechanism which allowed a minority of the academic community to overcome the fact that their activities conflicted with the prevailing ethos:

"... commercial deals could be treated with a greater degree of confidentiality than they could under the then existing procedures in the University: basically, backhanders for academics.

"In those days people were fairly puritan. It wasn't the done thing to have a grant go to [the University] and for £25,000 of it to go to Professor X for working on it ... It enabled a certain amount of camouflage to be imposed on these things with the aim that - if academics could be stimulated to greater efforts by this mechanism - the company would make a profit and the profits would be remitted to the University ..."

Kent Scientific & Industrial Projects Ltd (KSIP) was founded in 1980 and began operating at the beginning of 1981. Its official function was to act as a commercial arm for the whole University, exploiting its expertise and equipment in much the same way that discipline/technology-specific units located within particular Departments do in certain other universities. In subsequent years, a number of such discipline-specific units were founded at Kent, too, independently of KSIP ⁽¹⁸⁾, but only KSIP was given the right and responsibility for handling "hard" IP in the form of patentable products and processes. However, KSIP was intended to be an R&D-based business, not a "hard" manufacturing company which would entrepreneurially exploit such IP itself. KSIP was to act as a broker, identifying, evaluating and protecting IP and arranging for third parties to exploit

it. A Managing Director was duly appointed who was believed to have experience of dealing with IP and a grasp of how universities operate ⁽¹⁹⁾.

2.3 Policy

With the benefit of six or seven years' hindsight, the administration no longer regards the appointment as an unmitigated success, though it recognises that the University itself must take some of the blame for this. Neither the administration nor the then Board of Directors ⁽²⁰⁾ had formulated a policy to guide KSIP's activities:

"... We hadn't got a policy. We had just jumped on the bandwagon of having a company because somebody said it was a good idea. Nobody had really sat down and considered the advantages and the disadvantages ... Therefore, he was basically alone out there ..."

KSIP was left to its own devices where IP was concerned, though it is unclear how much the new Managing Director was responsible for what ensued and how much academics with a vested interest were responsible. Up to December 1986, when the first Managing Director left, KSIP made around ten patent applications, vesting the patents in its own name rather than the University's, or jointly in the name of KSIP and the inventors. Some of the IP arose out of research funded by the University itself and some out of Research Council-funded projects, which the BTG saw no future in pursuing ⁽²¹⁾. By omission or by design - it is unclear which - Kent did not establish a patent budget. As a result, KSIP ended up bearing the patent costs. In the majority of cases KSIP bore not just initial registration fees but the costs of acquiring full patents as well as renewal fees. Since much of the IP was protected not only in the UK but also in Europe, the US and Canada, this involved a considerable sum of money. With one exception, KSIP did not recoup these costs from licensees. In fact, KSIP seldom capitalised on protected IP by finding licensees. In the administration's view, the IP tended to be exploited intellectually rather than commercially. It is unclear whether this was the result of a deliberate, long-term policy to acquire a portfolio of strategic patents, or whether this was the result of individual academics acting out of vested interest. In the early 1980s, a considerable effort was being made to build up research groups. Some academics may have felt that more benefit would be derived from using research discoveries as background IP to gain new research contracts from industry than would be derived from licensing it. However, the administration suspects that some academics were also exploiting the IP via their own spin-off companies, a number of which began to emerge during this period.

With the benefit of hindsight, Kent's administration questions not only KSIP's approach to protecting and exploiting IP, but also its efficacy in identifying IP in the first place. Most of the patents which KSIP acquired during its first few years of operation protected IP which had originated in the Physics Laboratory. KSIP's first Managing Director had trained as a physicist and KSIP itself was located in the Physics Laboratory:

"... It's not accidental that virtually all the patents we got when he was here were in physics ... It was easy for him to interact with the physicists ..."

It is unclear whether the first Managing Director took a proactive or a reactive approach to the rest of the campus:

"... It might have been that KSIP went out and sought to obtain IP, went round the campus and proselytised, but I doubt it. In fact, I'm sure [it] didn't, because of one of the perpetual moans of the KSIP Board [was] that it [wasn't] a sufficiently proactive organisation ..."

2.4 Regulations and Documentation

There is no record of KSIP producing any written documentation to indicate to the academic community that it was responsible for IP, that researchers with potentially exploitable discoveries should notify KSIP - though this might perhaps have been deduced from an article in the university newsletter about the appointment and remit of KSIP's first Managing Director. There is evidence to suggest ⁽²²⁾ that the Registrar produced a document in 1982 which detailed the IP rights claimed by the University. However, it is not clear by what means this was circulated - or, indeed, whether it was circulated at all. The administrator who currently has responsibility for IP matters has no knowledge of it. He believes that even if it was circulated, it was soon forgotten. In his view, it is likely that academics who thought their discoveries had potential took some time to find out what they should do about it:

"... They probably wouldn't have known that they should [go to KSIP]. They probably would have talked in various common rooms and even made a judicious phone call to someone in the Registry and eventually they would have tracked down that that was where they should go ..."

On the other hand, if academics decided to exploit the IP themselves, there was little to deter them. The University had not amended its terms and conditions of employment in the wake of the 1977 Patent Act, nor had it reached a collective agreement with the local AUT.

2.5 Incentives

At the same time as outlining the IP rights claimed by the University, Kent introduced a financial incentive to encourage researchers to "flag" potentially exploitable discoveries. In keeping with the terms of the 1977 Patent Act, they were rewarded financially only if the patent was successfully exploited on a commercial basis. For the first time, Kent came to a policy decision on how royalty income from exploiting inventions should be distributed. There is no record of how this decision was reached, though more recent documents suggest that it may have been at the behest of the Board of KSIP, anxious to recoup some of its outgoings. In any case, the Finance Committee agreed to introduce a sliding scale. The first £1,000 net went to the inventor(s); the next £4,000 net was split 75:25 between the inventor(s) and KSIP; the next £20,000 net was split 50:50 between the inventor(s) and KSIP. Income in excess of £25,001 net was divided 25:75 between the inventor(s) and KSIP ⁽²³⁾. There is evidence to suggest ⁽²⁴⁾ that a document detailing this was sent to existing and subsequently to new members of the academic/academic-related staff by someone with responsibility for personnel. However, during the 1980s responsibility for academic/academic-related personnel at Kent was devolved to the Faculties, rather than organised centrally ⁽²⁵⁾. It is not clear who would have sent such a document and it was not possible to find a copy.

2.6 Summary

This was the situation when the Kingman letter arrived. KSIP had been left to work out its own *modus operandi*, with the result that whilst it had put together a portfolio of patents, it had made no real effort to exploit them commercially. Patents were costing the company around £15,000 a year, and it was not clear who, if anyone, was benefitting from this expenditure. Little or no attempt had been made to quantify the benefits to the University, either in financial or non-financial terms. An attempt had been made to recoup some of the cost by agreeing on the distribution of royalty income, but there had been only one tranche of royalty income to distribute ⁽²⁶⁾. The administration was in the process of slowly recognising that KSIP was operating in a less than optimal way - and that by default, if not by design, the University itself was partly responsible for this state of affairs.

3 THE KINGMAN LETTER

When the Kingman letter arrived, it was discussed by a group consisting of the Vice-Chancellor, the Deputy Vice-Chancellor, two Pro-Vice-Chancellors ⁽²⁷⁾, the Registrar and the Academic Secretary. The administration did not inform the academic community about the Research Councils' offer. Academics were not given an opportunity to make their views known or to contribute to the decision- and policy-making process. The decision to accept the offer was made by this small group, as was the decision to make KSIP responsible for any IP which might arise as a result. The idea of the University effectively taking over from the BTG was not seen as a controversial issue:

"Nobody would care tuppence! We had been doing nothing [via BTG] previously, so any increment would have been an improvement on the previous situation ..."

The response seems to have been drafted by the Registrar ⁽²⁸⁾. Kent, together with eleven other institutions, had its proposals accepted by the Scrutiny Group in the second round of deliberations. The letter of authorisation was sent on 3 November, 1986.

4 CURRENT POLICY AND STRUCTURES

4.1 Rationale

Despite the dissatisfaction with which certain members of the administration had come to view Kent's arrangements for handling IP, it was not the administration alone which agitated for a change. The new Managing Director of KSIP ⁽²⁹⁾ felt there were circumstances which prevented him from effectively identifying, evaluating, protecting and exploiting the University's IP ⁽³⁰⁾. Moreover, KSIP's new Board discovered that the company was spending around £15,000 a year on patenting costs, for no return ⁽³¹⁾. Concerned that this was "*assassinating the balance sheet*", in 1988/89 the Board put a resolution to Council diverting responsibility for patenting costs to the Registry.

The resolution was accepted and at the same time, responsibility for IP was transferred from KSIP to the Registry, more specifically to a Senior Assistant Registrar ⁽³²⁾. It was planned to establish a dedicated research grants office under his supervision and it seemed logical to locate responsibility for IP in the same place ⁽³³⁾. It was also felt that the

administration could ensure more of the University's IP was commercially exploited, eventually generating a surplus income.

Given its misgivings over KSIP's proficiency in identifying "hard" IP, Kent is not sure where to pitch its expectations for the future. On the one hand, many of its physicists have fairly applied interests ⁽³⁴⁾, as do its biologists ⁽³⁵⁾ and some of its electronics researchers. On the other hand, Kent feels that not having an engineering Faculty is a considerable handicap:

"... If you've got a lot of engineers around, it must influence the corporate view. I think it's an ethos thing ..."

This may partly explain why the University has been prepared to take what could be seen as a retrograde step. It has chosen to make IP the responsibility of a career administrator who already has a considerable workload, in preference to solving the problems which KSIP felt prevented it from handling IP effectively. Solving those problems would have involved instituting better systems for sharing information, but it might also have involved expanding the staff of KSIP, with all the associated cost implications ⁽³⁶⁾.

4.2 Structures

Kent now has a dual structure for handling "hard" IP. KSIP still handles the patents which were vested in its name, but the Senior Assistant Registrar is officially responsible for all IP discovered after mid-1989. It is already evident that this situation gives rise to a number of problems.

Firstly, while the University centrally has sole responsibility for research grants, both KSIP and the University centrally have the right to negotiate contracts with industry, Government Departments *etc.* Academics can choose which structure to deal with; theoretically, they could even play one structure off against the other in the search for the best deal.

Secondly, in contracts negotiated by KSIP, any IP generated which does not belong to the sponsor will belong in the first instance to KSIP. It is not clear whether KSIP will be obliged to assign that IP to the University and leave it to decide whether or not to protect and exploit it - or whether the ownership of such IP will remain with KSIP. As yet, there has been no occasion to consider this.

Thirdly, there is a conflict of interest inherent in the relationship between the Senior Assistant Registrar and KSIP. As Secretary of KSIP's Board, the Senior Assistant Registrar is effectively involved in evaluating KSIP's performance. Where exploitation of IP arising out of contracts is concerned, he and the Managing Director of KSIP could find themselves competing. At the very least, the Senior Assistant Registrar has assumed responsibility for exploiting IP identified after June 1989, while the Managing Director of KSIP has an ongoing responsibility for IP identified prior to that date. The inherent conflict of interest is compounded by the fact that, to date, the Managing Director of KSIP undoubtedly has considerably more experience of handling IP matters than the Senior Assistant Registrar: *ergo*, the less experienced of the two is sitting in judgement on the more experienced.

Fourthly, the Managing Director of KSIP retains his position as the University's ILO; as such, he, rather than the Senior Assistant Registrar, attends meetings of UDIL. Whilst he takes care to pass on to the Senior Assistant Registrar any relevant documentation, no mechanism has been established for communicating less formal information:

"... I talk to [him] occasionally, when particular matters come up. I haven't spoken to him since the last UDIL meeting ..." ⁽³⁷⁾.

4.3 Incentives

(i) Financial Incentives

Until 1989, there was only one incentive aimed at encouraging researchers to "flag" potentially exploitable IP - a financial incentive. In keeping with the terms of the 1977 Patent Act, researchers were rewarded financially only if their patent was successfully exploited commercially. At Kent, this was a largely hypothetical incentive, since upto October 1989, only two patents had been commercially exploited - and one of those collapsed after the licensee's company was taken over. Moreover, it was an out-of-date incentive. When KSIP's third Managing Director was appointed in July 1987, he noticed that personnel (see note ⁽²⁴⁾) was still distributing a document dated 1982. The income bands on the sliding scale introduced that year had not kept pace with inflation. Accordingly, in 1988, following a recommendation from the Board of KSIP, the Finance Committee increased the income bands by around 4 per cent per year, compounded ⁽³⁸⁾, with effect from 1 April.

(ii) Career Progression

KSIP's new Managing Director was concerned about the affect that spending time on IP matters might have on academics' careers, since this might act as a deterrent to "flagging" and helping exploit IP. As a result, Kent introduced additional incentives to encourage researchers to devote time to generating revenue from industry and to exploiting IP in its widest sense. The University has recognised that in some instances academics may have to make a choice between this kind of activity and "*more traditional academic work*". A paper prepared by the Financial Secretary for Council in June 1989 ⁽³⁹⁾ recommended mitigating this conflict by:

"... accepting that, in terms of career development, the successful completion of research contracts and consultancies (including obtaining licenses and patents) will be given equal credit to grants and publications ..."

This change was justified by the fact that a Department's research performance is to a large extent judged by the income it receives from research grants and contracts, that this in turn affects the block grant paid by the UFC and that greater contact with industry will make the University's "Enterprise in Higher Education" programme more effective. It was also observed that patentable IP could lead to new companies being founded.

Council approved these recommendations in August 1989 and in November 1989 the University's criteria for promotion were duly amended. Under category F "*important outside activities including consultancy*" were specified as being a criterion for promotion.

(iii) Financial Incentives Revisited

At the same time, Council approved changes in the income bands which dictate how royalty income is distributed. Since August 1989 the first £1,000 net goes to the inventor(s); the next £9,000 net is split 50:50 between the inventor(s) and the University; income in excess of £10,000 net is divided 25:75 between the inventor(s) and the University. This is considerably less generous than the terms agreed and circulated the previous year ⁽⁴⁰⁾.

There are no incentives directed specifically at the Directors of Laboratories to encourage them to seek out and "flag" IP. At present the residue of the income from royalties stays in the University's central funds; none of it is channelled back into the Laboratory which generated the IP:

"... Nobody has grappled with that yet ... Nobody knows what [proportion] of the payment to the University ought to be [returned to the Laboratory] ..."

The administration believes that these two personal incentives - "cash and glory" - are the only ones required, but doubts whether either will have much impact on some senior staff:

"... the people who are interested in money have gone out and got it already. The people who are interested in glory have gone out and got that.

"... If people really think you can take some Senior Lecturer who has been at the top of the scale for 15 years ... and has published one ... paper a year and has never had a research grant - if you think you can simply transform him into a vibrant, active IP person just by the stroke of a pen, basically that's just nonsense ..."

Moreover, despite sending copies of the Financial Secretary's paper to all Laboratory Directors, together with a note that Council had approved its recommendations, it is evident they have not fully taken it in:

"... even though we did our best to make sure it was practically printed on the flag at the top of the ... flagpole, at the last meeting of the KSIP Board of Directors, two Directors of Laboratories evinced a massive lack of knowledge of this. Which proves that you can take a horse to water, but you can't make it drink ..."

This may not be helped by the fact that the phraseology employed by the University in the annual memorandum detailing its promotions criteria is not very explicit.

4.4 Regulations and Documentation

It would appear that Kent formally accepted its rights in "hard" IP in 1982, on the basis of the 1977 Patent Act. The administration certainly treats "hard" IP generated by members of the academic staff as its own to dispose of, unless the terms of industrial research contracts specify otherwise. The Senior Assistant Registrar is not sure whether the Kent relies on the terms of the 1977 Act to support its claim, or whether the University has, in fact, instituted specific regulations:

"... I've always said to anybody who has asked me that our rules require that ... but I've a ghastly feeling that perhaps they don't!"

As yet, Kent has incorporated neither the 1977 Patent Act nor the 1988 Copyright Act into its terms and conditions of employment:

"... People are subject to the Act, but you don't have to tell them they are subject to it ..."

However, the administration recognises that it may be an advantage to get members of staff to admit - by virtue of signing a contract in which it is explicit - that they are subject to the two Acts. Kent has already issued one (*ad hoc*) contract which makes this explicit and sees this as creating a useful precedent.

The Senior Assistant Registrar has also ensured that all postgraduate students who generate exploitable, "hard" IP assign any rights they might have to the University, irrespective of how they are funded. This is now a condition of registration ⁽⁴¹⁾, though the position of undergraduates remains unclear.

Kent does not appear to have encapsulated in a dedicated document either its claims with regard to IP, the action it requires on the part of members of staff/students who generate IP, or the likely rewards. However, the Senior Assistant Registrar is now turning his attention to ownership of IP in books written by members of the academic staff. Having studied the 1988 Act, he believes the University should assert its ownership rights in such cases and share in the royalties if they exceed a threshold, yet to be determined:

"... I've asked myself ... why [are] the scientists being treated differently from the others? ..."

"... I'm going to nail our David Lodges to the ground ..."

Once this has been agreed on a University-wide basis ⁽⁴²⁾ - and Kent believes it will be advantageous for academics to agree ⁽⁴³⁾, the University may be in a position to issue comprehensive documentation.

4.5 Sanctions

At present, it is not clear whether there are any regulations at Kent which prohibit researchers from transferring technology on their own initiative in a way which does not financially benefit the University and may or may not financially benefit them as individuals. It is no secret that in the past some academics have founded independent spin-off companies to exploit IP they have generated ⁽⁴⁴⁾. If it transpires this was in breach of regulations, it is highly unlikely that the University would apply sanctions against them. Moreover, if regulations are passed in due course, it is equally unlikely that sanctions would be applied against future offenders:

"... I cannot conceive of a circumstance in which sanctions would be applied in this University under the present leadership ... There's nobody who is going to pull in this imaginary malcontent - and anyway, what sanctions have we got? Especially if he is a Professor already! Good cause? Oh, come on!"

It is felt that this *laissez-faire* approach would not necessarily change dramatically with a change of leadership:

"... That's not to say, of course, if we got a new Vice-Chancellor who was terribly tough that sanctions wouldn't be applied. But even so, I don't think they would, because people would simply up sticks and go ..."

There is a strong feeling in some quarters of the administration that the University is in a vulnerable position, that valued members of the academic staff could easily take up posts in the United States if they were offended.

5 THE EXPLOITATION PROCESS

5.1 Interpretation of Government Statements

Despite having taken over responsibility for identifying, evaluating, protecting and commercialising IP, the Senior Assistant Registrar has not seen all the documentation relating to the Research Councils' offer to the University and the subsequent authorisation. Some of the documents are not on file, most notably Kent's reply to the Kingman letter, detailing the University's approach to handling the exploitation of IP arising out of Research Council-funded projects. Despite a phone call to the SERC to establish what Kent proposed, he has still not seen a copy of the University's response.

Sir Keith Joseph's statement - in which the Secretary of State expressed the hope that universities would encourage researchers to exploit their discoveries themselves and provide guidance and help for those who wished to do so - is not something that Kent has been greatly concerned to interpret:

"... I suppose what we would have [understood] by it, had we actually articulated any interpretation, was that if a person did have something to exploit, then we would wish them to do it through University channels rather than do it on their own ..."

5.2 Identification

Kent's administration recognises it has accepted responsibility for an area about which it lacks sufficient information. It accepts that a comprehensive technical audit is required but has neither the time nor the expertise to do it. It has considered informally whether this is something which might be delegated, perhaps to outside, private-sector consultants. There is no single individual within the University with the necessary breadth of knowledge to cover all the relevant disciplines and the administration feels that there are not enough staff attached to each laboratory to allow it to nominate someone to cover individual disciplines⁽⁴⁵⁾. Moreover, this would imply an element of peer review which the administration feels would be unacceptable. There are no local public-sector agencies which could conduct a technical audit, and since it lost its monopoly, the BTG has stopped visiting Kent every six months to trawl for IP.

It is evident that whilst the administration itself is forced to take a largely reactive rather than a proactive approach, relying on researchers to recognise and "flag" exploitable IP is certain to lead to opportunity costs. This is due partly to institutional ethos and partly to a

long-standing failure to raise levels of awareness in even the most general way:

"... You could go into ... [a] senior common room and you wouldn't find more than one academic who knew what IPR was ..."

This is a surprising remark, given that Kent has a law division with considerable expertise in IP law ⁽⁴⁶⁾.

During the two years that KSIP's new Managing Director was responsible for identifying IP, he also recognised the magnitude of the problem:

"... I got the impression that people were not aware of their obligations with regard to IP in any (added emphasis) situation, let alone whether it was Research Council funded ..."

The administration did not inform the academic community that the University had been offered the opportunity to exploit IP arising out of Research Council-funded projects. However, in mid-1986 it was proposed that once the terms of authorisation were agreed with the Exploitation Scrutiny Group, the Chairman of KSIP would ensure that this information was widely circulated ⁽⁴⁷⁾. There is no evidence to suggest that this was ever done; it is possible that unforeseen circumstances prevented it ⁽⁴⁸⁾.

This means that no documentation has been distributed since 1982, except to new staff members. They have been expected to learn the University's policy on IP from this self-same document, in which revenue-sharing is outlined in terms of a sliding scale which has not kept pace with inflation and which, understandably, makes no mention of the removal of the BTG's monopoly and the University's new responsibilities.

When the Senior Assistant Registrar took over responsibility in mid-1989, he tried to address both the general level of awareness and this specific change means of a University-wide mailshot. In his original three-page draft, he outlined what IP was, stated the University's legal position, referred to the authorisation from the Research Councils and indicated the importance of "flagging" IP before doing anything to prejudice the ability to protect it. He gave descriptions of discoveries which were almost lost as an exploitable resource due to premature publication. The proposed mailshot was couched in a gently evangelistic tone:

"... I was trying to get the good people out there to realise that a University's IP is to it the same as a pound of bananas are to a greengrocer. It's a very difficult idea to get across to people, especially in a humanities- and social science-based University which fundamentally believes in freedom of information ..."

In the event, the three-page letter was vetoed by an informal group which meets periodically to discuss research grants ⁽⁴⁹⁾ on the grounds that it was not "punchy" enough. Instead, staff and students were sent a one-page letter during the summer of 1989. It was reproduced, under the heading "Guidelines on Intellectual Property Rights", in the University "Newsletter" in October 1989. Accompanying it was a reply from a lecturer in the Faculty of Humanities, who dismissed it as the academic equivalent of junk mail, once he realised it was not "a spoof, a witty squib directed at current trends" ⁽⁵⁰⁾. The Senior Assistant Registrar describes the mailshot as "flippant, stupid and trivial" ... "like a

camel, like an animal designed by a committee".

In KSIP's opinion, the problem was unlikely be solved by a single mailshot, in any case. It needed a systematic, ongoing effort, with targetted rather than general reminders, some of which should be addressed to the junior members of staff actually carrying out the research. It remains to be seen whether the administration will adopt this kind of systematic, ongoing approach. It has been suggested informally that principal investigators should set up such systems, rather than the administration.

It also remains to be seen whether the administration will put into operation systems which KSIP had set up to try and prevent researchers doing anything which will inadvertently prejudice the ability to protect the IP they generate. In September 1989 the BTG gave a presentation to reinforce the message of their pamphlet ⁽⁵¹⁾ which had been circulated to everyone in the Faculties of Natural Sciences and Information Technology. The BTG has expressed its willingness to do follow-up presentations, as have local patent agents, at no cost to the University.

5.3 Evaluation

Kent's approach to evaluating IP has varied according to who had responsibility for it. It is the administration's impression that KSIP's first Managing Director made an instinctive judgement as to the likely value of a discovery, after discussions with the relevant academics:

"... you know, if the Professor of Applied Optics said it was a good invention, there is no reason why we shouldn't believe him ..."

He was unlikely to have asked the BTG or to have sought industry's evaluation of a discovery:

"... If [discoveries] hadn't been Research Council-funded ... nothing would have induced him to give it to the BTG. He had a very low opinion of them. Everyone had a low opinion of BTG at that time ..."

"... I don't think he would ever have had things evaluated by outsiders. He wouldn't have got anybody to sign a confidentiality agreement. He wasn't that sort of person ..."

KSIP's third Managing Director also prefers not to immediately seek outside help in evaluating IP ⁽⁵²⁾:

"... I feel that before anything is offered to any outside agency, whoever they may be - BTG, Research Corporation, IBM, ICI or whatever - it is really upto the University (added emphasis) to know what they are about and what the implications are. I feel it should be necessary for the University to be able to carry out a preliminary evaluation itself ..."

Since KSIP did not have the resources - either financial or in terms of personnel - to commission private sector market analyses, this often involved the Managing Director himself using his knowledge, experience and contacts to do a preliminary evaluation himself ⁽⁵³⁾. His tactic then was to test his evaluation by offering discoveries to the major

players in the relevant industries, once a confidentiality agreement had been signed.

It remains to be seen how Kent's administration will go about evaluating potentially exploitable IP. The Senior Assistant Registrar believes that when he is confronted with something tangible to exploit, his first instinct will be to approach BTG -because at the moment he knows of no other means: ⁽⁵⁴⁾

"... I have only been nominally responsible for [this] for less than a year. We are in a situation in which that was simply dumped on me, on top of everything else. And frankly, I haven't had the time ..."

If BTG were not interested in the IP, the Senior Assistant Registrar would rely largely on the scientific evaluation of the inventor(s) and a patent agent. He would consider obtaining a market evaluation by offering the IP, under a confidentiality agreement, to a company operating in the relevant sector. He has no knowledge of public or private sector organisations which might provide a market evaluation and, in any case, he does not have a budget to cover the cost.

5.4 Protection

(i) Philosophy

Kent's approach to protecting IP has varied over the years, according to the views of the person who was responsible for it. If academics "flagged" promising IP, KSIP's first Managing Director liked to acquire full patents, wherever possible, irrespective of the commercial potential of a discovery. As indicated in section 2.3 above, it is unclear whether this represented a deliberate, long-term policy to build up a portfolio of strategic and generic patents, or whether it was encouraged by the academics concerned due to ignorance of the cost and/or self-interest.

KSIP's second Managing Director assumed little more than a "babysitting" role until a permanent replacement could be found. From 1987 to 1989, when KSIP's third Managing Director was responsible for IP, it was his policy to protect discoveries by patenting them, wherever possible. He was keen to establish KSIP's ownership of IP and was firmly against the practice of protecting IP by assigning ownership to a third party. For this reason, KSIP never offered IP to the BTG once the University had been given the right to exploit Research Council-funded discoveries as it saw fit. KSIP assigned IP ownership *only when it was obliged to by the terms of a contract with industry:*

"... [assigning] takes away from the University, or may take away from the University, the ability to use that IP in a whole series of [situations]. The IP is no longer owned by the University, but by the BTG [or company X] ..."

Researchers were not forced to comply with KSIP's drive to protect IP by patenting it, however. In one case, a Professor working on a health-related project was sympathetic in principle to the idea of patenting, but against the idea of charging companies a license fee for the right to exploit the discovery, preferring to give the rights freely to anyone. In this situation, KSIP felt there was no point in protecting the IP ⁽⁵⁵⁾; it did not try to override the Professor's scruples.

Like the first, KSIP's third Managing Director also tended to patent IP irrespective of the direct financial return which it might yield:

"... If ... the patent might secure that invention as the first in a series which would lead to other things, not necessarily commercially, it would be on that basis that I would make the decision [to file]."

"... in every case there have been no specific financial returns identified in the way of royalties. There [have been] other positive spin-offs, indirectly ..." ⁽⁵⁶⁾

Based on this philosophy, KSIP made initial registrations more or less automatically:

"... It doesn't cost a lot - a couple of hundred pounds [a time]. It is vital, because invariably when the idea appears, people are wanting to publish. You can't (original emphasis) say - I'm going to stop you publishing. [That] would be trying, in a way, to suppress academic freedom. They may be going off to a conference to give a paper ..." ⁽⁵⁷⁾

Similarly, it was common for full patent applications to be filed in a wide range of countries, using the European Patent Convention and the Patent Co-operation Treaty.

As yet, there has been neither time nor a pressing need for the University to devise a coherent policy on protecting and exploiting IP. This is something which the newly-established Industrial & Commercial Policy Board should do in due course ⁽⁵⁸⁾. In the meantime, the Senior Assistant Registrar has been left to make up his own mind. He sees things rather differently:

"... It is not the ownership which is important, it is whether or not you can use it ... That is the one thing I am absolutely clear about. It isn't who owns it. It is who has got the right to use it ..."

He therefore has no objection to protecting IP by assigning it to a third party. His approach is "*just common sense*". To date, common sense has suggested to him that a lot of money could be saved by treating IP as secret know-how, rather than patenting it:

"... I'm an anti-patenter, because I've never really seen why we should waste a lot of money doing all those [applications]. Some companies ... are known not to be in favour of patenting. You might just as well get to the marketplace first and sell 50,000 of these things before anybody else gets round to making one ..."

He recognises this might not be universally acceptable to the academic community:

"... I dare say some of the hawks in the Faculty of Social Sciences might be agitated about it, if they knew what was happening ..."

(ii) Finance

KSIP's Managing Directors did not have to contend with a fixed patent budget; patenting costs were simply absorbed by the company's other, revenue-generating activities. However, KSIP's third Managing Director made a conscious effort to locate licensees and recoup costs where he could.

KSIP's revenue-generating activities longer support the costs of protecting IP. Despite this, and despite the fact that Council has committed the University to assuming responsibility for patenting costs, Kent still has no patent budget. This appears to be by default rather than by design. Despite his conviction that secret know-how is the way to proceed, the Senior Assistant Registrar accepts that a patent budget is needed:

"... We should have one and I would like to have one and if I had the time, I would be beating heads around the corner to see if I could get one ..."

He has already had to "*struggle hard*" to get the Finance Office to agree to pay for initial registration of one invention.

The Senior Assistant Registrar would also like to introduce the concept that identifying, evaluating, protecting and exploiting IP should become self-financing in due course, at least as far as direct costs are concerned. (Costing in his time would create a precedent - and therefore a political debate, given the way that the University has operated to date.) Where direct costs are concerned, he points to the fact that the University has a portfolio of around 10 full patents and several applications, the earliest of which dates from 1982. He believes that if these were exploited more effectively, they would yield an income which would offset future patenting costs.

(iii) Practicalities

Researchers with patentable IP were usually asked by KSIP to write a paper indicating the significance of their discovery. This would be used by a patent agent as a basis for the final specification, following detailed discussions with the researcher ⁽⁵⁹⁾. In the absence of a patent budget, it is unclear whether a patent agent will now be employed, and if so, what the relative contributions of the patent agent and researchers will be.

Both KSIP and the administration believe that in the interests of acquiring patents, researchers should consider accepting some delay in publishing their findings. However, academics have had the right to decide whether or not to do this. The Senior Assistant Registrar would like to take a more directive line, but he recognises that this would be difficult to police and that he is unlikely to receive support from the Vice-Chancellor for such a move.

KSIP endeavoured to reduce any delay on publishing to the shortest time possible - indeed, it always tried to get industrial sponsors to explicitly agree to delaying publication by no more than 90 days ⁽⁶⁰⁾. Now that the administration is responsible for IP, the exact extent of any such delay will have to be negotiated. No maximum delay has been agreed, though the rules on embargoing theses may be used as a model ⁽⁶¹⁾.

(iv) Ownership of Patents

After toying with the idea of vesting patents jointly in the name of the University and the researcher, the administration has decided to continue KSIP's practice of vesting them only in the University's name. In recent years, KSIP has been willing in principle to waive/assign to the inventor(s) the University's rights in IP which it felt was not promising enough to protect/continue protecting. In practice, its positive approach to patenting meant that this was seldom needed; since 1983, KSIP has only once offered to assign its rights in a patent to the academic inventor ⁽⁶²⁾. KSIP did not seek to recoup costs

or share in the profits from IP which was subsequently successfully exploited. However, the third Managing Director saw it as vital to "*keep a line open*" to the inventor, so that the University might still have an opportunity to share in the exploitation, perhaps by providing start-up capital, second-round funding, etc.

The Senior Assistant Registrar aims to do a "*more ruthless*" cost/benefit analysis of whether it is worth protecting/continuing to protect IP. If not, he will offer to waive/assign rights to the IP to the inventor(s). IP which has not yet been protected could be offered within a matter of weeks, whereas it might take a couple of years to assign IP which is the subject of a patent - "*probably [due to] inertia, rather than anything else*". The University might consider trying to recoup its costs from any subsequent profits.

5.5 Commercialisation

When KSIP's first Managing Director was responsible for IP, no attempt seems to have been made to commercially exploit the discoveries made by Kent's academics. Discoveries arising out of Research Council-funded projects were offered to the BTG, of course, but few/none of these were taken up and exploited. By the time KSIP's third Managing Director was appointed, there was no longer an obligation to offer IP to the BTG. Despite his desire to see Kent's IP commercialised, his views on the disadvantages of assigning have ensured that KSIP has not offered any discoveries to the BTG in the intervening years.

(i) Licensing

KSIP has preferred to license to an existing company with a track record:

"... We are going the license route because in every case, there still requires to be an ongoing connection with the University ..."

Researchers at Kent have been willing to help identify and approach potential licensees and to act as consultants once the IP has been successfully licensed. KSIP has encouraged this, despite the difficulties:

"... The researcher is a very important person in the whole process. You can't do it without them ... They are a liability, but as long as [they] realise they are a liability and understand what their contribution is to the process, then it will work ..."

However, so far academics have played no more than a technical support role in determining which companies make suitable licensees and in conducting the actual licensing negotiations. This is their choice, rather than KSIP's choice.

By the end of 1989, only two of KSIP's 20 patents ⁽⁶³⁾ had been exploited, though a number of patents were the subject of ongoing negotiations. This may be due in part to the rigorous examination of potential licensees which KSIP has made, particularly in company start-up situations:

"... If somebody wants a license from us to set up a new company, we've got to know how strong that company is going to be sometime down the line. We want to see what its projections are, what its business plan is ... I certainly would want to see and study and ask a lot of questions about their business plan, about how they were actually going to use that license ..."

Now that the administration is responsible for IP, however, it is likely that this rigorous approach will be dropped:

"... I think at the moment the University would look at any option ..."

However, the administration is unlikely to grant licenses which confer any degree of exclusivity:

"... I am dead against exclusive licenses ... the willingness of universities to give exclusive licenses seems to me to be appalling and some, including those who have got large offices, are doing it ..."

However, would-be academic entrepreneurs might be granted a sole license. With this caveat, the administration believes it will consider any commercialisation route:

"... Nobody would start off by saying that X is a better route than Y. We would start off by looking at the exigencies of the case and decide on that ..."

(ii) University Companies/Joint Ventures

One alternative is to use the IP as a basis for company start-up, with the University and possibly the researcher having a stake in the company. Until recently, both the University and the majority of researchers have fought shy of the financial implications of entrepreneurial ventures, especially where "hard" IP is concerned. In general, the University would have been happy to be given an equity stake, but was less willing to buy one. However, the University recently participated in a joint venture of a different sort with a member of the academic staff; within five years it got an 18-fold return on its investment ⁽⁶⁴⁾. This may explain why, in 1989, the University was prepared for the first time to purchase an equity stake in a joint venture between itself, a researcher and a venture capitalist, exploiting IP ⁽⁶⁵⁾. The University may also have been swayed by the support the project received from the KSIP's latest Chairman, a prominent businessman.

(iii) Academic Spin-Off Companies

To date, none of Kent's researchers is known to have formed an independent spin-off company to exploit "hard" IP which he has generated. Kent is one of the few universities which has never submitted an entry to the Academic Enterprise Competition ⁽⁶⁶⁾, nor applied for a SMART award, nor competed for the Prince of Wales Award for Innovation & Production. This is largely because, with one exception (see ⁽⁶⁵⁾ for details), there has apparently been no suitable IP with which to compete. It is difficult to determine why this is. Kent's researchers certainly appear to prefer less entrepreneurial involvement in the process of commercialising their IP. Some have considered company start-up, but have had what KSIP regards as too proprietorial an approach for it to work:

"... You get people who come along and say - we want to hold onto it all. I say - well, look, I've got to be quite pragmatic with you and say [that] this doesn't happen in reality ..."

KSIP's attitude to would-be academic entrepreneurs may also play a part: KSIP does not take a sentimental approach to would-be academic entrepreneurs. KSIP's Managing Director believes he should treat academics who want to license IP to the same scrutiny as third parties.

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy

Kent describes itself as a "*totally laissez-faire*" University, though perhaps not to the extent of Oxford or Cambridge. It is certainly a University with relatively few rules. This gives academics considerable freedom to pursue their interests:

"... You could liken this University to an infinitely-sized enveloping sponge. In other words, you can go off in any direction you like. Ultimately, the resistance factor will get so great that you will have to stop. But there are no proscriptions on the direction. And you can go quite a long way in any of them ..."

It is in this manner that a few of Kent's academics have become involved in entrepreneurial activities. They were not responding to a University initiative or a putting into practice a University policy - they were simply exercising the freedom to pursue their interests. Some have chosen to operate **within** the University system. Whereas most of Kent's centres/institutes/units were established to pursue purely academic goals, a few have had - or come to have - a dual function, acting as the commercial arm of a particular division or research group, too (see note ⁽¹⁸⁾ for details). Towards the end of the 1980s, several more academic divisions established dedicated commercial arms ⁽⁶⁷⁾. This has usually been on the initiative of the academic staff concerned rather than KSIP or the administration. Similarly, it was the Director of one commercial unit, established in 1979/80, who proposed to the University that it should be spun off as a separate, wholly-owned University company ⁽⁶⁸⁾. This proposal is currently being evaluated with the help of the DTI.

A few of Kent's academics have founded independent spin-off companies. There has never been a requirement to ask permission to found a company or even to notify the University as a courtesy, but the administration feels that in earlier years companies were founded covertly, whereas recently this has been done openly, with the knowledge of the Vice-Chancellor ⁽⁶⁹⁾. The Senior Assistant Registrar believes the University should keep a formal record of such activities, both for insurance purposes and to be able to "*hold up its head in the enterprise culture*".

The more recent independent spin-off companies were set up by senior academics to exploit "soft" IP in the shape of expertise, rather than "hard" products or processes. None of them has been particularly successful, indeed, most of them have ceased trading ⁽⁷⁰⁾. A number of younger, more junior academics have "flagged" their interest in setting up companies, but have not yet taken the plunge:

"... It is going to be their personal investment and they are very reluctant to do it ... They have felt that at the present time, they should continue to do what they are doing and use that to gain more experience ... They [haven't] dropped the idea entirely ..."

Despite no longer being responsible for IP, KSIP's Managing Director is keen to keep in touch with these potential entrepreneurs, to provide encouragement and advice if and when they decide to proceed. It is still part of the Managing Director's remit to "*assist with University companies and joint ventures*". It was KSIP's encouragement which led recently to the University's first joint venture with a member of the academic staff and venture capitalists (see note ⁽⁶⁵⁾ for details).

The administration takes a positive view of academic entrepreneurship, seeing it as a means of generating income for the University. It has had qualms about the income which successful academic entrepreneurs might derive from their business activities ⁽⁷¹⁾, but has decided to accept this as part and parcel of the process.

6.2 Making Time

In principle, the administration supports the idea that academics who are trying to exploit promising IP should be allowed to devote some time to the project. Kent prides itself on being a flexible university and the administration can cite several instances in which it has generously accommodated an individual's desire for extra time to work on a particular project ⁽⁷²⁾. However, the administration may not always be given the opportunity to demonstrate its support. In practice, it is the Laboratory Director who determines how much time a researcher is allowed to devote to non-traditional activities such as company start-up:

"... There is no such thing as a University policy on this ... If [the researcher] went to the Director of his Lab and put it to him, then [it would] depend on the personality of the Director and what he perceived as his interests ..."

The same situation obtains where consultancy activities are concerned. Kent has not stipulated or even recommended a global limit; Laboratory Directors are free to impose local limits or to respond to every proposal on an *ad hoc* basis. The Laboratory Director's decision would usually be final, whatever kind of extra time a would-be academic entrepreneur was seeking - whether it was consultancy time, a reduced teaching load, relief from administrative or committee work, a part-time contract, leave of absence or a sabbatical ⁽⁷³⁾. There have been instances when Laboratory Directors have refused such requests ⁽⁷⁴⁾, but also occasions when they have backed the academic in his endeavours.

Provided the Laboratory Director approves, the administration itself is open to most suggestions. Entrepreneurial academics could opt for part-time employment on part pay, provided the Policy & Resources Committee agreed that the savings made could be used to employ a part-time temporary lecturer. Part-time employment on full pay is also a possibility:

"... If an approach were made ... well, we could give it a try. We would try to draft a paper and stick into the [Policy & Resources] Committee. We'd say X was a real genius and had invented something that could make a lot of money - can we have some extra money to cover him half-time? And depending on the case, we might get it ... This University is pretty flexible.

"What I suspect might happen - its the first question I would ask - would be: Can you fund it from the resources of the Lab? And, of course, they will all say no, but it might be that they could, or some of them could. There would be a fair amount of horse-trading going on but in the end, if the person were really keen on it, then we would find a way of doing it ..."

This has, in fact, happened; an academic attached to the Electronics Laboratory was allowed to work half-time on his "good idea" for a number of years. The administration could imagine a situation where an academic had such a "splendid idea" that he would be given full-time paid leave to develop and exploit it.

Unpaid leave of absence for one to two terms is another possibility. This could probably be extended if necessary, provided a temporary lecturer could be found. In some quarters of the administration, company start-up is also seen as an acceptable use of sabbaticals, though this is not known to have happened. Kent's academics are entitled to one term in every three years served. If, like many, would-be academic entrepreneurs had not taken their full entitlement, this could be aggregated retrospectively.

Whichever option is chosen, the decision could be made fairly quickly through the relevant parties convening an informal meeting. However, approval must formally be given by the Laboratory Director, the Dean, the Faculty Board, Senate and Council in turn.

6.3 Other Resources

(i) Equipment/Instrumentation, Support Staff, Communications

In principle, the administration also supports the idea that academics trying to exploit promising IP should have access to University resources. In practice, the extent to which would-be academic entrepreneurs get access depends on local demand. Similarly, whether or not they pay for use of resources depends on the resource in question. Secretarial and technical support staff would probably have to be paid at the going rate, for instance. On the other hand, the Finance Office would be unlikely to insist on charging the full market rate for use of equipment or instrumentation. Moreover, the marginal cost might be avoided if would-be academic entrepreneurs offered the University some kind of *quid pro quo*, such as a modest share in the company. Telephone calls should in theory be paid for - Kent recently installed a modern exchange which records the number dialled and the cost of calls made from each extension. However, it is not clear who would take on the task of separating calls made on company business from legitimate academic calls, if academics themselves paid insufficient attention to using phone codes for private calls.

In practice, the attitude of the Laboratory Director may also determine whether or not would-be academic entrepreneurs get access to resources and what kind of charge is involved - if any. The administration believes that attitudes could vary considerably. However, the avowed policy of the Faculty of Natural Sciences is to:

"... [give] scope to and [encourage] individual and group initiatives on the part of staff members, wherever these are compatible with and may enhance the University's teaching at undergraduate and postgraduate levels ..." ⁽⁷⁵⁾

(ii) Accommodation

Although Kent has a science park of sorts, it is not suitable for small start-up businesses ⁽⁷⁶⁾, and there are no incubator units in Canterbury itself ⁽⁷⁷⁾. For this reason, perhaps, the administration feels that Kent's would-be academic entrepreneurs would be given considerable help where accommodation is concerned. The University has sufficient space that even academics granted two years leave of absence would not normally be asked to vacate their office. Whether they were employed full-time or part-time, entrepreneurial academics could probably count on the use of their office as a base from which to get their company started. The administration would also look kindly on academics who were granted leave of absence but continued to use their office and laboratory bench - unless they wanted to bring in an outsider. In that case, they might be charged rent. Alternatively, they could offer some sort of *quid pro quo* to the University.

It is not clear whether the academic community is actually aware of the administration's views on using University accommodation for business purposes. Significantly, KSIP's Managing Director is under the impression that academics are not allowed to run a business from university premises. This impression derives not from published policy, but from the fact that to date he knows of no academics who have run their businesses from the campus. He believes the prevailing ethos is against such activities.

(iii) Financial Support

Kent has not set up any kind of seedcorn or innovation fund which would-be academic entrepreneurs could approach for first-round funding. At the end of 1989, the University had not made a direct financial contribution to any spin-off companies, with one exception. A small sum was invested in a start-up company, a joint venture between a member of the academic staff and a group of venture capitalists (see note ⁽⁶⁵⁾). This investment was not motivated by a desire to promote technology transfer from the campus to the economy. It was made for the same motive which governs the University's standard investment programme: profit. The University was exploiting inside knowledge of a situation which looked particularly promising and offered the opportunity to negotiate a preferential deal.

Kent is not averse to the idea of being given an equity share in academic spin-off companies in recognition of the resources which it has undoubtedly contributed to the discovery of the IP being exploited - or *in lieu* of royalty payments. It may no longer be averse to the idea of buying an equity share in such a company. However, it has not gone out of its way to publicise this change of heart.

6.4 Business Start-Up Advice

Whereas KSIP was equipped to provide business start-up advice to entrepreneurial academics, the administration clearly is not:

"... We certainly ought to have resources to do this, but we don't [have] ... I think if an academic wanted to set up his own company, really it would be very much upto him ..."

The administration is not concerned that academics spinning-off companies to exploit IP might not exploit it as effectively as an existing company with a track record:

"... Considering the dismal record of this University in exploiting its IP, if its IP was exploited at all, I personally would be very happy ..."

The administration concedes that it could direct would-be academic entrepreneurs to the new Business School for assistance, which would be free to charge for its advice. Unless a joint venture with the University was proposed, any cost would have to be paid by the academic, not the administration. In fact, at least one member of the Business School (see ⁽⁶⁴⁾) would be happy to advise on business start-up and business plans as a colleague, without making a charge. He feels this would present valuable investment and entrepreneurial opportunities from which he personally could benefit. Moreover, in some cases, he would recommend would-be academic entrepreneurs to approach the University itself for additional start-up capital. The Senior Assistant Registrar made no mention of directing would-be academic entrepreneurs to KSIP for assistance. KSIP's view is that, despite its changed remit, it would still be happy to give would-be academic entrepreneurs as much advice as it could, even to the extent of helping them draft their business plans. KSIP would not seek anything in return for this level of advice, despite the demands on its time which this might make. However, if academics wanted more assistance, KSIP might suggest some kind of *quid pro quo* - or alternatively, refer them to one of the many local enterprise agencies in Kent which offer free advice and assistance ⁽⁷⁸⁾.

This is not an option which the administration is currently considering. It professes to be "cagey" about institutions it knows nothing about and over which it has no control:

"... If ... an academic came along to me with a bright idea which he wanted to exploit, my gut feeling would be to keep it as tight as possible, as close as possible, not to involve the state in any way, because I am deeply distrustful of state bodies ..."

"... If there were a grant, we could apply for it, but ... my instinct would be to do it myself as far as possible ..."

"... If it were the case that one of [these] outside bodies really would put an enormous amount of effort into it for nothing, then I would be intensely suspicious ..."

The administrator concerned includes the economic development department of the local council and local enterprise agencies in this category of institutions.

7 SCRUTINY GROUP ASSESSMENT

In August 1990 Kent was informed that the Exploitation Scrutiny Group was "*generally satisfied*" with the exploitation arrangements which the University had established. A formal document was scheduled to follow, confirming the University's rights and responsibilities to exploit IP arising out of Research Council-funded projects for a further 2 years. The situation was due to be reviewed again in 1992 after Kent had submitted its fifth annual report ⁽⁷⁹⁾.

HULL UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

Hull University started life as a University College in 1927, endowed principally by the High Steward of Hull. Notwithstanding repeated attempts to be upgraded to a university, it retained this status until 1954, when it was finally granted its Royal Charter. Hull is a late example of a group of British universities commonly referred to as "civic" universities. In "Look Back in Anger", John Osborne's famous character, Jimmy Porter, described post-war "civic" universities as "white tile" rather than "red brick" universities. By this analogy, Hull is a "white tile" university.

1.2 Size

By the beginning of the 1980s Hull had become a medium-sized university by UK standards. In 1981, however, the UGC advised the University to reduce by 17 per cent the number of home students registered in 1979/80 by 1984/85. As Figure 2 revealed, this was nearly four times the national average reduction and as a result of this, Hull's size relative to certain other universities diminished somewhat in the course of the 1980s. At the same time, the UGC announced that Hull's recurrent grant would be reduced by 20 per cent between 1980/81 and 1983/84; this was also above the national average. Combined with the recommended reduction in student numbers, it is generally reckoned that this placed Hull among the six worst afflicted universities in the UK at this time.

In 1986 the UGC indicated that Hull should increase its student numbers by 7.52 per cent over the next four sessions ⁽¹⁾. By 1988/89, however, Hull still had 9 per cent fewer student FTEs than it had at the start of the decade ⁽²⁾. In terms of academic staff numbers Hull ended the decade considerably slimmer than it started it, too ⁽³⁾. The University lost at least 27 per cent of its full-time academic staff in the course of the 1980s ⁽⁴⁾; there was a six-fold increase in the number of part-time staff in the same period. Most of these losses were a direct result of the cuts imposed by the UGC in 1981.

Structurally, Hull ended the decade quite differently from the way it had set out. The four Faculties of Arts, Science & Technology, Social Sciences and Law, comprising some 48 independent Departments and Institutes, were reorganised in 1987/88 into 14 Schools, grouping together some 38 Departments ⁽⁵⁾. This has left Hull with a balance - in terms of student numbers - between the arts, the social sciences and the sciences ⁽⁶⁾. This balance was largely achieved by depleting a science base which was, in any case, never as comprehensive as had originally been intended ⁽⁷⁾. In 1985/86 the University closed the original Departments of Physics and Applied Physics; many of the staff left, while others were absorbed into the new School of Engineering & Computing, eventually forming the basis of what is effectively a new Department of Applied Physics. In 1986/87 the Departments of Biochemistry, Botany and Plant Zoology were merged to form the present Department of Applied Biology, losing 14 members of staff in the process. In 1988/89 the Department of Geology was closed as an Honours School, though some staff were kept on in a service capacity. The Departments of Russian, Linguistics and Classics were closed completely.

1.3 Science Base

Five of the 14 new Schools are dedicated to science subjects. The School of Mathematics groups together the Departments of Applied Mathematics, Pure Mathematics and Statistics. The School of Life Sciences comprises the Departments of Applied Biology and Psychology and the Institute of Nursing Studies ⁽⁹⁾. The School of Engineering & Computing groups together the Departments of Applied Physics, Computer Science, Electronic Engineering, Engineering Design & Manufacture. The School of Chemistry has no sub-departments and the School of Earth Sciences is effectively the Department of Geography ⁽⁹⁾.

On an aggregate basis, these five Schools accounted for 37 per cent of the university's total academic/academic-related staff at the end of the 1980s ⁽¹⁰⁾. They were responsible for around 34 per cent of Hull's undergraduates and 27 per cent of postgraduates ⁽¹¹⁾.

As Figure 6a showed, in the UGC's 1985/86 assessment of universities' research strengths in the natural sciences, engineering and technology, no subject areas were rated as outstanding at Hull. One was assessed as above average, five as below average and seven as average ⁽¹²⁾. It was suggested that if the ABRC's recommendations were ever implemented, Hull would be assigned to the "T" category; accordingly, the University would be able to offer "undergraduate and MSc teaching with associated scholarship and research activity but without advanced research facilities" ⁽¹³⁾.

As we can see from Figure 6b, the results of the UGC's 1988/89 research selectivity exercise suggest that the situation had not significantly changed in the intervening years. No units of assessment were awarded a "5", but two were awarded a "4", six got a "3" and six were awarded a "2" ⁽¹⁴⁾.

1.4 Research Grant and Contract Income

In 1984/85, Hull ranked 46th in terms of £ earned in external research grants and contracts, 47th in terms of the percentage of its total recurrent income which this external revenue represented. As Figure 41a shows, at 7.4 per cent in the year the Kingman letter arrived, proportionately Hull's research grant and contract earnings were the lowest of the universities participating in this study, though City's were only a percentage point higher ⁽¹⁵⁾. Departments in the Faculty of Science & Technology brought in just over £1.5m, accounting for 94 per cent of the University's total income from research grants and contracts ⁽¹⁶⁾. By 1988/89, as we can see from Figure 41b, the five Schools had earned nearly two thirds more than the Faculty of Science & Technology had in 1985, generating close to £2.5m and accounting for over 92 per cent of the University's total income from research grants and contracts ⁽¹⁷⁾.

The pattern of sponsorship which the science base attracted changed significantly over these four years, as Figures 345-346 show. Whereas the Research Councils and charities - which usually grant ownership of IP to the University - provided 63 per cent of its research grant and contract income in 1984/85, by 1988/89 this had fallen to just 40 per cent. In contrast, there was a dramatic increase in the proportion of income provided by industry/commerce - up from 8 per cent in 1984/85 to 31 per cent in 1988/89. There was no change in the proportion of funding from central government, local government and various overseas organisations, however.

2 HISTORY OF IP EXPLOITATION

2.1 Background

Prior to the late 1970s, Hull's administration showed no interest in identifying or exploiting IP. This was not because there was no IP to exploit, but because the administration and many senior academics felt it was an inappropriate activity for a university:

"... We [were] an ivory tower and we [didn't] get ourselves involved in these commercial things ..."

This attitude may have been influenced by what many of Hull's longer-established academic staff perceived as a particularly hard struggle to attain University status ⁽¹⁸⁾. The "ivory tower" view was not shared by everyone in the academic community, however. Over the years a number of academics recognised the commercial potential of their research discoveries and in some cases, brought them to the administration's attention. Until the 1980s, though, the administration provided little moral and no practical support for their attempts to transfer technology. In 1972 the University, like the NRDC, turned down the opportunity to participate in the exploitation of a wide range of stable liquid crystals. These had been developed under the guidance of a Reader in the Chemistry Department whose activities were scorned by colleagues:

"... When I started to do this exploitable work ... my fellow academics looked down their silly long noses at me and said: why are you doing that sort of work? We are academics! It was definitely beneath them ..."

The liquid crystals were subsequently used in the display panels of calculators, watches and numerous other electronic instruments ⁽¹⁹⁾. As a direct result, the UK obtained a major share of the world liquid crystal market, netting the academics concerned a considerable annual income and the first Queen's Award for Technical Achievement ever to be awarded to a university department ⁽²⁰⁾. The university is estimated to have lost upwards of £0.25m in royalties during the 1980s, though the liquid crystal research group itself has benefitted for many years ⁽²¹⁾. There are rumoured to be other examples - which yielded considerably lower returns, however.

Hull's administration paid little more than lip-service to the 1977 Patent Act ⁽²²⁾ and the CVCP's 1978 report. Some of the "new breed of young professors" ⁽²³⁾ who were appointed around this time felt that the administration simply did not share their interest in exploiting the university's expertise and inventions. Others felt that the administration was sympathetic, but that it was handicapped by the attitude of certain senior, long-standing members of the academic community.

In 1981, confronted by the prospect of Hull's recurrent grant being cut by a fifth within three years, the administration was forced to rethink its attitude. Its change of heart was reinforced in 1983 by two announcements - that significant earnings would no longer be offset against the Exchequer grant ⁽²⁴⁾ and that infrastructure costs for collaboration with industry represented proper use of the university's general income. In practice, though, Hull's administration felt that other activities had greater claim on its rapidly reducing resources. Despite increasing pressure from academics in the Faculty of Science & Technology, the administration did not immediately divert sufficient funds to establish an

industrial liaison structure.

2.2 Structures

Instead, as an interim measure, Hull made its newly-appointed Personnel Officer responsible for handling IP which was flagged by members of staff. Almost immediately, he found himself trying to make initial registrations of IP which members of staff had generated ⁽²⁵⁾. The University established a small Exploitation Fund ⁽²⁶⁾ to cover the cost of employing a patent agent to make initial registrations on its behalf since the Personnel Officer felt he was working "*pretty well in the dark*". It also established a Seedcorn Fund in the wake of the 1981 cuts. This was described as "*pump-priming support for research projects for which it might otherwise prove difficult to attract funds from outside sources at an early stage*" ⁽²⁷⁾ but in practice it was meant to include development work, too. If projects supported by the Seedcorn Fund were subsequently exploited commercially, the University made no attempt to recoup its investment; recipients were simply asked to submit a short report on the outcome of the project.

Hull made the Personnel Officer responsible for IP because it believed that if the University was going to derive financial benefit from its "hard" IP, it would have to amend its General Terms of Engagement ⁽²⁸⁾. In 1983/84 the Personnel Committee formed a Sub-Committee on Patents to consider how it should proceed. The Sub-Committee comprised a mixed group of administrators and academics with experience of or interest in IP ⁽²⁹⁾. In keeping with the new Vice-Chancellor's view that policy formulation is exclusively a management responsibility, Hull AUT was neither invited to participate nor even informed that the University proposed to draft a patents policy. It was therefore unable to contribute any of the information assembled by the AUT nationally. The Sub-Committee on Patents spent nearly two years formulating its policy without formal reference to what other UK universities were doing ⁽³⁰⁾, though it did draw on the CVCP's 1978 report. The "University's Policy on Patents" was drafted by the Registrar and the Personnel Officer and presented to the Personnel Committee in 1985/86.

In the meantime the administration had "*gritted its teeth*" and bowed to pressure from the Faculty of Science & Technology to set up an industrial liaison office (ILO). Hull made no attempt to obtain external financial support for its proposed ILO, assuming that it would have to pay "*a substantial salary*" out of its own funds. This was the situation when the Kingman letter arrived.

Hull was about to draft its proposed policy on patents and to submit it to Council. The University had protected a handful of discoveries by means of initial registrations and was in the process of trying to recruit its first IL Officer ⁽³¹⁾.

3 THE KINGMAN LETTER

Hull was not surprised to receive Sir John Kingman's letter. The administration perceived it as part and parcel of a clearly emerging policy which it welcomed. Given its financial difficulties, the administration did not for one moment consider rejecting the offer:

"... *We were interested in any opportunity to capitalise on our work ...*"

Indeed, the University was - and still is - disappointed that the same principle was not simultaneously applied to all government Departments and funding bodies.

The Kingman letter arrived while the Sub-Committee on Patents was still deliberating. Having decided to accept the offer, the administration did not regard it as an issue which demanded a separate, dedicated decision-making process. It saw no reason to treat IP arising out of Research Council-funded projects as different to any other IP, and the Sub-Committee on Patents was already evolving a general IP policy. The Research Councils' offer enhanced the validity of the Sub-Committee's efforts, since it was seen as greatly increasing the likelihood that researchers would generate IP which belonged to the University rather than to a third party.

Since the Sub-Committee on Patents felt it had already considered and resolved for itself most of the issues which the Kingman letter raised, the University was in a position to make a fairly swift response. The reply, drafted by the Personnel Officer, was accepted without comment and Hull, together with ten other universities and colleges, had its proposals accepted by the Exploitation Scrutiny Group in the second round of deliberations. The letter of authorisation was sent on 3 November, 1986.

4 CURRENT POLICY AND STRUCTURES

4.1 Rationale

Hull's approach to IP and university/industry relations in general has been coloured to some extent by the insights which the Registrar gained as a result of a 1985 study tour ⁽³²⁾. It was evident that, in contrast to the staff in some European universities, Hull's academics did not need to be persuaded *en masse* about the benefits to be gained from identifying and exploiting IP and from cultivating good relations with industry. On the contrary: a number of young professors had already expressed frustration at the administration's reluctance to accept there were benefits. This meant that Hull had more freedom than some UK universities to recruit its ILO from outside the education sector ⁽³³⁾.

It was also evident to Hull that though the University had many of the disciplines which seemed likely to generate exploitable IP ⁽³⁴⁾ and a decidedly applied ethos ⁽³⁵⁾, the size of the science base was likely to limit the quantity of exploitable IP. Therefore, there were no immediate grounds for setting up a large support unit ⁽³⁶⁾.

It was also clear that any unit given the responsibility to exploit IP and cultivate productive relations with industry should be hampered as little as possible by universities' traditional, slow decision-making processes. Members of the Sub-Committee on Patents contributed to the discussion about the most appropriate structure. They concurred that there should be ...

"... as little structure as possible ... [not] an elaborate, bureaucratic organisation ... one point of contact, one approachable person ..."

4.2 Structures

Having decided this, Hull advertised and re-advertised the post of ILO and was still not impressed by the applicants. In February 1985 however, the Treasurer heard through business contacts ⁽³⁷⁾ about a marketing manager in a major company who wished to undertake some form of "community service" prior to early retirement. Since the company concerned was prepared to second him for two years, he started work in the newly-formed Industrial & Commercial Development Agency (ICDA) the following week, reporting directly to the Registrar ⁽³⁸⁾. After two years, the University took him onto its own payroll, on administrative grade 5 ⁽³⁹⁾. In 1989/90 the ICDA had three full-time members of staff: an ICDA Officer, an assistant and one secretary. The ICDA did not at that time have a self-funding requirement. It was effectively an administrative service activity, the existence of which should be justifiable in terms of the increase in external revenue which it should generate ⁽⁴⁰⁾. As yet it was not subject to formal income generation targets.

(ii) It was envisaged that the Exploitation Fund, established a couple of years earlier, would in time become a rolling fund, replenished by the income from selling IPR. Hull accepted that this was a very long-term objective:

"... How long did BTG's [main] winner take? Ten years! It's a long lead time ..."

Agreements made at the end of the 1980s were scheduled to generate minimum annual income of £50,000 in 1991/92 and 1992/93 from one piece of IP alone. However, to date income of this order from IP has been the exception rather than the rule. It is not entirely clear what the current, true balance of the Exploitation Fund is, since the administration failed to alert the ICDA Officer to its existence. As a result, for five years the cost of patents was borne by the ICDA's annual operating budget of ca. £15,000, which was intended for promotional activities. The ICDA Officer eventually recouped the bulk of these costs. Having done that, he was under the impression that the Exploitation Fund still contained around £12,000. This would suggest that Hull had spent some £8,000 on patents over a six or seven year period.

4.3 Policy

Given the change to the original job specification ⁽⁴¹⁾ and the unanticipated speed with which the ICDA Officer took up his post, the Registrar did not have time to flesh out a comprehensive remit before he started work. He was asked simply to facilitate technology transfer, to foster relations between the University and industry and to substantially increase the university's research grant and contract income, but left largely to his own devices as to how he went about it. With the exception of the university's policy on patents, drafted by the Sub-Committee on Patents, there was little in the way of policy to guide him.

In the intervening years the ICDA Officer has been instrumental in the formulation of a number of new policies. He has done this both informally and formally, through membership of committees and working parties. In the five years since he was appointed, he has encouraged the University to make far more wide-ranging claims where IP is concerned. Until 1990, Hull's policy on IP focussed entirely on "hard", patentable IP in the form of inventions. The University made no claims *vis-a-vis* "soft" IP in the form of expertise/know-how and no claims *vis-a-vis* copyright in computer software. If the recommendations of a recent working party are adopted ⁽⁴²⁾, the university's claims will

extend to these areas, too. Moreover, since tactics have been proposed which are likely to reduce the quantity of "outside work" done by members of the academic staff, there will be less opportunity for academics to argue that IP was generated in the course of research commissioned by a third party - over which the University has no claim.

4.4 Regulations and Documentation

Hull's administration did not circulate any documentation relating to IP until 1987, chiefly because it did not have a agreed policy until then. In March 1986 the Sub-Committee on Patents submitted a draft policy on patents first to the Personnel Committee and then to the Joint Consultative Committee with Hull AUT, which was not satisfied with the document:

"... They appeared to want to impose [it], to say - this is how it is going to be from now on. We said - well, hang on a minute, this is a matter we need to negotiate.

"... We wanted to ensure that there was adequate negotiation between the member of staff and the University, so that the University didn't [operate] as a 'force majeure'..."

Where the division of royalties was concerned, Hull AUT felt that the University was "doing itself down":

"... They didn't seem to understand the basic principles ... We weren't primarily concerned with making our members into millionaires. We wanted our members to get a fair reward for what they were doing and therefore we concentrated heavily in the division of royalties on making sure that the first £40,000, or £80,000 if it was more than two people, goes heavily towards the individual and when it becomes a real money-spinner, then the University starts gaining ..."

Hull AUT was also concerned that the proposed policy statement did not make provision for arbitration in the event of a dispute between the University and the inventor(s). With appropriate amendments, which included provision that all research students should be subject to the same policy as members of staff, agreement with the local AUT was reached in February 1987. "The University's Policy on Patents" outlines the steps which researchers should take if they think they have discovered something commercially exploitable. It describes the circumstances to be taken into account when determining the contribution made by various parties. The formulae which govern the division of royalties take up an entire A4 page and are reproduced in Appendix G.

This document does not have the status of a Statute, an Ordinance or a Regulation. It is a policy statement which derives its authority from the fact that it was agreed between the University and the local AUT on the basis of "a relevant collective agreement, as defined in the Patents Act 1977, Section 40 [6]". The statement duly quotes Sections 39 [1] and Section 40 [6] of the Act. Despite its original intention, Hull has never amended its General Terms of Engagement of Academic Staff ⁽⁴⁹⁾. The statement was circulated to all members of staff in 1987. It has been included in the documentation sent to new members of staff in the intervening years.

The proposed new policy on IP, in which the University claims far more extensive rights⁽⁴⁴⁾, has been circulated in the form of the working party's final report. Since Hull AUT is taking legal advice on some of the proposals, it remains to be seen how far the university's claims regarding the ownership and exploitation of IP will extend. Once agreement has been reached, the administration proposes to update the draft section on IP in part 1 of its new Research Handbook.

4.5 Incentives

Hull has established a number of incentives to encourage academics to identify IP, to develop it into something exploitable, and to help ensure that it is exploited. Some of are aimed at individual members of staff, others at Deans.

(i) Financial Incentives (Individuals)

At the level of the individual academic, the incentives are all "positive". In keeping with the terms of the 1977 Patent Act, inventors are not rewarded for flagging IP or for helping to protect it. They are rewarded only if it is successfully exploited. Given that many discoveries cannot be commercially exploited until some development work has been done, Hull's administration sees the Seedcorn Fund as a valuable financial incentive to think in terms of applications, although this is not its sole purpose. In 1989/90, for instance, the Seedcorn Fund distributed some £15,000 in support of ten projects⁽⁴⁵⁾, several of which had potential commercial application. However, the Research Committee⁽⁴⁶⁾, which administers the Seedcorn Fund, decided that from 1990/91 the money would be better spent on postgraduate fellowships. The ICDA Officer believes he can find alternative sources of funding, without too many strings attached:

"... There are so many ways these days of getting money for someone with anything like a reasonable record or an established position in the Department ..."

In 1986 Hull devised a very complex sliding scale to govern the distribution of royalties⁽⁴⁷⁾ from discoveries which are successfully exploited. Expressed in algebraic equations (see **Appendix G**), it appears to vary the proportion which inventors receive according to how many inventors there were⁽⁴⁸⁾, to who pays the patenting costs⁽⁴⁹⁾, and to the extent to which the University contributes financially and/or administratively to the exploitation process⁽⁵⁰⁾. It also appears that in some cases, the sliding scale operates on the basis of absolute income, whereas in others it operates on the basis of annual income bands which are supposed to be index-linked to the index of retail prices for all items excluding food, with February 1987 as the baseline.

The diverse formulae used in the 1987 document introduce considerable variations into the financial rewards which might accrue to academics as a result of having made a successful invention. This could presumably influence the mechanism by which academics prefer to see their discoveries exploited⁽⁵¹⁾.

The formulae governing the division of income from IP are unchanged in the proposed new policy on IP, but significantly the income bands are exactly the same as those listed in the 1987 document. Contrary to the agreement, they have not been index-linked, indeed, all references to index-linking have been removed. It is not clear whether this is deliberate or in error.

The ICDA Officer believes that many academics regard the division of income from IP as a very positive incentive:

"... A lot of members of the academic staff are a bit more optimistic than I am that the crock of gold is there ..."

(ii) Career Progression

Hull's administration believes that today time spent by academics in flagging, helping develop and exploit IP is viewed positively when it comes to promotion. This was certainly not the case in the past. Such activities would not have impeded promotion, but they would have been discounted:

"... If somebody had an arrangement with an industrial firm, a consultancy on the side, well, good luck to him. He's [had] his reward there. He's not going to get a Senior Lectureship as well ..."

The memorandum ⁽⁵²⁾ relating to promotion to Senior Lecturer in the 1990/91 session indicates that the Promotions Committee is interested in the contribution made by candidates to:

- teaching, course preparation and examining;
- original and scholarly work;
- management and administration of the School and development of the School and the University;
- successful efforts to generate and develop new activities in co-operation with outside organisations and industry and in the field of continuing education;
- service within and outside the university.

Candidates for promotion from Lecturer grade A to Lecturer grade B are not expected to have made contributions in the last two areas, however. Guidelines issued to candidates indicate that they should include under the heading "*Research Activities*":

- preparation of applications for funds and contracts and **patent applications**;
- apparatus and instruments constructed.

Under the heading "*Work Outside the University*" they should include among other things:

- services to industry and commerce;
- consultancies in research and teaching.

The promotions criteria and accompanying guidelines are fairly explicit when it comes to IP which has been protected by a patent, but no mention is made of IP protected by secrecy agreements or assignation. Moreover, it is not clear what weight is attached to patent applications compared to, say, publications/conference papers/reports. The Senior Personnel Officer believes that Hull's Promotions Committee would not want to be tied to a formal system of weighting and that, in any case, any decision about the value of patents relative to publications would trigger a lively debate on campus. At present, the administrator compiling Hull's Annual Report on Research sidesteps the issue by including

patents/copyrights/computer software or languages/engineering designs/musical compositions and paintings/sculptures *etc* under the general heading "*Publications*", but listing them under a separate sub-heading, "*Other Public Output*" ⁽⁵³⁾.

It is not clear where academics should locate IP which is successfully exploited in their application for promotion, or where an entrepreneurial academic who was exploiting his discoveries himself should locate such activities. Does company start-up come under "*services to industry and commerce*" or, if it is a joint venture with the University, should it come under "*the development of the School and the University*"? At present, candidates have to use their judgement where this is concerned and hope that their vision of how their career should progress does not conflict with the Promotions Committee's.

(iii) Financial Incentives (Departments)

In theory, Deans of School at Hull have a particularly strong incentive to encourage academics in member Departments to flag potentially exploitable IP, to try to develop it into something exploitable, and to help ensure that it is exploited. From 1990/91, all Schools are subject to agreed income generation targets which amount to roughly 5 per cent of their UFC allocation over the next five years. It is not proposed to directly penalise Schools which do not achieve their targets, but there will be indirect penalties through the formula funding mechanism ⁽⁵⁴⁾. Targets have been set for four categories of income ⁽⁵⁵⁾ and although the administration recognises that income from IP is highly unpredictable, it is expected that the five science-based Schools should be able to derive some income from IP. To date, however, IP has generated very little income for any Department. Moreover, it is not yet clear how Departments will benefit from any IP they generate. It is intended that a percentage of the university's share of income from IP should revert to the Department which generated it, in much the same way that research overheads are divided between the University centrally and the Department which generated them ⁽⁵⁶⁾. However, not one of the university's statements of policy *vis-a-vis* IP has confirmed this, let alone indicated what percentage Departments will receive. Nor do the latest proposals address this question ⁽⁵⁷⁾.

4.6 Sanctions

Hull's administration knows that some academics in the University have taken out patents in their own names, both before the 1977 Patent Act and afterwards. In the absence of a regulatory framework - *ie.* appropriately amended General Terms of Engagement - the University felt that there was little it could do about it. In fact, even now the administration is not sure that it could do much about academics who, for whatever reason, patented their discoveries in their name alone. It faces the same problems if it should discover that academics have exploited IP clandestinely, to their sole advantage:

"... We have no system for disciplining academic staff, short of sacking [them] ..."

This is not seen as appropriate, given the present contractual situation.

5 THE EXPLOITATION PROCESS

5.1 Identification

Neither the administration nor the ICDA Officer made any effort to widely publicise the offer made in the Kingman letter. The information appears to have been given formally only to the six senior academics who helped draft the "University's Policy on Patents". Nor was any effort made to publicise the university's subsequent authorisation from the Research Councils. This was not mentioned in the "Bulletin", the University newsletter ⁽⁵⁸⁾, either. The only document to be circulated was the second version of the university's patent policy, amended following negotiations with the AUT. Despite having received authorisation from the Research Councils just three or four months earlier, the University did not take the opportunity to draw academics' attention to the fact that they were no longer obliged to contact the BTG to discuss IP arising out of Research Council-funded projects. In the intervening years neither the administration nor the ICDA Officer has sent members of staff written reminders of the rights and responsibilities which the University accepted relating to IP arising out of Research Council-funded projects.

Indeed, with the exception of the 1987 document, there has been little written indication of the university's aspirations *vis-a-vis* IP, whatever its origin. Despite this, the administration is confident that the academic community is aware of the university's rights, responsibilities and aspirations. It believes Hull's academics are adept at recognising practical applications of discoveries arising out of even the most "pure" research project - and acting upon that recognition:

"... [We are] confident that they have an eye on the main chance ..."

The ICDA Officer is less confident about awareness levels, but it believes that the spoken word is more effective than written reminders:

"... There is an assumption in universities that people can read, which is not always well-founded ... We quite clearly have a lot of illiterate members of staff who don't read anything ..." ⁽⁵⁹⁾

"... I spend most of my time on the hoof. It's the only way to operate ..."

There are undoubtedly Departmental "blackspots" where the ICDA has a low or non-existent profile. Significantly, the ICDA Officer has no record of Hull's entries to the Academic Enterprise Competition ⁽⁶⁰⁾. Failure to win the Competition need not imply that the IP concerned or the plans to exploit it were worthless, yet it is not clear whether either project has fallen by the wayside or whether the IP is being exploited with or without the University's knowledge.

The ICDA Officer concedes that it has been difficult to get the message across to new members of staff, especially research staff on short-term contracts. This particular problem is one of many addressed by the working party which the ICDA Officer joined in 1988. The working party has proposed a "fail-safe" solution, namely exempting members of staff on research grades from the copyright waiver which the University volunteers *vis-a-vis* literary, scientific or musical compositions produced by other members of the academic staff ⁽⁶¹⁾. Research Fellows/Assistants will not be allowed to publish without permission from their principal investigator/HoD. If this recommendation is adopted, it

will be included in a section on "*Ownership and Exploitation of Research Results and Patents*" in the new Research Handbook, due to be circulated to all members of the academic staff in the 1990/91 session. The Research Handbook was compiled by a Senior Assistant Registrar. It is to be hoped that the ICDA Officer vetted the section on "*Ownership and Exploitation of Research Results and Patents*" before the Handbook was circulated, since the draft version states that the NRDC has first right of refusal on inventions and other results of commercial value arising out of research supported by the Research Councils ⁽⁶²⁾!

Tactics to positively raise the awareness of all new members of staff - perhaps by means of a presentation on IP at the staff induction programme - have not been considered. Nor has the possibility of reinforcing the awareness of existing members of staff by incorporating a session on IP in the academic staff development programme ⁽⁶³⁾. However, in 1989/90 the ICDA Officer set up a series of university-wide seminars dealing with research issues, including IP ⁽⁶⁴⁾. These were attended by about 10 per cent of the academic staff. In an attempt to make academics more aware of the prerequisites of the patenting system, the ICDA Officer also invited researchers to attend the DTI's "Patents Roadshow", held in Hull in June 1990. It was attended by six academics from the Department of Engineering Design & Manufacture and one from the Department of Applied Physics. A similar lack of interest was experienced by the University library a year earlier, when it tried to hold a patents information evening; as a result, the event was cancelled.

All the ICDA Officer's tactics are geared towards one thing - persuading researchers to tell him about their discoveries before they tell anybody else. The ICDA Officer relies almost entirely on academics themselves taking the initiative. He does not feel it can institute further "fail-safe" systems, given his present resources. The Finance Office is happy to make applications for research grants ⁽⁶⁵⁾ available for the ICDA Officer to scrutinise so that it is aware of potential IP at the earliest stage. However, the ICDA Officer has neither the time nor the expertise to make it worthwhile doing this routinely. Equally, the ICDA Officer sees little value in reading interim or final reports. The ICDA Officer sometimes attends presentations which researchers make to their funding body but he regards this as "*a very rough and ready method*". He has considered a number of possible solutions to the problem but none has yet seemed workable:

"... I'm not very keen on having six learned people sitting round a table once a month examining things that have been put forward. I couldn't stomach that. I wouldn't be able to sit there. I think there would be violent disagreements. Would the chemists understand what the electronic engineers were saying, and vice versa? ..."

Given this situation, the ICDA Officer recognises the value of using outside organisations to trawl for IP. "Innovation" ⁽⁶⁶⁾ is seen as a useful tool since entries are expressed in language which can be understood by the layman. By virtue of acting as gatekeeper for forwarding the forms, the ICDA Officer has already been able to identify one exploitable discovery and a number of others which may be worth pursuing. These academics chose to confide to "Innovation" rather than to the ICDA Officer, but he does not see this as a failure on its part:

"... You've got to keep [working] at this in different ways ..."

The ICDA Officer has allowed the BTG to continue its customary twice-yearly visits, though he is sceptical about the value of it. This is due partly to perceived failings in the organisation of the BTG and partly to the attitude of Hull's academics ⁽⁶⁷⁾. Similarly, the ICDA Officer has signed enabling agreements with the Research Corporation. However, he does not give access to any of the more recently-founded organisations, having no way to check their credentials and fearing they might identify a promising discovery, arrange for it to be developed and never get in touch again.

5.2 Evaluation

Despite his marketing background, the ICDA Officer is generally unable to obtain an **independent** assessment of the market value of a discovery. The budget does not stretch to paying for private sector evaluations and there are no local public sector organisations with this sort of remit. The BTG and the Research Corporation are the only organisations which will provide a free and supposedly unbiased market evaluation. However, as a result of the NRDC's rejection of liquid crystals (see note ⁽¹⁹⁾ for details), Hull's academics have little faith in the BTG's pronouncements. Despite the fact that this happened 18 years earlier, there is a tendency for Hull's academics to try and prove the BTG wrong once again by attempting to develop and exploit their discoveries themselves ⁽⁶⁸⁾. The Research Corporation has a different kind of image problem: it is not a known quantity as far as the academic community is concerned.

Confronted by these constraints, the ICDA Officer's strategy is often to file an initial registration if the researcher concerned believes that his discovery is promising and patentable. If a partner is found to develop and exploit the discovery, the ICDA Officer relies entirely on that company's market evaluation. This is not the optimum situation, but as long as the University includes a reversion clause as part of any agreement, the ICDA Officer is not too concerned:

"... It would not be in [a company's] interest to play down the value of [the discovery] because that just puts up the percentage we would ask for. Round the other way, we could be conned. They could say - look, this is going to sell millions and 1 per cent of £1m is worth having. But they know they are going to sell £10,000-[worth] and 1 per cent of £10,000 is nothing. If one has a reversion clause, though, that's certainly a safeguard ..."

5.3 Protection

(i) Philosophy

If a discovery is seen as likely to have market value, it is Hull's policy to try and get it protected in some way. If it is possible to acquire patent protection, the ICDA Officer sees this - or even an initial registration - as lending credibility. However, the University has no principled objection to protecting its IP by assigning it or by marketing it as secret know-how. Any of these mechanisms are permissible, provided they do not prevent researchers from publishing their discoveries within a reasonable period; Hull's Charter prevents it from agreeing to unreasonable prohibitions on publication ⁽⁶⁹⁾. From the ICDA Officer's perspective, there can be advantages in assigning IP or selling it as secret know-how: it is often easier to persuade a company to take responsibility for protecting the discovery - by patent or by secrecy - than to recoup patenting costs which the University has already borne. On the other hand, while this strategy may be more cost-effective in

the short term, the ICDA Officer believes that in the long term, it is "*more prone to accident*".

Originally, it was proposed that a standing Sub-Committee on Patents should decide whether or not to protect a discovery - and if so, by what means. It was originally envisaged that the Sub-Committee would be alerted to the problem by the Registrar "*as soon as practicable*" and that members of the academic staff would be "*directed*" what to do ⁽⁷⁰⁾. In the second version of the University's patents policy, the University specifies that it will "*take the necessary steps to discuss the matter with the member of staff and other parties involved ... within six months*" ⁽⁷¹⁾. In practice, this has never happened, since the ICDA Officer dislikes working with committees:

"... It was upto me - and I've never called [the Sub-Committee] together ... Nobody has said anything ..."

At Hull IP is unlikely to be protected by any mechanism unless the researcher agrees. The ICDA Officer tries to come to a consensus with researchers about whether to delay exploiting the discovery intellectually - via publication - in the interests of exploiting it commercially. There has been no disagreement to date about the best course of action ⁽⁷²⁾. If there ever were, the ICDA Officer feels sure that ...

"... the University would back the member of staff. If he felt his career was going to be advanced by early publication and [he] was prepared to jeopardise some potential, future, long-term income, then we would say - fine. We would be prepared to back that ..."

Where there is a choice between protecting a discovery by patent, secrecy or assignation, researchers effectively have the final right of decision about this, too, since an initial registration is likely to allow them to publish sooner rather than later. Despite the dangers of early registration, the ICDA Officer believes this is the correct strategy for a University to pursue, given the difficulties of preventing inadvertent disclosure.

(ii) Finance

Because the ICDA Officer did not discover the existence of the Exploitation Fund until he had already been in post for five years, he has had a relatively limited sum to spend on patenting - *ie.* whatever proportion of his £15,000 annual budget he felt he could devote to it. Confronted by this constraint, the ICDA Officer has opted to pursue a liberal strategy where initial registrations are concerned. This has been done as economically as possible, however.

(iii) Practicalities

If it appears that acquiring a patent will be relatively straightforward, the researcher is asked to submit a "DIY" application, for which the University pays. If acquiring a patent is deemed to be particularly urgent or complex, the academics concerned are asked to visit the university's patent agent and to draft the initial specification in the light of the resulting discussion. The patent agent then translates the draft into the appropriate register. In each case, the procedure will be determined on the basis of a discussion between the researcher and the ICDA Officer. To date, around a quarter of Hull's initial registrations have been in the form of "DIY" specifications drafted by the academic without reference

to a patent agent:

"... unhappily we've been tending to go the more expensive way as things get more complicated ..."

Academics are expected to find the time to write patent specifications. If their existing workload makes it impossible to do this fairly quickly, they could try to negotiate a temporary easing of their schedule with their HoD, but this would be entirely at his discretion ⁽⁷³⁾. The ICDA Officer plays no part in such negotiations.

(iv) Ownership

Successive versions of "*the University's Policy on Patents*" have stated unequivocally that patents will be jointly vested in the name of the University and the inventor(s). In practice, the ICDA Officer has vested every patent in the name of the University alone, unless the inventor specifically requests joint vestment. This has happened only once, to date. According to the ICDA Officer, vesting patents in the University alone is:

"... an easier way of handling things administratively. I can do it from here without having to involve a lot of other people ..."

Whereas researchers have a considerable say in how their IP is initially protected, they have little **direct** influence on the decision whether or not to acquire full patent protection. The reason for this is entirely pragmatic: the sheer cost of acquiring full patent protection deters the ICDA Officer from being speculative beyond the first stage of the process, despite the University's desire to avoid a repetition of the liquid crystals debacle:

"... It is very difficult to pick the winners and I would be concerned about using scarce University resources [speculatively] ..."

The ICDA Officer will only proceed with a full application once a partner has committed itself to developing a discovery or it is very likely that a firm commitment will be made within twelve months or so of the initial registration ⁽⁷⁴⁾. Between 20 and 30 per cent of initial registrations are left to lapse because these conditions cannot be fulfilled. Academics may be able to influence the situation **indirectly**, by helping to identify partners and being persuasive. In rare cases, they may be able to influence the situation directly by attracting the capital to start a company to develop and exploit their discovery. Given the level of academic salaries, academics are unlikely to be able to bear the cost of **full** patent protection without substantial financial backing.

Hull's patent policy explicitly states that if the University elects not to participate in the development or exploitation of a discovery, it will waive all its rights in the IP, retaining no interest whatsoever. A decision can be reached within weeks rather than months. Although the ICDA Officer would not invest money in discoveries which had been assigned to the inventors, it would still refer them to appropriate sources of advice on protecting and exploiting it. The ICDA Officer would be motivated by a desire to maintain a good relationship with the academics concerned, to encourage them to bring their next discovery to his attention. Since the introduction of the patent policy, however, not one researcher has sought to acquire the rights to discoveries which the ICDA Officer has decided not to pursue.

If the ICDA Officer feels there are grounds for acquiring full patent protection, the University applies to those countries which its patent agents recommend. This usually includes the US, Japan and several European countries. In Europe the ICDA Officer tends to use the EPC route because the expenditure is slower and there is a greater chance of identifying licensees before heavy expenditure occurs.

The ICDA Officer does not believe its pragmatic, short-term approach to patenting is likely to change in the foreseeable future:

"... If we were enjoying revenue from our previous [patents], I think naturally we would tend to be more speculative. But I'm not the greatest optimist about the potential of this University - or any University, for that matter - to earn vast sums of money from IP ..."

5.4 Commercialisation

Where it has retained rights to its IP, Hull has had no **principled** objection in the past to it being exploited by a third party or by an independent academic spin-off company. Recently, the University has expanded its options by adding University companies and joint ventures to the list of mechanisms which might be used to commercialise IP. In practice, all these mechanisms have been used, but during the 1980s well over 90 per cent of the university's IP has been licensed to third parties.

(i) Academic Spin-off Companies

Since the late 1970s academics at Hull have been founding/co-founding "hard" companies to exploit IP which was discovered in the University. In one case dating from the late 1970s the academic concerned proceeded to exploit his discoveries without informing the University centrally and without establishing whether or not the University might claim ownership of the IP ⁽⁷⁵⁾. Several others established that at that time the University had no wish to participate in the exploitation; they therefore had no need of a license. One has set up a company more recently, but has negotiated an agreement whereby he alone owns the copyright on the software which he produces and markets. To date, no academics have acquired a license from the University to exploit their discoveries.

In future, it is less likely that academics will commercially exploit their research discoveries by means of independent spin-off companies. With the exception of income from goods and services sold to academic entrepreneurs, the benefit to the University from these companies has largely been non-financial to date. They have brought kudos to the University for having bridged the university/industry divide and a source of industrial placements for students. In the absence of license agreements, none of the "hard" academic spin-off companies has generated a royalty income for the University. None of the academics who have spun-off independent companies has admitted to exceeding the personal earnings limit and covenanted the excess to the University. It is impossible to establish whether their earnings have genuinely been too low, whether they have failed to declare all their earnings or whether they are simply unaware of the rules. No comprehensive staff handbook has been issued at Hull since the mid-1970s and attempts to distribute updated sections have not been entirely successful.

(ii) University Companies/Joint Ventures

In 1988/89 the University responded positively to a member of staff's proposal to embark on a joint venture ⁽⁷⁶⁾. The administration saw it as in keeping with its policy of "involvement, as opposed to non-involvement" as well as a potential source of income. Senior members of the administration have become so enthusiastic about the concept of joint ventures that they have considered making the university's participation ⁽⁷⁷⁾ a condition of permission to found a company. To date, however, only one joint venture with a member of the academic staff has been set up. At the ICDA Officer's behest, this particular enterprise has been structured as a joint venture between the academic and the university's holding company rather than a joint venture with the University itself:

"... The chances of being associated with a roaring success and making tons and tons of money against the chances of either being at best involved in a time-consuming, non-productive operation - or at worst getting caught up in something which is a loss-maker, with all the problems that occasions - I'm afraid I'm a bit cynical ... Therefore I think arm's length is probably best ..."

Knowing that some British universities have lost a considerable amount of money through failing to set up an arm's length relationship, the administration was happy to agree ⁽⁷⁸⁾.

The ICDA Officer believes there are other considerations to take into account:

"... I would be reluctant for the University to be a partner in setting up a relationship with a member of staff, as opposed to a holding company of the University which is not governed by the University ... I can't see how the University, through Senate and Council and all that paraphernalia, could ever come to an arrangement with a member of staff."

"... I think you can have a clash of interests [between] the University and the member of staff over matters academic ... Those people in the University who have anything to do with discussions with a member of staff clearly have a concern about some academic aspect of the arrangement."

"I think that as long as [the academic] gets agreement from his Dean of School that it will not interfere with his other duties, then fine. The Dean of School gives it his papal blessing, then [the academic] can come across and talk to Hull Unico and set it up on a proper commercial basis ..."

The ICDA Officer also believes that a holding company is less inhibiting to academics:

"... You can have problems of sheer size. You've got the University ... and a little one-person company and the whole thing is a total mismatch."

"Hull Unico is a very small unit which is known to be a commercial operation which is divorced from the academic side of the University entirely. It is not [governed by] its statutes and so on and can therefore talk on a more equitable basis with a member of staff ..."

Hull Unico was originally set up in 1985 in order to benefit from grants awarded by the DTI ⁽⁷⁹⁾. It was founded specifically to develop laser micro-soldering, the principles of which had been established by a research team in the Department of Electronic Engineering. Hull Unico soon assumed the status of a wholly-owned University holding company ⁽⁸⁰⁾. In the same year it established its first subsidiary ⁽⁸¹⁾ to exploit IP which arose out of research carried out by the Institute of Estuarine & Coastal Studies (IECS) for a regional water authority. In the ICDA Officer's view, this venture was not sufficiently well thought out:

"... I think it was [set up] in a flush of enthusiasm. It was a good idea for the University to be seen to be having these entrepreneurial characters working under the banner of the University but really doing their own [thing] ..."

Since the subsidiary was located 150 miles away, the ICDA Officer later encouraged the founders to organise a management buy-out ⁽⁸²⁾; this was completed in 1988. At present, Hull Unico has only one other subsidiary ⁽⁸³⁾. The existence of the company has not been highly publicised either within or outside the University because of its limited activity. The ICDA Officer has considered winding up the company to save on auditors' fees, insurance costs *etc.* If that happened, it is not clear how the University could participate at arm's length in joint ventures with members of the academic staff.

(iii) Licensing

Academics at Hull who do not have entrepreneurial leanings are given considerably less scope to contribute to the process of commercialising their discoveries than some of their colleagues in other universities. The ICDA Officer's knowledge of the market is better than that of many University ILOs, given his lifelong career in the business. He feels he has no need of directories like Dun & Bradstreet and relies less than many ILOs on researchers' knowledge of companies operating in their field. Moreover, he prefers to make the approach to potential licensees himself; the researcher may be present, but only in an advisory capacity. Similarly, despite having no previous experience, the ICDA Officer negotiates the terms of the license agreement ⁽⁸⁴⁾. He will discuss strategy with the researcher beforehand, but he alone conducts the negotiations. If the researcher is present - and he need not be - it is only in an advisory capacity:

"... I think it is easier for me to backtrack on too extreme a position without compromising the relationship between the academic and the company. [That] is much more important than my relationship. One must not damage that. If the company thinks the academic is a hard-nosed, grasping so-and-so, they won't have a good consultancy relationship. If they think I am, it doesn't really matter ..."

Non-entrepreneurial academics are expected to support the commercialisation process academically, through contract research or private consultancy.

The administration tries to include details of IP which is being commercially exploited in the Annual Report on Research Information. An annual memorandum asks Deans of School to pass on details of license agreements. Spin-off companies are not mentioned, however. Despite the omission, the administration would be happy to include details of ventures in which the University has a hand. It would be reluctant to name independent spin-off companies, however, in case they did not stem from a University activity. Independent spin-off companies might feature covertly, but only if a license agreement

were involved.

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy

Hull has had a policy on academic entrepreneurship for a number of years, but until 1990 - when major policy changes were proposed - it was never made explicit. Since the mid-1970s the administration has distinguished between academics who choose to be entrepreneurial within the University system and those who prefer to pursue their business interests outside the conventional framework of the University. Academics have been expected to understand that the latter comes under the general heading of "*outside work*" ⁽⁸⁵⁾. The relevant regulations required them to seek written permission for any external activity, whether it was starting a company, doing private consultancy work or whatever. It was irrelevant whether the proposed company was intended to exploit expertise/inventions arising out of the academic's work for the University or skills/interests which have no connection with the University. Equally, it was irrelevant whether the academic proposed to set up an independent company or a joint venture with the university/the university's holding company.

Permission to do outside work is granted/denied by the Vice-Chancellor, following advice from the Registrar. Hull has been concerned less about the **type** of outside work than about the extent to which it might impinge on a member of staff's primary academic commitments. Since the mid-1970s Hull has sought to control this by imposing an earnings limit, rather than a time limit, a rule which could theoretically constrain junior academics more than their senior colleagues ⁽⁸⁶⁾. In the administration's view, it is unlikely to have constrained anyone in practice, since the income they derived **personally** from their companies was liable to be negligible unless they were very successful.

By 1989/90 the University had given permission to around a dozen academics to found independent companies to exploit expertise/inventions ⁽⁸⁷⁾. In some cases, permission was granted retrospectively, after the administration had gently jogged the academic's memory:

"... I would say - I believe you've set up a company; would you mind asking for permission? ... It's a question of whether it is advisable to use a big stick and beat the naughty academic on the head. We've taken a fairly relaxed view so far ..."

In 1989/90, one academic spin-off company was technically operating without permission, a situation which the ICDA Officer felt was causing controversy in parts of the University and putting the HoD in an invidious situation ⁽⁸⁸⁾. Given its relaxed attitude during the 1970s and 1980s, the administration believes it is unlikely that academics from Hull have ever run companies **secretly**.

The administration says that it does not necessarily look for a financial return on the activities of its entrepreneurial academics. However, since the late 1980s it has grown increasingly interested in the concept of joint ventures with members of the academic staff trying to exploit "hard" IP ⁽⁸⁹⁾.

It is not clear whether this is in the spirit of supporting technology transfer or for hard-nosed financial reasons. Certainly, the administration has sought to safeguard its investment by means of a non-executive seat on the board. Its (unwilling) representative has been the ICDA Officer:

"... [The academic] is working on it full-time. He's got his own cronies. I will be invited along to all meetings ... but if I actually want to poke my nose in, I know very well I could very easily be [diverted]. I've got no chance at all ... unless he wants me to. And the only reason he'll want me to is because he's in trouble.

"I'm rather scared of being the non-executive director of this [joint venture] because the amount of time I can devote to it [is minimal].

"... If it all goes wrong ... I think my colleagues on the academic side ⁽⁹⁰⁾ perceive me [as having a managerial input], but I think they are being a bit naive ..."

The ICDA Officer agrees in principle with the administration's desire to benefit financially from academics' business activities:

"... It [is] a great pity - and we have seen it in the case of [company X] - if a member of staff has a very good idea, goes out and makes money out of it and the University doesn't make a penny. I think the University should encourage its members of staff to be entrepreneurial - it has to - [but] it has to have the opportunity of taking a stake in some small way in that person's [company] ..."

In practice, the ICDA Officer does not believe the University could afford to adopt an open-door policy which would commit it to acquiring an equity stake every time an academic proposed setting up a "hard" company - nor should it, even if it could afford to:

"... On balance, I think ... universities should be cautious. That doesn't mean to say that if it was a real winner, we wouldn't go for it ..."

The ICDA Officer felt there were other, less risky ways for the University to benefit financially from academics' business activities, whether they were running "hard" or "soft" companies - ways which could be applied more consistently.

The ICDA Officer was a member of a working party which is recommending what amounts to a radical change in the university's policy *vis-a-vis* academic entrepreneurship in the 1990s. The proposed changes are not presented in terms of a policy specifically relating to academic entrepreneurship, though some members of the administration admit that this is at least part of the underlying rationale ⁽⁹¹⁾. They are presented as logical changes in the context of the university's global approach to income generation now that Schools are required to achieve income generation targets. In keeping with the UFC, the working party recognised three categories of income and analysed the benefit to the University from each. Work for industry and commerce which is not subject to a research contract with the University - *ie.* consultancy work - is seen as "*carr[ying] no research benefits for the University*" ⁽⁹²⁾. Therefore, the working party argues, it should be undertaken only if there is a proper commercial return - *ie.* a minimum of £250 per day (or £40 per hour *pro-rata*) ⁽⁹³⁾. For every day's outside work done by members of the

academic staff - and the working party recommends a maximum of 45 days per year - it is proposed that £125 should be paid into the university's central funds ⁽⁹⁴⁾, irrespective of which company the work was done for and how much was earned:

"... In fairness, the same rules must apply when members of staff undertake paid work on behalf of an outside firm or company in which they have a share or interest ..." ⁽⁹⁵⁾

It is also proposed to renegotiate certain agreements already entered into with existing members of staff, since the administration wishes to be seen to treat every member of staff in the same way. This desire has its roots in the controversy which one particular academic spin-off company has generated on campus:

"... There's a subterranean feeling that certain guys are not pulling their weight in the Department and making money on the side. They are ripping off their colleagues who carry the heat and burden of the day in the Department. That feeling is abroad and not only in relation to spin-off companies.

"There's an illusion that they are making money, when they are not. There's a bit of a feeling of resentment [about] all sorts of off-shore operations. We hope that the application of the [new] rules will help clear the air ..."

Both the ICDA Officer and senior members of the administration still profess to be in favour of academic entrepreneurship:

"... It helps to anchor us in the real world ..."

Effectively, however, they are proposing to tax would-be academic entrepreneurs at the rate of £125 per day from the moment they start trying to set up a company. Some members of the administration would like to deduct this sum from the academic's salary at source if it was not forthcoming, but senior members recognise this would lead to complications *vis-a-vis* the Inland Revenue. Others are concerned that the proposed charge will deter academics from founding the kind of spin-off companies with which the University has been keen to associate itself in the past.

The working party has omitted to include a precise definition of "45 days per year", so it is not clear whether academics who try to restrict their company start-up activities to evenings and weekends could avoid incurring this charge. Since the Registrar takes the view that the University "owns members of the academic staff 365 days a year, 24 hours a day", this may depend on the negotiating skills of Hull AUT, which is taking legal advice. Whatever the outcome, the Registrar accepts that the University may have to consider alternative strategies for some academic entrepreneurs, some form of *quid pro quo*.

The situation of academics who choose to be entrepreneurial within the University system is also changing. In the past, they have been relatively free to set up units acting as the commercial arm of their Department, exploiting its expertise and resources. Several commercially-oriented units were founded during the 1980s ⁽⁹⁶⁾. The ICDA Officer felt initially that it would be more appropriate if they were run by professionals rather than by academics:

"... If you have a Department which is able to provide a service to the outside community, it is much better to concentrate that service within a commercial enterprise which is headed up by someone who stands or falls by [its] success - rather than diffuse it amongst twenty academics. That one person who is running it can go and talk to his academics and pull them in, if he wants to, on specific cases. Then you always have a point of contact and he can handle the business without disrupting the academic programme. Yet people in the Department will know what [he] is doing. That's the best of both worlds ..."

Recently, he has changed his view:

"... as soon as you strip the School of running it, then you've lost the incentive to do it ... I think it is better for a School to have ownership of this activity ..."

It remains to be seen whether which approach will prevail. Despite the fact that Deans are now required to accept full responsibility for Schools' devolved budgets ⁽⁹⁷⁾ and to ensure that agreed annual income generation targets are met, neither Schools nor Departments are allowed to establish commercially-oriented units without permission from the administration. They are required to submit detailed business plans. This is no easy task, given that they are not free to determine how such units will be run. The administration reserves the right to decide whether a professional manager should be brought in or whether the Department can deploy an entrepreneurial member of staff as manager. The administration tends to the view that such units need to be run by:

"... someone whose life depends upon it ... It's a question of [whether] we can arrive at a situation in which [an academic's] life depends on it being successful ..."

The time taken to resolve such questions is causing considerable frustration among some more entrepreneurial members of staff.

6.2 Making Time

Under the old policy and the proposed new policy, if would-be academic entrepreneurs decide to try and set up a company while still employed full-time, they may be able to devote time to it which they might otherwise devote to conventional consultancy activities ⁽⁹⁸⁾. If they want to devote more of their working week than this allows to their business, the administration expects academic entrepreneurs to negotiate a part-time, pro-rata contract or arrange for temporary unpaid leave of absence. It does not support the idea of being flexible about an academic entrepreneur's workload, even if he is engaged in a joint venture with the University. The administration does not view joint ventures as a legitimate University activity, but as a separate, outside activity - though it admits that it has not yet given this proper consideration.

Applications for leave of absence ⁽⁹⁹⁾ will not be considered unless they are supported by the Dean of School. Academics are expected to spend leave of absence in a way which the Dean of School regards as "*consonant with professional development*". The administration believes that most Deans would approve requests from members of staff who proposed to exploit their research discoveries commercially ⁽¹⁰⁰⁾.

Leave of absence is granted/denied by the Staff Resources Committee, which considers the extent to which Departmental research, teaching and examination commitments can be covered during the period of leave - and whether any substitute or extra help would be required for the period concerned. If the Committee considers a replacement is necessary, this must be put to the Staffing Committee. Leave of absence is granted for a year in most instances, or two years if circumstances merit it. If it took longer than anticipated to establish a spin-off company to the point where the academic could reduce his input, the University would be very reluctant to grant a third year's leave of absence. It would be concerned about where the academic's commitment really lay and whether he still identified sufficiently with the university's objectives.

None of Hull's would-be academic entrepreneurs has yet requested leave of absence to get their company up and running. If any did, it is not clear how the University would handle contributions to the University Superannuation Scheme. For the first year, Hull usually pays both the employer's and the employee's contributions. Academics who are earning while they are absent are usually required to reimburse their share of the contributions every three months, in arrears. If they are not earning, the Personnel Office sometimes agrees to bear the cost of both contributions.

Several of Hull's academic entrepreneurs have managed to get their businesses up and running and fulfil their academic commitments on a full-time basis. In some - but not all - cases, the academic has had a partner who have played a more active part in the business. In another, the business was sold on after a number of years. A few academics have left the University in order to devote themselves to the business ⁽¹⁰¹⁾. The administration does not believe that any of them left because pressure was put on them to make a choice.

6.3 Other Resources

The administration is against the idea of academics running businesses from University premises ⁽¹⁰²⁾, since there is already considerable pressure on space. Since the opening of the university's science park in 1985 ⁽¹⁰³⁾, Hull's academic entrepreneurs have been expected to operate from a site adjacent to the campus or from entirely independent premises. In 1989/90 there were eleven incubator units on the science park, all occupied. The nearest university-based alternatives were at Leeds or Bradford. However, incubator units and larger units could be rented from Hull City Council for somewhat cheaper rents ⁽¹⁰⁴⁾, while there were also private business parks for somewhat higher rents ⁽¹⁰⁵⁾.

Academics wishing to use equipment or instrumentation in pursuit of their business activities are expected to hire them at the full market rate, subject to availability. They are expected to compete for the use of equipment/instrumentation on the same basis as any other business. The administration prefers it if academic entrepreneurs do not use the university's hard-pressed secretarial or technical support staff, but if they do, they are expected to pay the full market rate for their services. In the ICDA Officer's opinion, the University has no choice but to charge academics the full market rate if it wishes to conform to the recommendations of the Hanham Report ⁽¹⁰⁶⁾. Since universities are "*notoriously bad*" at calculating real costs and since their overheads are relatively low, the ICDA Officer feels that, in fact, academic entrepreneurs are probably getting a bargain.

In one way, Hull's academic entrepreneurs have an undisputed advantage over other commercial concerns. The ICDA Officer believes they should be granted exclusive licenses, even though its normal policy is to try and negotiate non-exclusive licenses with third parties:

"... if the University is going to encourage a member of staff to get out there and do his own thing ... we should be as flexible and supportive as possible. [There is] no point in ... putting all sorts of obstacles against him doing it successfully.

"... you want to give the guy a chance and be prepared, unlike an ordinary commercial license, to let him get off the ground, to nurture him before you extract your pound of flesh ..."

6.4 Business Start-Up Advice

Whether academics propose to found independent spin-off companies or joint ventures with the University, the ICDA Officer feels it should try to ensure they get the right kind of business start-up advice. The University does not believe it has a legal or financial responsibility towards would-be academic entrepreneurs, but it does feel a sense of moral responsibility. The ICDA Officer does his best to warn academics that they are unlikely to have all the skills needed to run a successful, high-tech business:

"... Most people who come along understand that they need financial support. What [they] underestimate ... is the marketing support. Marketing [is seen as] something anyone can do. There's no skill or expertise. That's what people think ... As long as you've got someone adding the figures up and you've got a bright idea, marketing just falls off the back of a lorry ..."

In 1986, funded by the DTI, the University launched a scheme designed to help small businesses in the Hull and Grimsby area ⁽¹⁰⁷⁾. It is administered by the ICDA, which does not itself act as a troubleshooter for specific businesses. Instead, it refers small businesses to appropriate sources of advice. These might be within or outside the University. Academic entrepreneurs are treated in the same way and are referred to patent agents, accountants, commercial lawyers, the city's Economic and Property Department *etc.*, as required.

The ICDA Officer has mixed feelings about sending would-be academic entrepreneurs to talk to colleagues who established their businesses earlier:

"... Some of the experiences of members of staff with spin-off companies might not have been as rosy as they thought it was going to be. Therefore, their attitude might be depressing rather than [encouraging]. There's a difference between understanding the realities and being thoroughly depressed ..."

However, the ICDA Officer concedes it might be worth sending those just starting out to talk to those academic entrepreneurs whom he sees as successful.

In August 1990 Hull was informed that the Exploitation Scrutiny Group was "*generally satisfied*" with the arrangements established. A formal document was scheduled to follow, confirming the University's rights and responsibilities to exploit IP arising out of Research Council-funded projects for a further 2 years. The situation was due to be reviewed again in 1992 after Hull had submitted its fifth annual report ⁽¹⁰⁸⁾.

8 POLICY AND PRACTICE AS PERCEIVED BY HEADS OF DEPARTMENT AND DEANS

8.1 Removal of the BTG's Monopoly and Response to the Kingman Letter

(i) Awareness of the Removal of the BTG's Monopoly and the Research Councils' Offer

All six interviewees at Hull reported that they had been aware - at the time - of the removal of the BTG's monopoly, though few could remember exactly how they had learned about it. One ^(B) surmised that he had read about it in "The Times", while three ^(A, D*, E*) believed (incorrectly) that this information had been formally circulated to all HoDs by the University. Only two could remember clearly how they had learned of it; one ^(C*) reported that he had been involved in the University's Sub-Committee on Patents, which was asked to consider whether acceptance of the Research Councils' offer would require policy changes; the other ^(F) had learned of the offer when the university which formerly employed him decided (for a brief period) that it could not afford the cost of patent protection and that staff themselves should therefore pay those costs if they felt it was worthwhile.

Two interviewees ^(D*, E*) commented spontaneously that they had been more aware of the removal of the BTG's monopoly than of the Research Councils' offer, though both added that they had deduced what the implications were for the University and their department.

(ii) Attitudes to the Removal of the BTG's Monopoly and the Research Councils' Offer

Questioned about their attitude at the time to the removal of the BTG's monopoly and the Research Councils' offer, three of the six ^(A, B, D*) said they had had no real opinion, since it was difficult to see what relevance it had to their particular disciplines. One ^(A) added that then, as now, most research findings in his discipline were regarded as public property; he would not expect them to be commercially exploited.

Two interviewees said that they had welcomed the Research Councils' offer, though one ^(E*) remarked that since his department was already attracting a high proportion of funding from industry, rather than the relevant Research Council, staff were already thinking in commercial terms and the idea of taking on the BTG's former role was not "*such a big step*". The other ^(F) explained his support for the change in terms of the NRDC's - and hence the BTG's - very poor reputation; he added that he himself had little experience of the NRDC, but he knew a lot of people who had and that was enough for him.

(iii) Perceptions of the University's Motivation in Accepting the Research Councils' Offer

All six interviewees appeared to feel that Hull had been right to accept the Research Councils' offer, though one ^(A) said he had been - and still was - concerned about the long-term implications; his department had developed a number of mutually beneficial relationships with various organisations which exploited IP of all sorts - relationships which operated on an informal *quid pro quo* basis; he feared that sooner or later these would be jeopardised by demands from the University for departmental IP to be exploited on a formal, contractual basis in exchange for money which many of these organisations did not have at their disposal.

All six felt that, in accepting the Research Councils' offer, the University had been motivated by one overriding objective - generating additional revenue. This was variously described as "getting a slice of the action" ^(C), "establishing a wider funding base" ^(E), "protecting the University" ^(D) and "losing less money through the judgements of the NRDC" ^(F). Only three interviewees suggested that the University might have had secondary motives - namely, encouraging contact with industry ^(B), gaining access to new research ideas ^(B), transferring technology more effectively ^(D) and generating publicity - thereby gaining a better reputation ^(A).

(iv) Awareness of and Views on the Process of Determining the University's Response to the Research Councils' Offer

None of the interviewees knew that the University's response to the Kingman letter had effectively been determined by the Registrar alone and drafted by the Personnel Officer, capitalising on his legal background. The interviewee who had been consulted on the possible need to modify University policy - by virtue of his involvement in the Sub-Committee on Patents ^(C) - had assumed two things: firstly that his views had influenced the University's decision to accept the Research Councils' offer and secondly that he had been consulted in his capacity as HoD. He pointed out that at that time, prior to the establishment of Schools, HoDs had had managerial responsibility and added: "If I hadn't been consulted, I would have been frothing at the mouth, certainly". A fellow interviewee ^(D) also felt that this is what should have happened - if only for reasons of widely disseminating the information. Another ^(E) said that every effort should have been made to consult not only HoDs but also all members of staff who had relevant experience. However, another ^(E) said:

"... Universities are funny places. They are supposed to consult everybody. But I think probably not. I don't think everybody would have had worthwhile things to say about it and it would get more confused. I think you must just go for the people who have a definite input ..."

This view was echoed by a fellow interviewee ^(B), who said that although he felt a little aggrieved at not being consulted, the University had doubtless followed the most sensible procedure. Another ^(A) suggested that even if the University had embarked upon a wider consultation process, it is doubtful whether the outcome would have been any different. He added: "[All this] doesn't really seem to be part of our world, but it is consistent with our perceptions of being part of this University", concluding that this particular episode did not disturb him any more than other symptoms of his department's relationship with the University.

8.2 Identifying Intellectual Property Created by Academics

(i) Views on the Likelihood of Different Disciplines Generating Exploitable IP

Asked whether they thought the particular spread of science and technology disciplines in a university had an influence on the amount of exploitable IP which might be identified, five interviewees felt that some disciplines were currently more likely than others to generate exploitable IP - though one ^(A) declined to specify which and another ^(C*) suggested that this was a matter of fact rather than potential. The third ^(D*) suggested that "*the hard sciences*" were likely to be the most productive - partly because staff in those disciplines have got used to the idea that research results might be commercially as well as intellectually exploitable. The fourth ^(F) cited chemical engineering and electronic engineering as the most likely to generate exploitable IP, while electrical engineering and civil engineering were, in his view, far less likely to - and physics was not particularly likely to. The fifth ^(E*) opted for "*the more applied areas*", citing engineering and medical disciplines, especially biotechnology, as the most likely to generate exploitable IP and mathematics and geography as the least likely. In his view, however, it was not simply a matter of individual disciplines; the breadth of disciplines in any one university played a part, too, which meant that Hull, with its unusually small science base, was less likely as a whole to generate commercially exploitable IP. This view was echoed by another interviewee ^(B), who added that it was essential to have sound physics and chemistry departments, since physics in particular was the basis of all science - and Hull had contracted, indeed, almost destroyed its physics capabilities at one point.

Despite this pessimistic view, two interviewees ^(C, E*) felt that the research bias of their own department was likely to generate more exploitable IP than similar departments in other universities. One ^(E*) attributed this to the nature of the department's particular sub-disciplinary interests and strengths, while the other ^(C*) attributed it to the characteristics of the staff in his department: "*We happen to have got our human chemistry at a very high pitch ... It's this human chemistry that has made it happen*". Equally important, in his view, was the age profile of his department, which had an unusually high proportion of 30-35 year olds:

"... If you end up with a department full of people who have been around for 20-30 years and they're in the 55-60 age bracket and they were doing great things in their thirties, you can't kick them out all of a sudden. But if you've got 70 per cent of your department aged 50+, you're in trouble. Scientific productivity is a function of age - and also scepticism and complacency. I feel a bit like that - you know, oh, God, not another bloody ladder to climb after you've done it several times ..."

Four interviewees ^(A, B, D*, F) thought that the research bias in their particular departments was likely to generate less exploitable IP than similar departments in other universities. One ^(F) explained this in terms of the fact that the subject areas covered by his department cut across traditional departmental boundaries - and while one subject area was just as likely as elsewhere to generate exploitable IP, another was far less likely to. Another ^(A) added that in many respects, his was a very "*applied*" discipline; however, the department as a whole had no wish to be labelled as "*applied*", staff preferring to project themselves as "*a pure science department which solves problems for people*".

(ii) Awareness of the University's Wish to Identify IP

Asked how aware they thought staff in their department were about the University's wish to identify potentially exploitable IP, one interviewee ^(B) characterised his staff as unaware, with the exception of himself - because the question did not arise in connection with their research. Another ^(E*) rated staff awareness as "five on a scale of ten", adding that the exploitation of IP was not something they worried about too much. The third ^(D*) described his staff as "aware intellectually but not entrepreneurially", with one or two exceptions, while the fourth ^(C*) said that his staff were aware of the University's wish in this respect, but less so than he was. He attributed this to the fact that the University had done little to inform the academic community as a whole of its interest in identifying IP; he himself was aware of the University's interests because he was privy to its strategy papers. The fifth ^(F) said that IP was not uppermost in the minds of his staff, but they were nonetheless aware, while the sixth ^(A) described his staff as "aware but disgruntled", adding:

"... If [the University] provided everything we needed to do our job, then anything we produced as a result must reasonably be theirs. But as they don't provide everything we need to do the job, people feel - is this fair?"

(iii) Responsibility for Identifying IP

Five of the six interviewees felt that their staff would take a positive view of being asked to "flag" potentially exploitable IP, though one ^(C*) qualified his answer, observing that his staff would be positive to the extent that the goal in question was achievable. If there were a conflict between, say, devoting time and energy to increasing income from IPR as opposed to new research grants/contracts, staff might prefer to put their energy into obtaining new research grants/contracts - and he would accede to market forces.

The sixth interviewee ^(D*) felt that the attitude of his staff was "neutral". Every School had participated in discussions with the administration concerning the need to generate exploitable IP; over the previous two years this had been presented to the academic community as a necessity, a matter of survival - and his staff accepted this, though few evinced any enthusiasm for the exploitation of IP *per se*.

Asked whether they thought the ICDA Officer should adopt a proactive or a reactive approach to identifying IP, two interviewees ^(A, B) opted for reactive. One ^(B) thought that most "inventors" would recognise the fact that they had invented something, while the other ^(A) felt that the University had not thought through the implications of a proactive approach:

"... If [the ICDA Officer] takes a proactive approach, [the University] has to sort out a lot of other things at the same time. We have to start outlining job specifications and organising the situation so that you have a structure to that employment. If the University did that, they'd actually get less effort out of people than they do with the present system.

"If you look at the number of hours worked by university staff, they are actually going down ... The average stuck at 60 hours per week for many years, and now it has come right down. Here you gave people what looked like an unstructured life and they filled it up to the full, whereas if you start asking them - What have you done today? Does that belong to me? - people will say - Well, I've done what

I'm meant to do today, so I can go home.

"So, I think reactive is the best bet ..."

Another interviewee ^(C) thought that the ICDA Officer should try to pursue a strategy midway between proactive and reactive:

"... A proactive role or [he] would find things done behind [his] back too readily. So, [he] needs to be upfront, saying - Don't forget, you're on our patch and we pay your salary at the end of the month, so we want a slice of your action. But [he] needs to react and respond sensitively ..."

However, three interviewees said they felt the ICDA Officer should adopt a proactive approach to identifying IP. Definitions of what constituted being "proactive" ranged from the ICDA Officer himself going around departments reminding staff of the University's policy and encouraging them to start looking for IP themselves ^(D, E) to getting himself intimately acquainted with the research activities of each department ^(F), to bringing in outsiders to trawl for IP - and not always the same outsiders ^(E), so that the interest value to members of staff was maintained at a reasonable level. The general feeling was that he should do these things considerably more often and more widely than he had to date. One interviewee ^(F) also suggested that the ICDA Officer and the administration needed to co-operate on the development of a systematic approach which would enable him (*ie.* the ICDA Officer) to identify and follow up new research grants as well as contracts.

(iv) Strategies for Identifying IP

Two interviewees ^(C, E) rejected the idea of scrutinising projects at the proposal stage; one ^(C) commented that it was simply too soon to tell, while the other ^(E) felt that making a judgement at this stage that there was no exploitable IP was likely to induce a negative attitude to the possibility from the outset. Another interviewee ^(A) rejected the idea at both the proposal stage and the interim and/or final report stage, on the basis that the ICDA Officer did not have the ability and it was not an appropriate task for the in-School research committee or the University research committee; he saw both committees as a forum for informing colleagues about research being undertaken in the School and the University respectively and formulating future research strategy, not as groups which should proactively deal with the outcome of research already completed.

His views were diametrically opposed to those of several interviewees. One ^(F) thought that the University should establish a "*flying squad*" -to examine every aspect of research proposals, from pricing to cross-disciplinary input to various logistical implications - and IPR. The "*flying squad*" would consist of a team of people from which an appropriate sub-set would be selected to deal with each proposal. This same team would then follow the progress of the project where an award was made. This particular interviewee reported that he had already tried to gain support for this idea, but that it had not been positively received ... "*I just haven't been sufficiently persuasive*". Another ^(B) thought that the University research committee should occupy itself with "*the finished product of research in the widest sense*", which he defined as including not only the identification of IP but also quality assurance. A fellow interviewee ^(D) thought that scrutinising for IP could be a useful job for his in-School research committee, since it was important to "*sell*" research as well as to stimulate it. A similar view was expressed by a fourth interviewee ^(E), who felt that his in-School research committee could oversee the identification of IP at the

interim and/or final report stage; scrutiny could be delegated to HoDs or research group leaders, who would be required to report to the Dean from time to time. Asked whether he had given the matter some thought prior to being interviewed, this particular interviewee said:

"... No, not until you came! I think it is something we have to think about and that is the sort of thing which would be encouraged if there was a more proactive [approach] from the University itself. If it came forward, then we would also go forward to make sure we were doing our bit ..."

He added that it was mainly a question of structures or mechanisms; the University's desire to identify IP had been accepted, but the University had not given Schools a pointer with regard to how best to go about it. He was unaware of the fact that the Registrar had decided that scrutinising research proposals was part of the ICDA Officer's remit, a decision which another interviewee ^(C) characterised as:

"... the Registrar being stupid again. He sits at his desk and takes a decision, and having taken that decision, he assumes it will all happen. He ignores the fact that [the ICDA Officer] can't do the job because he can't understand it. So, he's set up a mechanism. As for the fact that the mechanism doesn't work, he says - Well, don't confuse me with the facts ..."

The first two interviewees ^(A, C) felt that the people "on the ground, actually doing the research" were the best people to identify potentially exploitable IP; in their view, the most effective way to identify IP was to encourage "self-policing".

Asked to consider a number of "fail-safe" mechanisms for identifying IP, five interviewees rejected the idea of scrutinising drafts of papers before submitting them to journals. Similar objections were cited, for instance:

"... Who would understand [these papers]? ... We've just had a peer review exercise and it is quite obvious from some groups that peers did not have a wide enough view of their own subject area, let alone other people's ..." ^(A)

Attention was also drawn to the inevitable delay which this would impose on academics' efforts to publish, though one ^(C) suggested that a compromise might be for academics to lodge with the University a copy of papers despatched to journals, so that the time it took for the paper to be published could be utilised to scrutinise for IP which might have been overlooked. This interviewee, who had been a member of the Sub-Committee on Patents, was clearly unaware that, where patentable IP was concerned, sending them to journals would constitute disclosure, even though they had not actually been published.

The sixth interviewee ^(E) remarked that there was a need for more effective education about the prerequisites of UK intellectual property law and what constituted disclosure; in addition, however, submitting drafts of papers before despatching them to journals was a good fail-safe system which he hoped academics would accept if it was proposed.

8.3 Ownership of Intellectual Property Created by Academics

Asked whether they thought it was more appropriate for IP to belong to the University or the academic(s) who created it, two interviewees ^(B, F) said they thought that academics should be treated like any other employee. One ^(F) said that academics may think they are different, but in his discipline, in particular, there really was no difference at all. The other ^(B) justified his view by equating academics with any other professional person whose function was to give service to the community at large - only in this case, service took the form of generating additional revenue to help maintain the standards of the academic community in particular.

One interviewee ^(A) said he thought there should be shared ownership, arguing that academics were usually enabled to create IP by the infrastructure provided by universities - and universities should therefore share ownership of resulting IP. He added that it was debatable whether this could be justified in the case of Hull University, however: "*Really, we've not been put in the position to do the job*".

Two interviewees felt that academics should explicitly be excluded from the provisions of the 1977 Patent Act. One ^(D) argued that patent ownership should be on the same basis as copyright in universities: academics should have sole ownership, though universities should share in the proceeds where they had provided essential resources. The other ^(C) saw universities as collections of individuals who were more likely to perform effectively if they were given the flexibility to have their IP exploited as they saw fit:

"... Giving to the individual the greatest flexibility is going to provide the greatest incentive for that person to perform. I can see no virtue in the employer, just because the University is the employer, taking IP which [it] cannot really commercially exploit ..."

In his view, ownership of IP should be the subject of the domestic contractual law of each individual university, rather than determined by national law.

One interviewee ^(E) was of the opinion that it made no difference whether the academic(s) concerned or the University owned the IP they created, since the outcome would be identical.

8.4 Protecting Intellectual Property Created by Academics

(i) Attitude to Protecting IP Created by Academics

All six interviewees agreed in principle with the broad concept of protecting IP generated by academic research. One ^(G) remarked that it offered the possibility of generating an income for the University which was independent of both the UGC and industry, adding: "*Anyone who has been through the past two years here always has that at the back of their mind*". Another ^(C) observed:

"... There's no doubt that any academic who does not file a patent and subsequently finds that the work that has been published in the public domain has resulted in a multi-million dollar business is going to kick himself ..."

When asked to consider the fact that UK universities are not legally obliged to patent patentable IP, that they have the right to protect it by treating it as secret know-how instead, two interviewees ^(A, B) said that they were opposed to this course of action. Both argued that this was contrary to the function of a university. One ^(B) commented:

"... If the thing is exploitable, they should be open about it. We are supposed to be a seat of learning and we should communicate what we [discover]. Supposing you were a musician and you wrote a score. Should you keep it secret? Of course not! Other people should enjoy it ..."

The other ^(A) angrily recounted his own experience of a Government department refusing to let him publish any aspect of a report which it had commissioned. A third interviewee ^(C) described the impact of secrecy in his Department:

"... we've got major activity in two very jealous commercial areas, and there is work going on in this Department behind closed doors ... I would much prefer when I get visitors to the Department to be able to walk them around the Department, [whereas] I have to go around in a furtive way. I get into hot water with my colleagues when I take someone like yourself into the [...] lab. They come upto me afterwards and say - You do realise, don't you, that we need notice of this and that we're under obligation to our sponsor ... We're being torn apart!"

One interviewee ^(D) had no opinion on the subject of secret know-how, never having thought about it before; on reflection, he came to the conclusion that it was the University's responsibility to patent, where possible. Just two interviewees ^(E, F) felt there might be circumstances where secret know-how was justifiable. One ^(E) said: *"There must be times when the University would be wise to emulate industrial companies"*, while the other ^(F) thought the question should be determined by what exactly the University was trying to protect; if it was a process which could not be uncovered by dint of analysis, secret know-how was feasible; if not, it was not worth considering.

Four interviewees ^(A, B, D, E) concluded that patenting was preferable if there was a choice. However, one ^(C) felt that patenting was not necessarily a panacea:

"... When I was a career academic in the 20-30 [age] bracket, I submitted two patent applications and thought it was a great novelty to do that. Having experienced the patenting process, I became an anti-convert to patenting and I said - Never again will I talk to those guys, because it inhibited me. And that must still happen today ..."

(ii) Who Decides Whether and How to Protect IP Created by Academics?

Only one of the interviewees ^(F) knew what the University's practice was in relation to who decides whether and how to protect IP created by academics - a practice which he supported. Upon being told that in practice the academic(s) concerned were allowed to decide, the other five also indicated that they agreed with this. One ^(C) remarked: *"To inhibit a super piece of work being published - of Nobel Prize winning calibre - [would] cause a lot of emotion ..."*, while another ^(A) observed cynically: *"If a committee thought that one up, all they were doing was commenting on the reality of the situation, rather than inventing rules"*; in his view, if academics wished to disclose their research findings, they could always find a way to do so and the University could do nothing about it.

(iii) Attitude to the Logistics of Protecting IP By Patent

None of the interviewees questioned the University's policy of asking academics to draft patent specifications themselves, unless it was sufficiently complex to warrant a preliminary chat with a patent agent; none of them appeared to know about the existence of the Exploitation Fund, either.

Asked how they would respond to members of staff who requested a temporary adjustment to their workload in order to facilitate the process of drafting a patent specification, the interviewees expressed differing views. Two ^(B, D^o) said that they would try to temporarily reduce the member of staff's workload. One ^(B) commented:

"... I think that in most departments, if you have someone who is really going places, I think automatically the department takes steps to alleviate his workload, because this is just as important as teaching ..."

He conceded that there were members of staff in his department who would object to being asked to take on extra work while someone else drafted a patent specification, but added that active researchers in the department often used School meetings to gripe about those who were doing little or no work in addition to their teaching and to urge them to do more, so those objecting would receive little sympathy. The other ^(D^o) observed:

"... The general practice I adopt is that if people have a lot of outside work or administration to handle, I tend to reduce their teaching load ..."

In his view, patent specifications demanded the same flexibility, though it was possible that some members of staff might not see it that way:

"... It has never been tested. I don't think in theory anyone would object. I think it would have to be projected in theory first and discussed ..."

He indicated that if it ever became necessary, he would "*raise the issue of the common good*", focussing on benefits to the department, such as prestige, status and additional revenue. This was not a long-term solution, however; he likened drafting a patent specification to writing research proposals and remarked that he and a fellow Dean had been trying to persuade the University to provide the resources needed for administrative assistance, in order to facilitate such activities, adding: "*This may come some time in the next two years, otherwise something will have to give*".

Another interviewee ^(A) made the same analogy between writing research proposals and drafting patent specifications, but said that his staff would simply have to find the extra time. The department had already tried to equalise workloads by giving researchers less teaching to do, and was actively working towards a modular approach to courses, to give greater flexibility. Another three interviewees ^(C^o, E^o, F) said that staff in their department would simply have to find the extra time to draft a patent specification. One ^(E^o) did not think that his staff would resent this, since most would perceive it to be part of the process of doing research; however, if, in time, it became so burdensome that "*something else had to give*", he would lobby the administration to come up with a better mechanism. Another ^(C^o) felt that the incentive of some additional income should be sufficient motivation for staff in his department to get on with drafting their patent specification without whingeing:

"... My view would be that notwithstanding a very high workload, if there is another incentive, such as IPR and consequential personal income, then get on with it. If you think I'm being bloody-minded, remember that the workload of the individual is itself profiled according to their past track record of activity. So, I have two or three members of staff who have an extraordinary research workload and gradually and gently I've been easing off their teaching commitments. This is done in a way which is not contentious and not too visible. Occasionally, when [complaints] crop up, I say to the individual - Look, you get that kind of research activity and you, too, can have a lighter teaching load ..."

The third ^(F) was less optimistic, judging that the expectation that they should simply find the extra time could deter some hard-pressed members of staff from drafting patent specifications, with the result that the University could fail to capitalise on an IP opportunity.

8.5 Entrepreneurially Exploiting Intellectual Property Created by Academics

(i) Exploiting "Hard" Intellectual Property

Asked to give their views on the idea of exploiting "hard" IP entrepreneurially, instead of automatically licensing it to an existing company, most interviewees seemed to signify approval of the idea. Nearly every interviewee referred spontaneously to one or more of the independent spin-off companies founded by members of the academic staff at Hull, whose entrepreneurial activities they seemed to follow with some interest. One ^(E*) characterised two outgoing members of the academic staff as "millionaires" (a claim subsequently dismissed by the two academics in question) and said:

"... All of these people have done everything that was required of them and much more. The fact that they were doing these other things really enhanced their businesses ..."

In his view, Hull's academic entrepreneurs provided very effective role models for the academic community, in stark contrast to the situation at the large civic university where he was previously employed - where having a company was "*not the thing to do*". This view was diametrically opposed to that of another interviewee ^(B), who felt that in the past companies started by academics had caused significant problems at Hull:

"... Upto three or four years ago there was a problem here, where in fact there were companies within departments and the boundary between the companies and the department's research was blurred ..."

"This has happened. I can assure you that this did go on. Individuals were running companies ... Let me put it like this. Supposing I set myself up as a company here in [this department] and then I took on personal contracts. I could come in, I could use the University's mainframe computer - because I wouldn't tell anybody. And I could even use research students. I could set the project up in such a way that I could exploit people."

"Now, there was a tendency in British universities to have companies within departments. And I think that what happened here was that the University decided to kick the companies out. Because I think it was bad for the departments. I used the word "blurred" because if a guy is sitting in his office - is he really working for the University or the company? ... What I am really saying about this blurring of department and company is ... the laboratories. Why should company X get advice or instrumentation or chemicals or something in University time and then sell it as a company. That must be wrong ..."

Some interviewees distinguished between different types of entrepreneurial venture which could be set up to exploit "hard" IP. One ^(A) felt that independent academic spin-off companies were better than joint ventures, precisely because they were independent:

"... I am suspicious [of the University]. I think it is wanting a little stake for a big pay-off ... If you look at it from the staff member's point of view, why are they interested in investing in you? It is because they want to own you, not because they want to see your venture be particularly successful ... That's the thing that comes across all the time. We are going to control you. We are going to make sure we get every penny out of you. It isn't in the line that - let's go forth together and really make things happen and we'll all be rich. It isn't like that at all ... It is actually to keep tabs on you ..."

He added:

"... Just associating with [the University] would be the kiss of death! It is the decision of how you play things. Because it is quite clear that small companies have all sorts of ways of coping with problems like tax and the way that the books are actually made up ... And the University would stifle that completely ... I don't think they could be seen to be associated with anything that was less than proper, even if what was being done was legal. It would really mean that you were in a straightjacket. They would have a view - and if it was [the ICDA Officer]'s view, heaven help you - of how a business ought to be run. And they would have the University bureaucracy view that, you know, you have to have double insurance on absolutely everything before you made a move out of the door.

"And I don't think young companies work like that at all. They take big risks and I think that they ... it is a pity all this is being recorded. I think they actually have to launder their money in a way which makes it worthwhile them continuing ..."

For similar reasons, this particular interviewee was even more sceptical about wholly-owned university companies. He also felt that academic staff should not be drawn into involvement with university companies unless their contracts were rewritten; since such activities constituted neither teaching, research nor administration, academics who got involved with university companies were liable to find that this interfered with their career progression.

Three interviewees ^(B, D*, E*) said that they were in favour of the idea of the University participating in joint ventures with members of staff to exploit "hard" IP. The first ^(B) explained his support in terms of the increased revenue-generating potential which joint ventures should offer. The next ^(D*) remarked that joint ventures demonstrated that the University was actively interested in technology transfer - something which it had signally

failed to demonstrate in the past; he attributed this to the University's long-standing tendency to be "*ultra-cautious*". The last ^(E*) felt that the University's participation in a joint venture with a member of staff should result in the whole being greater than the sum of the parts:

"... then we get what we hope are the skills of the individual person in this sort of commercial environment, backed by something he wouldn't otherwise have. It's a lot harder to set something going yourself than if you've got a university behind you, financially, morally or whatever else. It does help. It also helps the new little company to have a better image when it goes out to collect money ..."

This same interviewee also felt there could be a down side to joint ventures - namely "*the heavy hand of the University restraining [the company] from making quick decisions*". However, at the level of the individual academics involved, he did not foresee major problems, since one of the strengths of Hull University was its "*immense flexibility*".

Another interviewee ^(F) said that he did not really know enough about joint ventures - either in principle or in practice - to be able to judge; however, joint ventures sounded as though they were consistent with his views on the kind of activities which the University should support.

Three interviewees ^(B, D*, E*) were also in favour of the idea of the University itself setting up wholly-owned companies to exploit "hard" IP - indeed, one ^(E*) regarded university companies as preferable to joint ventures with members of the academic staff in one respect:

"... A university is a funny place. It is not the best sort of organisation to be doing commercial things. And therefore it needs a different organisation, something that is not encumbered by the university system or even the Registrar - especially the Registrar! So, I think it definitely needs an organisation which works differently and quickly and knows what it is doing ..."

This particular interviewee was aware of the existence of Hull Unico, but felt that the University had not made the most of it:

"... you see, it hasn't actually done much. It's a very small thing. The one or two things it has done under its auspices have then virtually become separate subsidiaries ..."

In his view, once the University was prepared to be serious about its wholly-owned company, the company should be given a higher public profile - both internally and externally. This same sentiment was echoed by another interviewee ^(B), who saw university companies as a vehicle for getting a good return on IP - and for advertising the University's capabilities.

However, a fellow interviewee ^(F) was of the opinion that if the company started by his former university was anything to go by, he was against the idea of wholly-owned university companies. Further questioning revealed that he was specifically against the idea of "umbrella" companies which tried to assume responsibility for the exploitation of every IP opportunity which arose, rather than dedicated companies. It also transpired that he was against the idea of university companies which were founded "*for the sake of it*"

and run by people from industry who did not understand academia. In his view, such companies should evolve naturally, run by the academics whose IP they were exploiting; academics could develop business and marketing skills, and could be assisted by professionals, if required.

(ii) Exploiting "Soft" Intellectual Property

Interviewees were asked for their views on three mechanisms by which academics could exploit "soft" IP: personal consultancy, commercial arms of departments and various types of spin-off company.

Asked about their attitude to members of their staff doing personal consultancy, one interviewee ^(F) said that there was no such thing as personal consultancy in his department; 50 per cent of his staff did consultancy, but it was all done in-house. Another ^(B) reported that all the consultancy in his department was done on an in-house basis, too, with the exception of a single member of staff who had a special arrangement - *ie.* only 10 per cent or so of his staff did personal consultancy. A third ^(E*) was unsure about the difference between personal and in-house consultancy and had no real idea how many of his staff did either, since he had only recently been appointed and had yet to find out; he hazarded a guess that around a third probably did some consultancy of one sort or the other. A fellow interviewee ^(D*) thought that very few of his staff did personal consultancy - and that what they did probably took up no more than 5 per cent of their time. These responses contrasted strongly with those of the other two interviewees. One ^(C*) reported that 75 per cent of his department - all but the very young - did personal consultancy, and 50 per cent did so regularly. The other ^(A) said that all his staff had done some personal consultancy, though it was not clear how regularly they did it. Neither thought that any of their staff were doing more personal consultancy than they were supposed to, whereas one of the former group ^(D*) expressed concern about the amount of in-house consultancy which some members of his staff were doing.

Most interviewees felt there were advantages and disadvantages to their staff doing consultancy - personal or in-house. Only one ^(B) felt "*there could never be a negative affect*", though another ^(F) thought that the only negative affect was on his staff's personal life; he worried about the pressure which extensive consultancy inflicted on family life and its impact on the divorce rate. It was suggested by the other five that extensive personal consultancy could result in people losing sight of the primary objectives of their employer ^(C*), impact negatively upon their teaching performance ^(C*, D*, E*), their research performance ^(E*), their publication rate ^(C*, D*, E*) and their administrative responsibilities ^(C*, E*), and lead to neglect of postgraduate students ^(A, E*). One interviewee ^(C*) observed that he had already experienced a couple of instances of these kinds of affect in his own department; in one case, this had involved a senior professor. He also referred to an academic at another UK university who was alleged to have infringed the intellectual property rights of a student in pursuit of his consultancy interests - which had led to a 25-year court case.

On the other hand, most interviewees felt that consultancy could also have a positive affect; it could make life much more interesting for academics ^(B), could evolve new and valuable partnerships with industry ^(D*), lead to the blurring of the divide between universities and industry - long overdue in some subject areas ^(D*), and provide a source of novel and relevant teaching material for undergraduate courses ^(A, F).

Although two interviewees ^(B, F) reported that most/all the consultancy in their department was done on an in-house basis, only one of the two ^(B) reported that his department had set up a commercial arm to market the expertise of various members of staff. The commercial arm had no dedicated staff or accommodation; it was a purely notional organisation; the staff who contributed to it made no personal gain; it was all done for the gain of their discipline. Another interviewee ^(E) reported that a commercial arm had been set up in his department in response to a certain research group being overwhelmed with requests from industry; it had started off with one dedicated technician who had to generate his own salary and had expanded to take in a general manager, who worked on the same basis. The commercial arm used all the department's equipment and instrumentation *gratis*: "*For the moment we want to treat it as favourably as we can to get it off the ground*". In order not to incur the charge of unfair competition, the department allowed a rival company on the neighbouring science park to purchase materials through the department, made the entrepreneur an honorary lecturer and collaborated with him, where possible.

Another interviewee ^(D) reported that his department had considered establishing a commercial arm, but felt it would be competing with a multi-disciplinary entity which acted as the quasi-commercial arm of several departments. He added:

"... There's no formal agreement at the moment. It's just a gentlemen's agreement, and since there will be no gentlemen in 1991 when [self-financing budget centres] come into effect, I think there may be problems!"

A fellow interviewee ^(A) reported that some years earlier a member of his department had set up an independent spin-off company which provided the kind of consultancy service which a departmental commercial arm might provide. At the time, income generation had not been seen as a legitimate departmental activity; now that it was, the experience of the member of staff concerned had shown how much effort and capital the department would have to put into establishing a *bona fide* commercial arm; in his view, the independent spin-off company represented a far better mechanism for exploiting the department's expertise.

Only one interviewee ^(F) was sceptical about the net value of a departmental commercial arm - on the grounds that it was difficult for the HoD to maintain sufficient control over it; moreover, he feared he might lose the close contact he now enjoyed with members of his staff if they became involved.

Asked what they felt about the tendency for academics who do extensive consultancy to set up in business, all six interviewees felt that this was a positive side effect. One ^(B) suggested enthusiastically that it would have a very beneficial affect on the entrepreneur's academic's teaching. Another ^(F) said - less enthusiastically - that if this was what it took to enable universities to survive today and in the future, it was to be welcomed. A third ^(A) remarked on the benefits which he felt an entrepreneurial member of staff brought to his department:

"... [Dr. X] has a very astute policy that the bread and butter stuff is done by his company but all the research is done by the Department. So, he acts as a sub-contractor to the Department. We have a research assistant at the moment who is employed by the University, who is actually part of a contract that was negotiated by [Dr. X] with [a government department] ..."

Three interviewees did not unequivocally embrace the idea of academic entrepreneurship however. One ^(D*) felt that exploiting "soft" IP entrepreneurially could easily impede an academic's career progression. This particular interviewee mentioned that he was very worried about an entrepreneurial member of his staff for precisely this reason:

"... He has been working on the company since he arrived in Hull two years ago ... It has certainly affected his ability to produce the books which he should have been producing. I am concerned that the effort he has put into setting up the company will not be taken into account in the overall assessment ..."

Another ^(E*) described academic entrepreneurship engendered in this manner as "a two-edged sword":

"... There are certainly undesirable things about too much entrepreneurship. It's nice to have that sort of attitude but you mustn't have too much of it. It doesn't fit. If you want to make a department like this tick, you want people to do things because they want to and can see that it is good for the department. If you get a guy who says - Well, I'm only going to do it if I get so much money for it or if I only spend so much time ... That sort of attitude - too much of it doesn't work ..."

This particular interviewee said that he had already had occasion to talk to a member of staff who had adopted this attitude, but pointed out that he had little recourse beyond that; there were no disciplinary procedures which covered attitude problems and if you tried to "hedge a person in", he was liable to become a departmental malcontent.

The third ^(C*) felt that the academic entrepreneurship was not a side effect of doing extensive consultancy, but a direct effect; the two were "geared together very tightly". He added:

"... People who are most likely to do [extensive consultancy] are going to be the most successful, by definition. If the most successful start up companies, then they [concentrate on] that and sacrifice the department, spend more time there than they should do. The University will eventually wake up to the fact, and then, of course, they are on a loser anyway, because they'll clear off. So, the net result is - you lose your best people. If it was very visible, it would be a major concern ..."

8.6 Support for Entrepreneurial Academics

(i) Time

All six interviewees agreed with the University's policy of leaving to the discretion of the relevant Dean the amount of time which academics were allowed to devote to their entrepreneurial activities. All six professed to be sympathetic to the needs of academic entrepreneurs in this respect - though one ^(B) felt that his sympathy would be ill-placed if there were no return to the University. The interviewees exhibited less consensus when it came to putting their sympathy into practice, however.

Three interviewees indicated that they would be prepared to formally reschedule or reduce the member of staff's workload for a limited period in order to help them start up a company to exploit research discoveries or expertise. One ^(B) said that it was important not

to lose the would-be entrepreneur as an academic resource to the department; for this reason, he thought he would first try to reduce their administrative burden. If this was not sufficient, he would see whether he could temporarily reduce other aspects of the would-be entrepreneur's workload. Another ^(D*) observed that there were two or three big administrative jobs in his School; these were done by all members of staff on a strict, two-year rotation basis; if a would-be entrepreneur had done at least one stint, he would try to arrange up to two years with no administrative responsibility at all. Reduced committee work would be more difficult, since everyone had ongoing responsibilities, but a temporary rescheduling of the would-be entrepreneur's teaching load might be possible, given enough notice. A third ^(E*) observed that there was not much of an administrative workload to reduce in his School, and that what there was tended to be done by the Dean and two senior professors; accordingly, the easiest way to help academic entrepreneurs would be to temporarily reduce their laboratory work; this was the most time-consuming aspect of the job and could be reduced "at a stroke". It would be harder to reduce someone's teaching schedule, since some lecture courses were highly specialised; however, with 3-4 months' notice, less specialised courses could be rescheduled or given by another member of staff on a temporary basis.

Two interviewees felt that they could not temporarily reduce or reschedule a member of staff's workload in the interests of company start-up. One ^(F) characterised this as impossible logistically, while the other ^(C*) said it would be less problematical to accommodate academic entrepreneurs' need for time by means of a part-time contract or complete leave of absence - an option which he might suggest if the academic concerned did not broach the idea himself. The remaining interviewee ^(A) reported that an academic entrepreneur in his department tended to reschedule his workload on his own initiative, rather than formally ask for it to be rescheduled or reduced. He added that staff were always free to trade lectures with fellow members of staff on a purely informal basis; he would only consent to this being done on a more formal basis if the member of staff in question provided - from one source or another - sufficient funding to pay for teaching support.

Five of the six interviewees ^(A, B, C*, E*, F) responded positively to the idea of temporarily giving would-be entrepreneurs a part-time contract or complete leave of absence - though most emphasised that sabbaticals should not be used for this purpose and several had caveats. The sixth ^(D*) said that he would counsel against temporarily giving would-be academic entrepreneurs a part-time contract or complete leave of absence because it was not clear whether the University would release the funds saved to enable the department to pay for a temporary lecturer. This particular interviewee seemed to be unaware that departmental use of salary savings was guaranteed at Hull - as was a fellow interviewee ^(A), who remarked that he would not support applications for a part-time contract or leave of absence unless he was given a guarantee in this respect; if he had this guarantee, however, he would be very supportive:

"... I am very conscious of the spin-off that comes from these things. That the image of the Department is enhanced. They come back with new knowledge, as well. So that is all to the good of the Department ..."

Two interviewees ^(B, C*) felt that it was important to give academic entrepreneurs the assurance that if their business activities did not work out, or they grew weary of them, they could return to the academic fold on a full-time basis; one ^(C*) suggested that the University should continue paying academic entrepreneurs' pension contributions during

their absence/partial absence. Another ^(E) said that he would be sympathetic to a temporary part-time arrangement or complete leave of absence, provided the academic concerned was engaged on "a worthwhile project"; he would need to assure himself that the project was in the interests not only of business success but also the would-be entrepreneur's career development; he would also want to assess how likely it was that the School might benefit indirectly from the member of staff's business activities - through new research ideas - and eventually funding, consultancy opportunities - or simply bathing in the reflected glory; he felt that the ICDA Officer should be able to help him to make these judgements. A fourth interviewee ^(F) indicated that for him, "temporary" implied leave of absence of just one term; a year would create tremendous difficulties since the department needed at least one year's notice to reorganise the timing of highly specialised optional courses.

(ii) Equipment/Instrumentation, Support Staff, Communications, Accommodation

Only one interviewee ^(F) appeared to be aware that the University was prepared in principle to let entrepreneurial academics have access to all these facilities except on-campus accommodation, provided they paid the full, market rate for them.

Upon hearing that this was the University's policy, several interviewees signified their approval of the University making such facilities available to academic entrepreneurs. One ^(D) remarked: "People do need some sort of backing ... stimulus, support". Another ^(E) commented that it would be helpful if the University got around to communicating this policy to members of staff:

"... it would be nice if we could have [something] which actually promotes the fact that [the University] is in a position to encourage people, that this is something they want to do. There's been nothing to tell us that ..."

This same interviewee thought that the University should be more flexible with regard to accommodation in the start-up phase - despite considerable pressure on accommodation - since the smallest offices on the science park were far too big. Looking around his own office, he observed: "You can always find niche by constructing walls. With a bit of thought, it's surprising what you can do". This sentiment was echoed by a fellow interviewee ^(D), who revealed that he had flown in the face of policy and persuaded the University to let a member of his staff locate his start-up company in departmental accommodation: "It is a matter of convenience to have the company just ten or twelve yards away".

There was less of a consensus about the basis on which the University made these facilities available to academic entrepreneurs. Two interviewees ^(C, F) broadly agreed with the University's policy. One ^(F) said he thought that Hull could not afford to charge a marginal rate, because of the opportunity costs; in his department, for example, there was an ongoing commitment to industrial research which meant that if an investigation moved in a certain direction, equipment and instrumentation might have to be turned over to the project at very short notice. The other ^(C) indicated that what the University construed to be the full, market rate might not be enough in his department, particularly if there was competition from industry for the use of equipment or instrumentation: "I think, to be perfectly honest, we would be filthy capitalists and accept the highest bid".

This contrasted with the view of a fellow interviewee ^(E*) who suggested that the University should be as flexible as possible both about the facilities it provided academic entrepreneurs and the basis upon which it made them available. It contrasted even more strongly with the attitude of another interviewee ^(D*), who felt that it was important to help would-be academic entrepreneurs in the start-up phase; he had turned a blind eye to phone calls made by an entrepreneurial member of staff trying to establish his business and had let him use equipment and instrumentation without charge: "*That's entirely between him and I*". As far as this interviewee was concerned, the University's Finance Office knew nothing about it and he did not intend to advertise his idiosyncratic approach; his support had reaped dividends in so far as the company was now "*on its feet*" and had its own phone line and its own secretary. He felt that when Schools were obliged to become self-financing, it would no longer be possible to adopt this supportive approach: "*Things will get a lot more hard-headed then*".

One interviewee ^(A) questioned the University's right to formulate this kind of policy centrally:

"... I think the University has got double standards. Because it is saying that as a cost centre, the Department must be responsible for covering its own costs and as a first step towards a cost centre, we've been allocated our entitlement to space ... I don't see how they can give it to us and make us responsible for it, and then claim control over it ... If we are given the accommodation, we can use it as we think fit. And if we want to create a big disco floor in this Department and everybody living in little rabbit hutches, that would be within our remit, I think.

"... So, for example, we have a retired professor in this Department who does a full teaching load for free. We give him an office, a phone, and anything he wants ..."

Several interviewees distinguished between in-principle support for the University's policy and actually providing various forms of support in practice. One ^(B) remarked that he had no facilities to provide, apart from use of the mainframe computer "*which is free, anyway*". Another ^(C*) said that his department was "*grossly undersecretaried*", with the result that it might not be possible for entrepreneurial members of staff to arrange to pay departmental secretaries overtime to work for their company; it would probably be necessary to bring in a dedicated secretary. However, technical support staff could probably do such work on an overtime basis since their work was "*less strenuous by nature*". However, the HoD of a neighbouring department ^(F) reported that technical staff were at a premium and could not be made available to academic entrepreneurs; on the other hand, he might be able to make accommodation available, despite the general pressure on accommodation. Another interviewee ^(E*) observed that his department's commercial arm exerted tremendous pressure on equipment and instrumentation, with the result that it might be difficult to make either available to academic entrepreneurs.

(iii) Financial Support

Few interviewees appeared to be aware that Hull had recently decided it was prepared in principle to provide a measure of financial support for academic entrepreneurs - either in the form of the seedcorn fund or in the form of equity - and prepared, too, to help solicit venture capital from external sources.

Upon hearing that this was the University's policy, four interviewees ^(B, D*, E*, F) said that they were in favour of the University taking equity in academic spin-off companies, though one ^(B) remarked that the viability of the company should be carefully vetted first and another ^(E*) said that the University should always have a minority share-holding - *ie.* a maximum of 30 per cent. Where the seedcorn fund was concerned, one interviewee ^(F) thought that for projects with commercial potential, the University should create an innovation fund which made serious sums of money available. Another interviewee ^(D*) suggested that Hull should also consider making soft loans to academic entrepreneurs, observing that an academic entrepreneur in his department had asked for a departmental loan to acquire a vital piece of equipment:

"... I could have provided it but it was difficult. So, I think that maybe that sort of situation should be argued out centrally at the admin level, rather than in [the] School ..."

A fellow interviewee ^(A), who was not in favour of the University taking equity in academic spin-off companies, thought that the University should either provide certain forms of advice to academic entrepreneurs ("*basic accounting principles, basic marketing, advertising*") - or, they should finance the cost of bringing them in from outside.

8.7 Incentives and Disincentives

(i) Exploitation of "Soft" IP

As we have seen, until the beginning of the 1990-91 session, the amount of personal consultancy done by academics at Hull University was limited by the amount of money which they earned from it, rather than the amount of time devoted to it. Academics could earn up to 25 per cent of their gross salary without being "taxed" by the University; sums in excess of 25 per cent were supposed to be covenanted to the University but none ever were. From 1990-91, however, the time academics might devote to exploiting expertise via consultancy and/or spin-off companies was limited to 45 days per year and the University proposed to "tax" members of staff at the rate of £125 per day, irrespective of what they earned.

None of those interviewed initially ⁽¹⁰⁹⁾ knew exactly how the earnings limit was calculated and one ^(D*) was unaware that there was a limit of any kind. When told the basis upon which the limit and the "tax" (if appropriate) was calculated and asked whether they agreed with it, two interviewees ^(D*, E*) felt unable to express an opinion on the subject. One ^(B) remarked that he felt the University's approach was right, but could not say why. Only one interviewee ^(C*) gave a coherent (though ambivalent) response to this line of questioning:

"... If your income starts to become greater from outside than inside, your loyalties are going to change, so the employer does need to keep an eye on that. Not necessarily interfere, but keep an eye out ..."

"... There's another argument which says that income should not matter, time should, and if you can double your salary by working an extra hour per week, good luck to you!"

The two respondents whose interviews were conducted/completed nine months later ^(F, A) were aware of both the old and the new scheme, having attended a presentation on the subject. The former ^(F) claimed that the new scheme had broadly been modelled on a system which had operated in his department since he had been appointed HoD some years earlier. Not surprisingly, this particular interviewee was in favour of those aspects of the new scheme which resembled his own; however, he strongly disagreed with the "division of the spoils" which the University had decided upon; since he permitted his staff to do consultancy only in the evenings or at weekends, he saw no reason why the University should expect a cut of £125 per day, given that it was not losing any staff time between Monday and Friday during the hours of 9-5. The latter ^(A) felt that the University was employing "a sort of Noddy accountant's model" of academic life which was a major disincentive to individuals wishing to exploit "soft" IP by means of personal or in-house consultancy or spin-off companies. Moreover, in his view, this would rebound on the department as a whole:

"... If we have got an income generation target and we could meet it if two or three people were able to exploit some offer that had been made to them, then the Department as a whole would be wise to actually enable them to exploit that, in order that the Department's target could be met ..."

In his view, the limit of 45 days per year per person should be taken as a departmental average; individuals who did a lot of consultancy could trade off against those who did little or none - though this was a matter for the department as a whole to regulate, rather than the individuals concerned. Alternatively, the University could grasp the nettle and rethink the question of academic contracts:

"... The system I like is one I have come across in Portugal, where you can opt to be a full-time lecturer, in which case you are owned body and soul by the institution, so if you do contract work, you are just an employee of the institution [and get nothing extra]. Or you can choose to fulfil your duties to the university, which are defined - and it is teaching, primarily, and you draw only 70 per cent of your salary [and keep what you make from other activities] ..."

The interviewees demonstrated considerably greater awareness of the impact of consultancy on promotion prospects. Five knew that the University had recently taken the view that consultancy should be a criterion for promotion, even though this was not formally articulated in the promotions criteria; only one ^(E^o) was unaware of this. Opinions were divided as to whether this was a change for the better. One interviewee ^(B) expressed concern, saying that he thought the University should be very cautious about the extent to which it was prepared to reward consultancy activities in terms of promotion:

"... I wouldn't ever like to get to the situation where, if Joe Bloggs brings in £Xm, he gets himself a Chair. I would object to that, very much so ..."

Three interviewees ^(A, C^o, F) were unequivocally in favour of the University's *volte face*, but two ^(C^o, F) were concerned about the fact that the change had not been formally documented. One ^(C^o) said:

"... Hopefully, consultancy does [count as a criterion for promotion]. I'm told by the Vice-Chancellor that it does now - informally. I'm a little sceptical about that, but very definitely I think that it should do.

"... But there again, you've got to be watchful because a person who does not have the benefit of that might argue - You're rewarding the person twice ..."

(ii) Exploitation of "Hard" IP

All six interviewees were aware that the University had instituted financial incentives to encourage members of staff to "flag" potentially exploitable IP, though none could quote the percentage split. When told how the University divided income from the exploitation of "hard" IP, one interviewee ^(B) described it as an appropriate reward for "very hard work" - and therefore an effective incentive at the level of the individual. Another ^(F) said that in his department, this was certainly an effective incentive - so much so that, as HoD, he felt that this was one area where the department should stand aside and let the University split the proceeds with the individual(s) alone - a view which he felt was shared by most members of staff. However, several interviewees were sceptical. One ^(E*) remarked: *"... My impression is that there might be a policy at the University but there are not many examples of it [in practice]"*. He felt that the University should circulate brief case histories, so that staff could relate to other members of staff who had actually benefitted. Another ^(C*) observed that in contrast to the old system, the percentage split could hardly be construed as an incentive:

"... The Registrar didn't tell you what was there before - which was practically nothing. So, looking at it from the academic's point of view, the academic might say - Before, I used to take it all. Now the University asks for half. Why?"

"What is going to happen, of course, is that it is going to be driven underground. [The University] might think that is [the new system] but I can tell you that it won't happen. Staff regard it as an intrusion (original emphasis), though they can't defend it logically. The logic is - Hell, you work for us, mate. You are probably sitting in your office doing this, so we want a slice of the action ..."

This particular interviewee felt that the University could have created far more effective incentives:

"... I can think now of some incentives that would work. Given the opportunity to specify incentives, then I would certainly create a more competitive environment - even a cut-throat environment, in which people could work ..."

A related sentiment was expressed by another interviewee ^(A):

"... What they really ought to do is make this a wonderful place to work, facilities which excite people to do things - and then you'd get all sorts of spin-offs. It is a question of atmosphere. The current atmosphere, through the political climate, is not such as to generate the enthusiasm that has been generated in the past. And in the past, I don't think people would have asked questions like - Does this belong to me or does it belong to the University? Whereas they would now. [In the past] they would have been thrilled to see it on the market. The staff [today] are reflecting a policy that has been forced upon them by government ..."

The department's share of income from the exploitation of IP was not perceived to be a significant incentive, either, despite looming income generation targets. One interviewee ^(E) felt that the department's share of any income from the exploitation of "hard" IP was too hypothetical to be an effective incentive. Another ^(D) felt that the exploitation of "hard" IP would have very little impact on his department's income generation target and even if it did, the University would doubtless raise his target the following year. A third ^(C) conceded that the prospect of the department sharing in income from the exploitation of "hard" IP generated by a member of staff might concentrate his mind, but it was very doubtful whether it would have any real impact on junior members of staff who were divorced from the realities of issues like income generation targets. In his view, the introduction of profiled salaries - on the US model - would constitute a far more effective incentive at both the individual and the departmental level.

Four interviewees did not appear to be aware that taking the trouble to "flag" potentially exploitable IP had recently come to be regarded by the University as a criterion for promotion. One ^(D) retorted: "*That's news to me!*" and added that it had not encouraged academics to list patents and copyright material on their CVs. Only two ^(C, F) demonstrated awareness of this change of attitude on the part of the University; one ^(F) observed that appraisal in his department formally assessed contributions to the creation of IP - of every sort, not simply patents; he believed that the promotions committee also took such contributions into account - albeit in a less quantitative manner - even though this change had not been formally documented anywhere. The notion that "flagging" exploitable IP should now be a criterion for promotion was not challenged by any of the interviewees; however, only two ^(C, F) indicated that they were positively in favour of this change.

When asked whether they thought entrepreneurial exploitation of "hard" IP arising from research was taken into account by the promotions committee, only one interviewee ^(A) demonstrated awareness of the University's current approach; he reported that the public statement was that such activities would have a positive impact on promotion, but only as an extra, not instead of more traditional activities like research. Asked whether they thought that entrepreneurial exploitation of IP should be a criterion for promotion, not one interviewee disagreed with this approach. One ^(E) commented that academic entrepreneurship was not a measure of performance, but it was probably an indicator that if you were entrepreneurial, you were likely to be good at other activities which the University valued. Another ^(B) suggested that any activity which benefitted the community should be rewarded. A third ^(A) said: "*I think that we have got to go for the team player and if somebody is good for the University, the University ought to promote them*". A similar sentiment was expressed by a fellow interviewee ^(F) who remarked that since universities as institutions were being forced to become more entrepreneurial, it was appropriate to reward individual members of staff who did likewise.

The last two informants - whose interviews were conducted/completed nine months after the others - were critical of Hull's proposed new "tax" on academics who chose to exploit their research discoveries entrepreneurially. One ^(A) remarked:

"... I can't imagine that anybody would be willing to put the effort that is required into building up a company on the terms that the University has offered. My friends in commerce literally laugh. They wouldn't go near it. [They] think it is just a joke ..."

The other ^(P) conceded that the University might have the moral right to "tax" entrepreneurial members of staff even at the stage where they were sitting in their offices mulling over the germ of an entrepreneurial idea; however, in his view it had no right to levy a "tax" on people's thoughts or activities outside the hours of 9-5, Monday to Friday.

LIVERPOOL UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

Liverpool is one of a group of British universities commonly referred to as "civic" universities. Founded as a University College in 1881, in 1884 the Liverpool was admitted as one of the constituent colleges of the Victoria University, which had been incorporated by Royal Charter in 1880 following a petition from Owens College, Manchester. Liverpool was upgraded to full university status in its own right in 1903.

1.2 Size

At the beginning of the 1980s Liverpool was the seventh largest monolithic university in Britain, judged by the number of student FTEs. In 1981 Liverpool was advised by the UGC in 1981 to reduce the number of **home** students registered in 1979/80 by 2 per cent within the next three sessions. This was well below the national average, as **Figure 2** revealed. At the same time the UGC announced that Liverpool's recurrent grant was to be reduced by 16 per cent by 1983/84. As we can see from **Figure 2**, this was close to the national average. By most methods of reckoning, therefore, Liverpool falls into the least afflicted group of universities in terms of resulting hardship.

In 1986 the UGC indicated that Liverpool should increase its student numbers by just over 1 per cent over the next four sessions, less than the national average ⁽¹⁾. By the end of the decade, Liverpool had just under 4 per cent more students than it had at the beginning ⁽²⁾. Despite this relatively low increase, Liverpool retained its position as Britain's seventh largest monolithic university, judged on the basis of student FTEs. Moreover, despite the cuts, by the end of the 1980s Liverpool had increased its full-time academic/academic-related staff by nearly 9 per cent, while the number of part-timers had increased by a factor of twelve ⁽³⁾. Structurally, too, Liverpool ended the decade much as it began, with eight Faculties comprising over 60 Departments. There were slightly fewer than at the beginning of the decade, owing to the merger/closure of a number of Departments; most of these were in response to UGC subject reviews, rather than the cuts ⁽⁴⁾.

1.3 Science Base

Liverpool prides itself on its particularly comprehensive science base. In 1988-89 the **Faculty of Science** itself grouped together the Departments of Biochemistry, Pure Mathematics, Applied Mathematics & Theoretical Physics, Statistics & Computational Mathematics, Chemistry, Physics, Computer Sciences and Earth Sciences. In the same year, several departments merged to become Environmental & Evolutionary Biology, though some staff moved to Genetics & Microbiology. The **Faculty of Engineering** comprised the Departments of Civil Engineering, Electrical Engineering & Electronics, Industrial Studies, Materials Science & Engineering and Mechanical Engineering. For a comprehensive list of Departments in the **Faculties of Medicine and Veterinary Science**, see note ⁽⁵⁾.

These four Faculties accounted for 70 per cent of the academic community in the 1988/89 session. They were responsible for 51 per cent of Liverpool's undergraduates and 78 per cent of registered research students ⁽⁶⁾.

In the UGC's 1986 assessment of universities' research strengths in the natural sciences, engineering and technology, Liverpool was rated 6th best in the UK ⁽⁷⁾. As **Figure 6a** shows, one subject area was rated as outstanding, eight as above average, ten as average and seven as below average ⁽⁸⁾. It was suggested that if the ABRC's recommendations (ABRC, 1987) had been implemented, Liverpool would be assigned to the "X" category; accordingly, the University would be able to offer "teaching across a broad range of fields and substantial research activity in particular fields, in some cases in collaboration with others" ⁽⁹⁾.

In the 1988/89 research selectivity exercise, as we can see from **Figure 6b**, three "units of assessment" in the natural sciences, engineering and technology received a "5" rating, four received a "4", five received a "3", four received a "2" and one received a "1" ⁽¹⁰⁾.

1.4 Research Grant and Contract Income

As **Figure 41a** shows, in 1984/85 Liverpool ranked 13th in terms of £ earned in external research grants and contracts, but 33rd in terms of the percentage of its total recurrent income which this external revenue represented - 11.5 per cent ⁽¹¹⁾. The Faculties of Science, Engineering, Medicine and Veterinary Science brought in close to £6.4m, accounting for 94 per cent of the University's total income from research grants and contracts ⁽¹²⁾. As we can see from **Figure 41b**, by 1988/89 these four Faculties had more than doubled their 1985 earnings, generating close to £14m, accounting for 92 per cent of the University's total income from research grants and contracts ⁽¹³⁾.

The pattern of sponsorship which Liverpool's science base attracted differed somewhat from the pattern four years earlier, as **Figures 345-346** show. The proportion of funding received from the Research Councils and charities fell from 69 per cent in 1984/85 to 63 per cent in 1988/89, while the proportion of funding from industry/commerce increased from 9 per cent to 15 per cent over the same period. The proportion of funding from central government, local government and various overseas organisations was unchanged at 22 per cent.

2 HISTORY OF IP EXPLOITATION

2.1 Background

Liverpool has an IP portfolio which dates back to 1954. This is not a sign that the administration or the academic community took an active interest in seeking out and exploiting IP. It is more a record of individual researchers who recognised that their discoveries might be exploitable and felt they should inform the administration. Others may have recognised the potential of their work but not seen the need to involve the centre; they were under no legal obligation to do so. Academics who thought in terms of protection and exploitation were in the minority, however. Since the 1940s, Liverpool has tended to be a very "pure" University ⁽¹⁴⁾.

Prior to the late 1970s the administration did not regard the exploitation of IP as part of its remit. This was probably due in part at least to the attitude of the then Registrar ⁽¹⁵⁾. Academics who did come forward with potentially exploitable IP were inevitably told:

"... Dr. Bloggs, if you can do something, please do!"

Academics were free to exploit their discoveries themselves or arrange for an existing company to exploit them, as they saw fit. The only requirement was that those intending to found a business should notify the Outside Work Committee. If patent costs were incurred, upto the late 1970s they were not borne centrally. Inventors were obliged to try to find the money from Departmental budgets or, failing that, pay for it themselves. If the discovery generated an income, the administration expected the academics concerned to return sufficient money to the University to cover any outlay which had been made by the Department ⁽¹⁶⁾. Liverpool did not expect to make a profit on academics' exploitative efforts: the University's rights in the IP were unclear in law and at that time it contributed little or nothing to the exploitation process. Its role was usually limited to signing agreements on behalf of researchers if industrial partners were unwilling to deal with them as individuals.

2.2 Policy

Liverpool's first coherent policy on "hard" IP dates from 1977/78. It was triggered by two simultaneous events. Firstly, the newly-established Research Committee alerted the University to the possibility of generating an income from exploiting the IP which it now appeared to own, following the 1977 Patent Act. Secondly, the CVCP's 1977 report on IP arrived on the Registrar's desk. Liverpool did not set up working parties or invite consultation on the terms of its policy; it simply adopted the CVCP's recommendations wholesale.

2.3 Practice

Adopting this policy did not signal an immediate change in the administration's attitude to "hard" IP, nor that of most of the academic community:

"... there was no imperative to act on the revised position. Other things were still of a higher priority ..."

This changed abruptly in 1981, following the UGC's announcement of a sizeable cut in the University's recurrent grant. Members of the administration ...

"... raised their heads above the parapet and said - where else can we [raise] some money?"

It was then accepted that "hard" IP offered a long-term means of increasing the University's income. It was also recognised that it was important to be seen to be contributing to the nation's wealth. Liverpool had already started to market IP in its "softer" forms. In 1979/80 the University had appointed a new Assistant Registrar ⁽¹⁷⁾ whose remit was to capitalise on the University's resources and skills by bringing in new contract research and consultancy work. He was located in the Research Development Advisory Service (RDAS) and reported to the Academic Secretary, whose belief in the importance of good relations with industry was largely responsible for the new post being

created ⁽¹⁸⁾. As its name suggests, when it was originally established in 1977, RDAS was seen as an administrative service, supported from the Registrar's budget. The research development advisory function continued to be supported in this way, but the new industrial liaison function was largely funded by the Wolfson Foundation ⁽¹⁹⁾. Although it was part of the new Assistant Registrar's remit to generate an income, it was never proposed that this should become a self-financing activity.

The RDAS was not originally intended to handle "hard" IP. This was the (unofficial) responsibility of the HoD of the Department of Industrial Studies ⁽²⁰⁾. A co-founder of the University Directors of Industrial Liaison (UDIL), the university ILOs' umbrella organisation, he started giving advice to the Faculty of Engineering. Eventually, when academics from other Faculties notified the Academic Secretary of their discoveries, they were directed to talk to him. In practice, being located in the Faculty of Engineering, he did not proactively encourage the exploitation of IP originating in other Faculties:

"... The Faculty structure [led to] a series of independent empires, so that people in Science did not necessarily speak to anybody in Engineering, and vice versa ..."

When he retired from this position in the early 1980s, the administration recognised the value of providing advice centrally. The remit of the RDAS was extended accordingly, with the Assistant Registrar assuming responsibility for "hard" as well as "soft" IP.

2.4 Guidance

Despite having a policy on IP in its "harder" forms and a desire to benefit the University by exploiting such IP, Liverpool had little practical experience. Decisions regarding patent applications were taken initially by the forerunner of the Senior Management Team ⁽²¹⁾, based on material provided by the inventor, his HoD, the Assistant Registrar and the Chairman of the Research Committee. The Assistant Registrar tried to acquire skills which he did not initially have, attending courses on IP ownership, transferring ownership and licensing; he also became a member of the UK Licensing Executives Society (UK).

In the course of 1981/82 the Academic Secretary and a senior Pro-Vice-Chancellor paid visits to a number of UK universities, together with the new Assistant Registrar, who had become Liverpool's UDIL representative. They concentrated on the major civic universities:

"... The general view was [that] it was not appropriate for us to go and look at what Salford was doing because their situation and their subject mix was totally different from ours ..."

These visits led to the conclusion being drawn that universities operated in quite diverse ways, but without any noticeable difference in results. The new Assistant Registrar drafted a paper, "University Interaction with Industry", which made specific recommendations regarding tactics as well as overall strategy. These were accepted and subsequently endorsed by Senate.

2.5 Regulations and Documentation

Liverpool did not amend its Terms and Conditions of Service to explicitly incorporate a statement of the rights it was claiming in IP generated by members of the academic staff;

nor was this mentioned in its letter of appointment. The University felt that amending its Terms and Conditions of Service would require extensive negotiations and that the number of cases arising would not justify the likely aggravation.

Liverpool outlined the IP rights it felt it had and indicated its interest in exercising them in a revised edition of the Handbook for Academic & Academic-Related Staff (staff handbook). This first came into circulation in 1977/78. The underlying rationale and the University's policy *vis-a-vis* IP were explained in greater detail in a new Research Handbook, produced at the same time on behalf of the Research Committee. This incorporated the salient points of the CVCP's 1977 report. In 1981/82 the entry in the Research Handbook was updated by the new Assistant Registrar. He gave specific advice on the procedures which academics should follow if they thought they had discovered something potentially exploitable.

2.6 Structures

Having set up what amounted to a fledgling, in-house technology transfer division, in 1985 Liverpool set up a wholly-owned University company which had the potential to exploit IP - primarily "hard" but also "soft" - as opportunities arose. The idea was proposed by the then Academic Secretary, who felt there were a number of projects which might be exploited directly, yielding a greater income for the University than if they were exploited indirectly. Though the President of Council was sceptical ⁽²²⁾, the idea was supported by the new, Acting Vice-Chancellor ⁽²³⁾, an engineer:

"... We were being abjured by the government to be more entrepreneurial, so we thought we had better have a University company ..."

The University provided the company, University of Liverpool Technological & Research Applications Ltd (ULTRA), with capital of £0.25m from its private funds ⁽²⁴⁾. A lay officer was appointed as company chairman and a recruitment agency was used to headhunt a suitable CEO. The man subsequently appointed was a Liverpool graduate, a chemist with considerable entrepreneurial experience. Having identified around 15 suitable projects, he in turn appointed a marketing and a financial manager to help progress them. It was intended that ULTRA should act as a holding company and form subsidiaries as required. As an incentive to the academic community to participate wholeheartedly in the exploitation of their IP, the University eventually agreed they should be given a 49 per cent share of the equity in any subsidiary which was formed.

This was the situation in 1985 when the Kingman letter arrived. The administration had moved from disinterest in IP to an interest in identifying, protecting and exploiting it. Having established the RDAS in 1977 to promote "soft" IP, in the early 1980s its remit was extended to include the transfer of "hard" IP. Between 1954 and 1985 the University had acquired some half a dozen patents in its own name. A further 15-20 discoveries had been assigned to the NRDC/BTG and a handful to private or public companies. The NRDC/BTG had also rejected a number of suggestions, which the RDAS also chose not to pursue. On average the RDAS was handling half a dozen IP opportunities each year ⁽²⁵⁾. It was anticipated that in due course, once it started to operate, ULTRA would be able to exploit a dozen or more IP opportunities.

3 THE KINGMAN LETTER

Knowing that the BTG's monopoly was to be revoked, Liverpool had already guessed that universities themselves would be offered the opportunity to exploit IP arising out of Research Council projects. Liverpool's expectations were based on the view that if the BTG had not succeeded, no alternative central body was likely to do so, either. When the Kingman letter arrived, the University had no hesitation in accepting the offer. Liverpool saw it as a means to generate an income which had no strings attached to it, which might eventually help the University have more control over its own destiny. It was also seen as politically advisable, though following the appointment of the new Vice-Chancellor in 1985, there was a genuine and growing interest in technology transfer as a way for the University to help regenerate the local community.

Liverpool already had a detailed policy on IP, which had been publicised not long before. It was necessary only to extend the existing policy to include discoveries arising out of Research Council-funded projects and to ensure that practically, the University could meet the eleven criteria laid down by the Research Councils. The Assistant Registrar drafted the reply to the Kingman letter. Liverpool was among the first 33 universities and colleges whose reply was accepted, after further clarification, by the Exploitation Scrutiny Group. The letter of authorisation was sent on 23 July, 1986.

Liverpool's acceptance of the Research Councils' offer was not seen as controversial by the academic community - largely because "*it filtered in at a very low level of perception*". This was just one of a series of changes which the University was undergoing at the time. The Jarratt Report (CVCP, 1985) had been published only two months prior to the removal of the BTG's monopoly. Major changes which both preceded⁽²⁶⁾ and followed this were occupying people's attention. Even if this had not been the case, the idea that the University was effectively taking over from the BTG was unlikely to cause controversy:

"... We have never had a particularly strong interaction with the BTG. Our royalty income from the BTG is [about] £3 a year after tax! We had maybe 20 [items] registered [prior to] the transfer, but they didn't do anything with them.

"Most people hadn't really gathered what the BTG was. They had seen NRDC on the back of their SERC forms - if they bothered to read them. Except in one or two places, it had no profile at all ..."

For those few academics who had encountered the NRDC or the BTG, the experience was not particularly positive; their discoveries were not exploited. Some duly published their results, only to find the idea picked up and exploited by industry without any benefit to themselves or to the University.

4 CURRENT POLICY AND STRUCTURES

4.1 Structures

Largely at the initiative of the then Academic Secretary, in 1987 Liverpool decided to expand the RDAS. The Planning & Resources Committee agreed to establish a larger, integrated office which would handle both research, industrial liaison and IP. This was intended to achieve four principal objectives:

- * helping academics increase the level of external research funding, particularly from Research Councils, charities, industry and the EEC;
- * maximising the overhead income from external research funding;
- * maximising the University's exploitation of its IP;
- * raising the University's profile with industry, government Departments and the UGC in relation to its links with industry.

The new Office of Research Services & Industrial Liaison (ORSIL) started work at the beginning of 1988. In 1989/90 ORSIL was staffed by three full-time officers ⁽²⁷⁾ and three secretaries, compared to RDAS' one officer and two secretaries. One of the three officers is the Senior Assistant Registrar ⁽²⁸⁾ and the other is ORSIL's Director. Liverpool appointed as Director ⁽²⁹⁾ a long-standing member of the academic staff, previously Sub-Dean of the Science Faculty. The Director was appointed on grade 5, though by 1990 this had become equivalent in practice to a grade 6 appointment.

In 1989/90 ORSIL's reporting structure was fairly complex: the Director reported to the Academic Secretary regarding the research support aspect of the office's work, and to the Director of Finance, the senior academic and the senior lay officer regarding the EC, industrial liaison and IP matters. In some cases, he reported directly to the Registrar or the Vice-Chancellor. It was envisaged that if the Director and the Senior Assistant Registrar made good judgements, ORSIL should eventually become self-funding. There was, however, no formal requirement for the Office to achieve this by a target date.

Towards the end of the 1980s the University set up a Commercial Opportunities Group, known informally as "the Billington group", after John Billington, a member of Liverpool's Council. After expressing concern at a Council meeting about whether Liverpool should be setting up campus companies, he was requested by the President of Council to set up an informal group to advise the University. In 1989/90 the Commercial Opportunities Group consisted of John Billington himself, the local manager of 3i and the former, Acting Vice-Chancellor. Effectively, its role was to vet commercial propositions which were put to the University and indicate whether the University should support them - financially or in any other way.

4.2 Rationale

Despite the size of the University, in 1989/90 ORSIL did not have a dedicated IP officer. Ideally, it would have liked to have an officer who could concentrate on proactively seeking out IP, but felt that financial constraints made this unlikely for the foreseeable future, particularly as handling IP is not ORSIL'S primary objective ⁽³⁰⁾:

"... [We] recognise that in global University terms, (a) it is a very long-term investment, (b) it's a very risky investment and (c) the University has much more pressing needs on its purse ..."

Financial considerations certainly play a part in Liverpool's rationale *vis-a-vis* IP, but from the Academic Secretary's perspective it is less a question of competing constituencies than of limited expectations *vis-a-vis* IP:

"... The danger is that, in imagining there may be [a] very large [amount of] IP across the University and setting up all sorts of hares running to identify and secure these, when it comes to the crunch there are very few really important exploitable ideas ..."

In his view, the identification and exploitation of IP is a "relatively minor" activity, seen in the context of all the University's other activities ⁽³¹⁾. In fact, there has been a significant increase in the amount of IP which the RDAS and ORSIL have had to evaluate, protect and exploit since 1985. This is due largely to the increase in the proportion of research funding provided by industry in the intervening years. ORSIL believes there is potential for Research Council-funded projects to generate exploitable IP, but that it will take a considerable amount of time and resources to identify, evaluate and realise. There may be less potential than the government or the Research Councils imagine, however:

"... by sending [proposals] out to general peer review, if it is academics who are doing the peer review, then exploitation is not going to be a prime consideration. It is still going to be the science ..."

4.3 Regulations and Documentation

The University's claims, policy and procedures relating to IP are documented exclusively in the staff handbook. This states the University's claim to ownership of "all the results of research which has been supported by the University", including notes and specimens ⁽³²⁾. Members of staff are required to seek the University's permission before making use of their research results in any way, including publication ⁽³³⁾. Permission to exploit research results intellectually is generally given by the principal investigator and/or the HoD after they have checked the terms of the grant/contract with ORSIL. Permission to exploit commercially is granted exclusively by ORSIL.

The staff handbook indicates that the University is "keen to see that all inventions and discoveries which are capable of commercial exploitation are suitably protected, for example, by patent" ⁽³⁴⁾. It is made clear that commercially exploitable IP could also take the form of computer software or know-how. The staff handbook explains that the University has rights in IP arising out of projects funded by the Research Councils and most of the major charities, as well as projects which the University itself has funded. It adds that where industry sponsors contract research, the costs of patenting are normally borne by the companies concerned.

The staff handbook goes on to outline in detail the procedure - agreed with Liverpool AUT - which staff and students should follow if they believe they have discovered something commercially exploitable. ORSIL recognises that neither the staff handbook nor the Research Handbook give sufficient information on the dangers of disclosure, nor, indeed, on what constitutes "disclosure". It is likely that information of this sort will be assembled at some time in the future in a document which will outline in greater detail policy and practice *vis-a-vis* patenting.

Finally, the staff handbook discusses ways in which IP might be exploited, the minimum contribution towards the exploitation process which members of staff are expected to make and the compensation they might receive as a result. It specifies that the University will give "a fair share" of any resulting income with the researcher, after direct costs have been covered. Nine criteria are listed which will be taken into account to determine what

constitutes "a fair share" ⁽³⁵⁾.

Liverpool has still not amended its Terms and Conditions of Service, for the reasons outlined in section 2.5 above. It still bases its claims on the 1977 Patent Act, bolstered by a collective agreement with the local AUT. As the local AUT sees it, this is quite in keeping with a more general policy: the University issues short contracts which specify the absolute minimum and it tends to rely on updates of the staff handbook and on the AUT to communicate agreements of all sorts - including pay increases - to its members, rather than communicating them centrally to all members of staff or revising the Terms and Conditions of Service.

4.4 Incentives

The administration recognises the need to counteract an institutional ethos which has not encouraged academics to think in terms of the commercial potential of their research findings. It has introduced two incentives.

(i) Financial

In keeping with the terms of the 1977 Patent Act, academics at Liverpool receive no personal financial reward for bringing potentially exploitable IP to ORSIL's attention. They are rewarded only if the IP is successfully and profitably commercialised - and they may have some say in how it is commercialised. Despite the cautious terms in which the staff handbook outlines the income split, in practice, the University usually splits the revenue from IP on a 50:50 basis with the researcher(s) concerned. This is "*not written in tablets of stone*", but where ORSIL has taken on most or all of the burden of arranging the exploitation process, this division has usually been agreed in practice.

Liverpool has also provided an incentive for HoDs to encourage members of their Department to flag IP. The residue of the income is split evenly between the University centrally and the Department. It is upto the HoD how such income is spent. At the moment, this is largely a hypothetical incentive, since none of Liverpool's IP has yet generated a significant income. It is, moreover, less strong an incentive than a Department's share of overheads on research grants/contracts ⁽³⁶⁾.

(ii) Career Progression

By the mid-1980s, the number of academics doing contract research and consultancy for industry/commerce had grown considerably. Many of these were unable to publish their research output owing to restrictions imposed by the sponsors, or, at best, able only to point to patents in which they were the named inventor. Discussion of this problem led to general agreement that such people should not be penalised by the promotion system ⁽³⁷⁾. ORSIL believes that the problem has now been overcome:

"... A guy with no academic papers but fourteen patents stands as good a chance as somebody with fourteen academic papers and no patents ..."

If this is a genuine change, it has certainly not been explicitly documented. The criteria for promotion make no reference to IP of any sort, or to license arrangements, collaboration with ULTRA or spin-off companies. Promotion from Lecturer A to Lecturer B indicates simply that applicants should have "*performed satisfactorily the teaching and*

other professional and departmental duties allocated ... and [have] a satisfactory level of research activity" ⁽³⁸⁾. Criteria for the award of discretionary points on the Lecturer B scale indicate that applicants should demonstrate "*competent performance*" in two of the following areas, in one of which there should be evidence of "*a major contribution*":

- * administration/management;
- * teaching;
- * involvement with appropriate outside organisations;
- * research.

The document ⁽³⁹⁾ adds that research activity should be demonstrated by refereed publications or work within professional organisations. It also indicates that involvement with appropriate outside organisations should have led to a major contribution to the academic area concerned or "*to the well-being or reputation of the University*". It is not clear whether full patents count as refereed publications, or whether entrepreneurial involvement in the exploitation of that patent would count as a major contribution to the well-being or reputation of the University. Criteria for promotion to Senior Lecturer are even less explicit. They are "*concerned with excellence in teaching, research and administration and, more recently, with professional distinction and related matters*". Applicants should support their claim by "*published evidence such as book reviews, citations and similar material*"; moreover, "*particular recognition will be given to external awards and other forms of external recognition*" ⁽⁴⁰⁾. Again, it is not clear where patents or IP of other sorts figure in this list.

4.5 Sanctions

If academics inadvertently disclose exploitable IP, there is no sanction which Liverpool could apply, nor would it wish to devise one, even if the IP concerned might have yielded a considerable income. If ORSIL discovered that individual academics were deliberately withholding information about exploitable discoveries due to an "open publication" philosophy, it would point out fairly forcefully that universities are funded less and less from the public purse:

"... We have to look after ourselves and if, by giving this away, [a researcher] has lost us the opportunity to save so many jobs, well, that's on his conscience ..."

Academics who withhold information with a view to exploiting their discoveries themselves are a different matter. ORSIL knows from experience that this sometimes happens and that it will only find out by chance ⁽⁴¹⁾ - perhaps by virtue of "*the Rolls in the car park*". ORSIL's response is invariably pragmatic, determined in this case by the financial implications:

"... The bigger the £ sign, the more energy ..."

ORSIL would try to persuade the researcher concerned to retrospectively assign his property to the University. If persuasion failed and it was worth it, ORSIL would consider taking legal action. It would be upto the appropriate section of the administration to decide whether this should be accompanied by disciplinary procedures, on the basis that the person concerned had breached the terms of a collective agreement. ORSIL regards these procedures as "*fairly toothless*"; it is unlikely to involve more than an interview with the Vice-Chancellor, unless the University was prepared to institute "good cause"

proceedings. This might not be the sensible solution:

"... If at the same time as feathering his own nest he was a brilliant academic with a world-wide reputation, would we want to?"

ORSIL would adopt the same pragmatic stance towards academics who wished to challenge the University's presumed ownership of IP which they had generated:

"... If Dr. Bloggs firmly believed he was the sole owner of this thing and it [had] nothing to do with the University and if it's going to make him a few £, we might say - well, we reserve our position but we're not going to fight about it.

"On the other hand, if he had come up with nuclear magnetic resonance, for instance, we would say - we'll get our lawyers onto you and you can get yours and we'll fight it out ..."

5 THE EXPLOITATION PROCESS

5.1 Interpretation of Government Statements

Sir Keith Joseph's statement - in which the Secretary of State expressed the hope that universities would encourage academics to exploit their discoveries themselves and give help and guidance to those who wished to do so - was not greatly at odds with Liverpool's approach to exploiting IP at the time. As an institution, Liverpool was in the process of embracing the enterprise culture, partly for its own benefit, partly for the benefit of the surrounding community. Through ULTRA it was in the process of providing a framework within which entrepreneurial academics could function without having to take all the risks and acquire all the necessary skills. By allocating them a 49 per cent share of the equity in any companies which were formed, Liverpool was trying to provide an incentive for academics not just to "flag" IP but also to get involved in exploiting it entrepreneurially. In the intervening years, however, Liverpool has come to view the government's hopes as unrealistic.

5.2 Identification

When agreeing to establish ORSIL, the Planning & Resources Committee noted that in order to achieve its objectives, ORSIL would have to "*persuade the academic staff of the need to exploit the University's IP*" ⁽⁴²⁾. In saying this, the Committee recognised that institutional ethos has encouraged researchers at Liverpool to focus on exploiting their research results intellectually and to neglect thoughts of how they might be exploited commercially. There are signs that the ethos has changed in the course of the 1980s, though perhaps less than in many other institutions over the same period ⁽⁴³⁾. Nonetheless, persuading the academic community of the value of commercially exploiting IP is vital, given that ORSIL has to rely heavily on academics themselves bringing their discoveries to its attention:

"... One of the problems we face is the fact that there is a clear statement [of policy] ... but there is nobody to see that it is implemented. We don't actually have the resources to go around each Department and say - right, what have you got that might be inventive?"

"... We have to rely on people actually coming forward ..."

Confronted by a ratio of two officers to over 1,200 academics, ORSIL devised a number of tactics for raising and maintaining awareness of IP, particularly IP arising out of Research Council-funded projects, since it was anxious not to lose its newly-acquired rights ⁽⁴⁴⁾. When the University received its letter of authorisation in 1986, the RDAS informed every member of staff in the Faculties of Science, Engineering, Medicine and Veterinary Science by letter; it also sent a letter to the designated Research Correspondent in every other Department, with a request to circulate it. It did not immediately use the University newsletter, "Precinct", to tell the academic community that the University had effectively taken over from the BTG:

"... [Precinct] is not an organ for disseminating policy or even information of that sort. It is much more concerned with newsy academic issues ..."

However, towards the end of a special issue of the newsletter devoted to "*Resources and Research*", dated June 1987, a section headed "*Exploitation of Research Council Inventions*" detailed the removal of the NRDC's (*sic*) right of first refusal and the University's authorisation to assume ownership of and responsibility for the exploitation of "*inventions or commercially valuable results*" arising out of Research Council-funded projects.

From January 1990, this information was included in the staff handbook which stated clearly that the rights in any commercially applicable results of research funded by the Research Councils and many, but not all, of the major charities, were vested in the University. Prior to this, ORSIL reminded HoDs by means of a yearly memorandum to each Department, soliciting information which forms the basis of the University's annual return to the Research Councils. This is a practice which ORSIL plans to continue, even if the Scrutiny Group decides it no longer requires a detailed annual return.

ORSIL has devised a number of tactics for reminding the academic community about IP in general, however it was funded. Some are written reminders, others involve face to face contact. Some are produced in-house, others involve publications or expertise brought in from outside. Some are already being implemented, others are due to be implemented shortly. ORSIL reportedly prides itself on attention to detail. When the BTG circulated its pamphlet on patents ⁽⁴⁵⁾ to selected members of staff, for instance, ORSIL obtained extra copies and circulated them to those who had not received them directly. ORSIL has made formal presentations on IP as part of the staff development programme and at the induction course for new members of staff; however, neither are compulsory ⁽⁴⁶⁾. There are plans to produce a twice-yearly, dedicated, 2-4 page research supplement to the University newsletter which would also cover IP ⁽⁴⁷⁾. It is also proposed to stage a series of open seminars on IP in 1990/91, perhaps with invited speakers ⁽⁴⁸⁾. This is liable to be repeated fairly regularly, since ORSIL knows from experience that it is difficult enough to get academics to grasp what constitutes "disclosure", let alone to retain that understanding ⁽⁴⁹⁾.

ORSIL feels it is important to tackle the problem at different organisational levels, since levels of awareness vary considerably from one Department to another. This can be a function of size:

"... If you have a small Department of, say, ten people and five or six are fairly active, then the other four will know about it ..."

It can also be a function of ethos. This is less problematical now that HoDs are appointed for a fixed period of 3 or 5 years ⁽⁵⁰⁾, but the attitude of the HoD can still have an affect, as ORSIL knows from experience ⁽⁵¹⁾:

"... if the HoD is agin it, then it is that much harder. It is more likely to deter the staff in what I would regard as the second wave, not the key types, the entrepreneurs ..."

ORSIL tries to send an officer to attend Faculty meetings or local research committee meetings since these provide a platform for a less formal reminder about the importance of exploiting IP. In future, ORSIL plans to target groups of academics by status (HoDs, Research Correspondents, research group leaders, principal investigators *etc*) and by subject grouping (medics, engineers *etc*). ORSIL hopes that these combined tactics will raise and maintain a general awareness of IP in a reasonable proportion of the academic staff.

Discovering what individual members of staff are doing is more problematical. ORSIL takes every opportunity it can to mix with staff. Meetings tend to take place in Departments rather than in its own offices, for instance, and ORSIL tries to meet people who visit the University from relevant outside organisations, since this also provides an opportunity to meet members of Liverpool's staff and learn what they are doing. In theory, ORSIL could overcome some of the problems created by its staff shortage through devolving to existing local structures the responsibility for proactively seeking out IP. In 1986, for instance, each Faculty set up an in-house research committee at the request of the (university-wide) Research Sub-Committee ⁽⁵²⁾. Although the Research Sub-Committee periodically refers matters for comment, essentially these in-house research committees operate independently. This makes it difficult for ORSIL to devolve responsibility:

"... If we suggested it, it would have to come via the Academic Committee, and I think the Academic Committee has a number of other bridges to build before it would consider this particular activity ..." ⁽⁵³⁾

In an effort to reduce the risk inherent in relying on academics to flag their research discoveries, ORSIL tries to scrutinise research reports at the interim or final report stage, consciously following the example of Duke University in the United States:

"... they've got a team of about ten people who read all the proposals. If we could, it would be very nice ... but if you're going to [do] this, you've got to have somebody who appreciates reasonably well what they are reading ..."

Given its staffing level, ORSIL manages to scrutinise no more than a quarter of the research reports which the University generates each year, capitalising on the two officers' expertise in chemistry and electrical engineering. In the past, this was a less time-consuming procedure because the University's annual research report gave a two-page

summary of each Department's activities; this has recently been reduced to a list of publications. Since it is part of ORSIL's remit to "*overcome organisational or institutional obstacles*" ⁽⁵⁴⁾ to identifying and exploiting IP, it plans to step into the breach by producing an annual report on the commercial activities of each Department. The report will cover "hard" and "soft" IP, however its discovery was funded.

ORSIL would like to be able to ask academics to submit drafts of papers for scrutiny before submitting them to journals. Practically, it recognises that this is out of the question, partly due to staff shortages and partly because it is quite foreign to the ethos of the institution:

"... It would smack of a limitation of academic freedom ..."

In 1989/90 ORSIL had not yet brought in outside organisations to trawl for IP, apart from the BTG which continued to pay visits every six months or so. ORSIL also established a relationship with 3i Research Exploitation Ltd, formerly the Research Corporation; however, this agency preferred to be brought in to do a comprehensive technical audit which ORSIL did not feel the University could afford ⁽⁵⁵⁾. ORSIL was also considering developing a relationship with DTE. Liverpool has learned from experience that so far, it has only managed to scratch the surface when it comes to discovering IP which is exploitable ⁽⁵⁶⁾.

5.3 Evaluation

Where potentially patentable IP is concerned, ORSIL first tries to establish whether the discovery is likely to embody an inventive step. In making this judgement, it relies largely on the inventor(s) and informal advice from a patent agent.

For all types of IP, ORSIL's main concern is to try to get some idea of its market value. Initially it tries to do this by speaking to the relevant HoD; since few of Liverpool's HoDs have worked in industry, however, they may not have the necessary knowledge. The University has links with local industry and with the City, partly through former members of staff ⁽⁵⁷⁾ and partly through contract research/consultancy which has had a successful outcome. ORSIL sometimes approaches contacts like these for an initial assessment, in confidence. It might also approach the Director of the Merseyside Innovation Centre, the University's equivalent of a science park. If none of these sources has the relevant knowledge, ORSIL feels its options are limited. Venture capitalists require a product to be fairly well defined before they will give an opinion. In ORSIL's view, it is risky to make a discovery known to industry at such an early stage, since it may not be possible to protect it adequately. The north west of England does not have the kind of public sector agencies which operate in Scotland and the north east of England and which can evaluate discoveries. ORSIL feels that unless the IP has been protected, it is unwise to commission a private sector evaluation, despite the expertise which is undoubtedly available:

"... What you really want to find is an organisation which can, in secrecy, look your idea and give you an honest opinion as to whether or not it is valuable - and you can do that in complete safety. That limits the organisations dramatically. It comes down, in fact, to the BTG, the Research Corporation and DTE ..."

As a result, in 1988/89 ORSIL asked BTG to evaluate around 14 discoveries, almost half the IP identified during that period. In the other cases, where the IP was not previously obligated and was patentable, ORSIL tended to file an initial registration -in order to be free to talk to industry and commission private sector evaluations, if these were felt to be justified.

5.4 Protection

(i) Philosophy

As the staff handbook indicates, Liverpool is interested in protecting exploitable IP. If IP is not obligated to a sponsor ⁽⁵⁸⁾, this may mean acquiring patent protection or, in some cases, treating it as secret know-how. In principle, ORSIL prefers to acquire patent protection, where possible:

"... If a patent has been granted, then you have something tangible to sell ... You have got something that is invented ..."

However, if a company wishing to exploit a given discovery were against patenting, ORSIL would agree not to proceed with a full patent application, provided certain conditions were met:

"... The University will never accept complete secrecy ... It will always insist on the right to publish and the right of access to theses, though we are quite happy to accept a time-limit. There can be secrecy for a year or two ..."

If the researchers concerned agree, ORSIL is prepared to protect their discovery by assigning the IP to an industrial partner, rather than retaining ownership. ORSIL does not regard retaining ownership as vital, provided the agreement is carefully written:

"... Whether we assign or license? In most cases the license is exclusive, so to all intents and purposes, it is the same as an assignment ..."

"Even in an assignment, it will be subject to some sort of control. It's not an absolute right - [not] here you are, end of story ..."

IP may be assigned to an industrial partner, but it is increasingly being assigned to the BTG or a similar organisation ⁽⁵⁹⁾:

"... The majority [of academics] prefers us to follow the BTG-type route. They don't want to be that much involved. It's too much hassle. They want to get on with their research."

"Yes, it would be nice to pick up a few £ at the end of the day ... But the majority don't want to be involved at the company level ..."

(ii) Finance

Liverpool is willing to support a fairly speculative and wide-ranging programme of initial registrations. This means that if ORSIL believes it is not worth protecting a discovery, but the researcher is adamant that it is, an initial registration will probably be made:

"... I'm happy to miss the £300-£500. I'd rather risk it, run it for a year and see if anything comes of it than scrap it now ..."

On the other hand, ORSIL may simply cover the cost of the researcher registering the discovery himself ⁽⁶⁰⁾.

Where full applications are concerned, ORSIL is far more cautious. It would be unusual to proceed to a full application unless there were strong indications that a company was interested in exploiting a discovery, or that it was unusually promising. To a certain extent, the decision depends on the technology concerned. If is biotechnology, the University recognises that it might have to wait 15-20 years for a return and that the patenting procedure is unlikely to be smooth:

"... In biotechnology, you are constantly fighting objections. There aren't enough examiners and it is so easy to raise objections ... You have to be prepared for a long, hard battle ..."

ORSIL itself has the authority to decide whether or not to proceed to a full application, whereas the RDAS did not; if in doubt, it seeks the view of the Senior Management Team. ORSIL usually applies initially for a UK patent. This might be followed by individual national patents in the countries suggested by the patent agent, taking into account potential markets. ORSIL generally avoids using the European Patent Convention or the Patent Co-Operation Treaty, because of the cost. Moreover, overseas applications are filed only if the IP looks very promising:

"... The University still takes the view that in most cases, it should not itself undertake a major overseas patent filing programme, because of the expense ..."

ORSIL believes that in 1988/89 it spent between £70,000 and £80,000 per year ⁽⁶¹⁾ on all the direct costs associated with patenting. This includes initial registrations, full applications, renewal fees ⁽⁶²⁾ and employing a patent agent:

"... We have always taken the view that it is appropriate and good practice to use a chartered patent agent. This office has never written and filed its own patents, simply because experience at other places and advice from the BTG and so on has shown that they do actually earn their [fee] ..."

The University's patents bill has occasioned frequent comment from the Director of Finance as well as a question from the President of Council. The IP protected to date is unlikely to generate a significant royalty stream for some years. In the short-term, ORSIL would "defend vigorously" the need to spend at this rate, pointing out that it makes every effort to offload ongoing costs onto licensees.

(iii) Practicalities

Once they have flagged their discoveries, academics contribute relatively little to the process of protecting their IP. They may be able to influence the decision about whether to protect it - and how. Beyond that, their contribution is generally limited to providing a short description of their discovery, which the patent agent uses as a basis for discussion prior to writing the patent specification. Occasionally, academics choose to help draft the specification.

In theory, since the University claims ownership of all research results, the final right of decision in a publish/patent conflict situation rests with the University. This is indicated in the staff handbook ⁽⁶³⁾. However, it has never been tested in practice:

"... We have had no real clashes [regarding] exploitation [versus] publication. We explain to the people what has to be done and the majority accepts it quite happily ..."

ORSIL does not agree with UDIL's proposal that academics should be asked to withhold publication for up to five years (UDIL, 1988). However, it recognises the dangers of patenting too early. ORSIL generally asks academics to delay publication for around a year, on average. ORSIL believes that in many cases, academics are unlikely to want to publish their findings because they are too specific or too trivial to gain them any kudos. There could be cases, of course, where there is a strong incentive to publish - and to publish soon. It is not clear what might happen in practice if, once an academic had flagged his discovery, there were a conflict between his desire to disclose it and ORSIL's desire for a delay in order to protect it. ORSIL would probably ask the Senior Management Team to arbitrate. In normal circumstances, ORSIL itself decides whether to file an initial registration in the UK, following advice from a patent agent; unlike the RDAS, ORSIL is not obliged to seek permission from the Senior Management Team.

(iv) Ownership

Prior to 1977/78, academics themselves decided in whose name to vest patents. Some vested patents in their own name, others in the name of their Department, and others still in the University's name. In some cases they made joint vestments. Since 1977/78, patents have been vested solely in the University's name, despite the fact that the policy laid down in the staff handbook indicates that patents will be jointly owned by the University and the academic(s) who generated the IP.

If the University does not wish to participate in the exploitation of a discovery, the staff handbook states that "*the benefit of it shall belong as between him/her and the University exclusively to the member of staff*". This is not something which has happened since the late 1970s ⁽⁶⁴⁾, however, and is unlikely to happen in future. In general, ORSIL prefers to retain ownership of such IP. Even if it did waive/assign its rights in favour of the inventor(s), Liverpool would retain a small financial interest to cover the cost of the resources which the University contributed towards the discovery.

5.5 Commercialisation

Where it retains ownership of its IP, Liverpool has no **principled** objection to exploiting it via licensing to a third party, a University company, a joint venture ⁽⁶⁵⁾ or an independent academic spin-off company. In practice, little of Liverpool's IP has been exploited by the more entrepreneurial of these routes.

(i) University Companies

Due to unforeseen difficulties ⁽⁶⁶⁾, ULTRA managed to exploit only two or three of the 15 or so projects originally identified. Although ULTRA was intended to act as a holding company, forming subsidiaries as required, in practice this did not happen. ULTRA set up only two companies; one of these has been spun-off ⁽⁶⁷⁾ and the future of the other remains

to be determined ⁽⁶⁸⁾. Instead, ULTRA itself started to market products in two main areas ⁽⁶⁹⁾. This limited product range was a consequence, ULTRA's second Managing Director ⁽⁷⁰⁾ felt, of the essentially non-entrepreneurial character of Liverpool's academics. In his view, it was significant that one of ULTRA's product ranges arose out of the entrepreneurial inclinations of a technician, rather than a member of the academic staff. In ORSIL's view, academics did not regard what ULTRA had to offer as a good deal. For a variety of reasons, ULTRA was wound up in the 1989/90 session.

The University has decided instead to form separate companies to exploit specific opportunities as they emerge. So far, two such companies have been founded, both resulting from the entrepreneurial activities of non-academic, rather than academic staff ⁽⁷¹⁾.

(ii) Joint Ventures

As yet, Liverpool has not participated in joint ventures with members of the academic staff to exploit "hard" IP. The University is not against the idea in principle but, partly on the advice of the Commercial Opportunities Group, it has been extremely cautious to date. In ORSIL's view, the University's attitude to risk inhibits it from being very entrepreneurial:

"... The University ... does not take risks. That is a clear policy. It is not in the business of taking risks. We are not a commercial organisation. If you want a personal view on whether that restricts us, the answer is yes. My view is that we ought to take some risks. I have a more enterprising - or perhaps entrepreneurial - attitude. I fully accept the [University's] reasons, though. It has the ultimate responsibility, so [its] caution will be greater ..."

(iii) Independent Academic Spin-Off Companies

Liverpool has not reneged on its commitment to support entrepreneurial academics, but ORSIL does not encourage them. In the section of the staff handbook dealing with exploitation routes, there is no mention of academic spin-off companies. ORSIL is not against academic entrepreneurship *per se*, but it believes that there are very few academics who could found viable "hard" companies:

"... There are ... very few individuals who would actually have sufficient entrepreneurial skills that we would be happy to say - ok, go and do your own thing. Just keep us informed and send us a cheque. Most of them would actually be grateful for the sort of experience and assistance we can give.

"Of those whom we deal with, a high percentage have a very hazy perception of patenting, licensing, exploitation -what it means, how you do it, the practicalities ..."

As indicated in the staff handbook, ORSIL has the final right of decision as to how a discovery is exploited ⁽⁷²⁾. This is a right which it tries to exercise subtly, however. Ostensibly the decision is made in consultation with the researchers concerned, but ORSIL lobbies fairly efficiently to get them to appreciate why, in the main, assigning or licensing their discovery to an existing company is likely to yield greater returns for less trouble. If a researcher persists in wanting to set up a company, ORSIL makes an *ad hoc* judgement.

It tries to weigh the pros and cons - the academic's enthusiasm *versus* his perceived ability and the difference in the likely income to the University from the academic's as opposed to ORSIL's preferred route. Because it is a relatively new organisation and is anxious to have "*satisfied customers*", ORSIL believes it is sometimes worthwhile agreeing to arrangements which will yield a lower financial return than might otherwise be obtained. This has already happened on at least one occasion:

"... [Professor X] can come up with sensible deals. At times, we could do better, but it's the way he operates.

"... He does not like us becoming too involved. With people like him, we stand back and say - look, we are here if you want to use us ... He'd resent [any other approach] ..."

ORSIL also tries to take into account the contribution each route might make to local economic development:

"... The University as an institution is committed to community assistance. If we've got a guy who wants to set up a company from which he will benefit [as] the only employee, then we regard that in rather a different light to the guy who is going out and setting up a company which will employ ten people ..."

This is seldom easy to gauge. ORSIL recognises that companies can do a great deal worse - or better - than their business plans projected. If in doubt, ORSIL refers the problem to the Senior Management Team or to the Commercial Opportunities Group.

In practice, few academics approach ORSIL wanting to found independent spin-off companies. It is not clear whether ORSIL's reluctance deters people, or whether they are simply not interested in the first place. ORSIL itself believes the latter is the case, but concedes this may be a false impression:

"... The truly entrepreneurial ones may well be doing their own thing and we may never know!"

ULTRA's second Managing Director believed there was evidence to suggest that there is some degree of "black market" activity. Moreover, quite a few of Liverpool's academics have submitted entries to the Academic Enterprise Competition ⁽⁷³⁾. Although ORSIL distributes the entry forms for this and similar competitions, academics do not require the University's permission to enter and none have approached ORSIL for help drafting their entries. ORSIL was aware of only one entry - because it won third prize ⁽⁷⁴⁾.

(iv) Licensing

Most of Liverpool's IP is exploited via licensing or assigning. Liverpool's academics play a part in this process by helping to identify potential licensees. ORSIL invariably starts with academics' suggestions before moving onto other companies with which the University has a connection ⁽⁷⁵⁾ or tapping local databases ⁽⁷⁶⁾. Since ORSIL recognises the value of personal contacts, it is often the academic who makes the initial approach to a company. However, academics play only a supportive role in the actual license negotiations, which are conducted by the Senior Assistant Registrar, since he is a member of the UK Licensing Executives Society. Liverpool is prepared to grant exclusive licenses

with worldwide rights:

"... We don't have the effort to go out and look for multiple licensees. If we find one company which seems prepared to do a reasonable job, then it gets it - away you go, subject to some sort of provision of either minimum royalties or a return in the event of non-exploitation within a minimum time ..."

Liverpool also allows licensees to choose the companies which they sub-license to - provided the University is guaranteed a reasonable percentage of the resulting income.

Once a deal has been struck, the academic's role is liable to be limited to consultancy or further contract research:

"... In general our outside partners would not want our staff involved [commercially] ... They feel, quite fairly I think, that the majority of academics have no experience in this field ..."

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy

Liverpool claims not to have a formal policy *vis-a-vis* academic entrepreneurship. It is an issue which has never been formally discussed. ORSIL does not believe there would be any virtue in formulating an official policy, since this might be unnecessarily limiting:

"... We are [dealing with] a lot of talented individuals who have a wide variety of ideas. We want to be as flexible as possible with them ..."

Custom and practice suggest, however, that certain types of academic entrepreneurship are more positively regarded than others. A few academics have channelled their entrepreneurial energies into projects within the University system, by setting up commercially-oriented units, institutes or centres ⁽⁷⁷⁾. The first of these ⁽⁷⁸⁾, dating from 1974, benefitted the academics who participated in it through increased opportunities for consultancy work. It also benefitted the University centrally, in so far as academics were obliged to pay a percentage of their earnings to the University. However, the Department in which it was located felt it did not benefit financially: the profits were all ploughed back into expanding the unit itself. The unit in question has now been forcibly spun-off as a private company ⁽⁷⁹⁾. Academics founding such units nowadays are required to adhere to strict accounting procedures and operate with a small management committee which reports to a board of directors. The University is open to the idea of supporting such projects from its private funds and has actually done so ⁽⁸⁰⁾, though some requests have been rejected following advice from the recently-formed Commercial Opportunities Group.

Two groups of academics from two different Departments tried to take advantage of the framework provided by ULTRA. This was not entirely successful. One company has been spun-off as an independent company (see ⁽⁶⁷⁾) and one of the academics from the other group has since left the University to devote his time to running completely independent spin-off companies which he has either set up or taken over.

Several academics opted to operate outside the University and its company from the beginning, founding completely independent companies to exploit expertise and/or products. The University benefits financially from the entrepreneurial activities of those who are still employed as academics. Academics are required to seek permission from the Outside Work Committee ⁽⁸¹⁾ to set up companies. Permission is granted, subject to the would-be entrepreneur giving the University the right to examine the company's accounts. Those running "soft", R&D-based companies are obliged to pay 15 per cent of their annual profits to the University and to show their accounts, if required. In principle, "hard" companies wholly-owned by members of the academic staff are also expected to pay 15 per cent of their annual profits to the University - though ORSIL recognises that it could be counter-effective to prevent the company from reinvesting that profit in the business. Academics who participate in "hard" companies with outsiders are expected to pay 25 per cent of any director's fees, royalties, dividends *etc* they receive to the University, in the same way that anyone doing consultancy must pay this percentage to the University. Both of these types of academic entrepreneurship are seen as benefitting the University in non-financial ways, too.

A few of Liverpool's academics have become involved in businesses which are not connected with their University work ⁽⁸²⁾. This is viewed less positively. Often, since the business is registered in the spouse's name, the academic concerned has not sought permission and in at least one case, the extra responsibility has had a detrimental affect on the academic's work for the University ⁽⁸³⁾.

ORSIL believes that researchers who try to combine the role of academic with the role of entrepreneur are liable to do justice to neither:

"... Members of staff who are still here in their tenured posts do not, in general, fit into a company structure very well. They don't have the appetite ... To be successful in business [you] must be hungry. You're unlikely to be hungry if you are in an established job. There is a limit to how much time you can give to your company. If you are running your company [well], then one would query why you still have your University job ..."

As far as ORSIL knows, none of Liverpool's academic entrepreneurs has left to pursue a full-time career in business, other than one who took voluntary advantage of the early retirement scheme which operated during the late 1980s. It knows of only one who opted for a part-time contract. ORSIL knows of half a dozen or so academics who have founded independent companies to exploit "soft" IP in the form of expertise. It has a more positive view of these academics' chances of running a viable company and doing their job.

6.2 Making Time

Even though ORSIL has the power to grant or withhold permission for researchers to exploit "hard" IP entrepreneurially, if it does grant permission, it has no control over the amount of time which they can devote to the enterprise. If academics felt they needed more than evenings, weekends and the day a week consultancy time which is usual at Liverpool ⁽⁸⁴⁾, they would have to negotiate with their HoD. In fact, if they wanted a constant day per week, this might also be a matter to discuss with their HoD. A request to devote time to an independent spin-off company would not necessarily be sympathetically received, ORSIL believes:

"... [We] can think of many Departments [which] would be sympathetic ... and many which wouldn't be, where the HoD would be worried that the other staff would very much be against that member of staff. They would see it as going off, earning money at their expense, because they [were] having to cover ..."

Moreover, ORSIL is aware that some HoDs have been frustrated by what they see as an over-commitment on the part of some academics to outside activities. Academics trying to set up a joint venture with the University via ULTRA ran the risk of being viewed in the same light. ORSIL believes that if ULTRA had progressed as planned, their entrepreneurial efforts might have come to be seen as a *bona fide* University activity, but this did not happen.

There are three types of leave of absence at Liverpool: study leave, special leave of absence and leave for *ad hoc* purposes. The staff handbook indicates that study leave of a term or more is for "*research or other approved academic purposes*". Special leave is generally for a shorter period and is designed to allow staff to attend courses/conferences "*or similar meetings connected with their work or the advancement of knowledge in their subject*". There is no guidance as to the kind of *ad hoc* purposes for which leave of absence might be granted ⁽⁸⁵⁾. ORSIL suspects that a request for leave of absence in order to set up a company would be viewed sympathetically by the Leave of Absence Committee ⁽⁸⁶⁾ which, unusually, includes a number of lay members as well as University officers; ORSIL is unsure because the situation has never arisen. At present, Liverpool has no mechanism for granting leave for *ad hoc* purposes on full pay. The staff handbook makes no mention of part-time contracts; however, there is a precedent where company start-up is concerned.

Applicants for leave of absence must have the support of their HoD and must indicate to the Committee how their academic commitments will be covered and whether any substitute or extra help will be needed by their Department. In reaching its decision, the Committee takes account of any success applicants may have had in obtaining financial support, either in whole or in part, for the period of their leave.

Liverpool has no policy governing the pension contributions of academics taking leave of absence. Custom and practice suggests that for the twelve months, would-be academic entrepreneurs would probably be expected to pay the employee's contribution themselves. They might also have to pay the employer's contribution. The Leave of Absence Committee would probably reach an *ad hoc* solution, taking into account the overall cost to the University, if any, of providing a substitute.

6.3 Other Resources

(i) Equipment/Instrumentation, Support Staff, Communications

ORSIL does not believe it is right to provide academics trying to exploit their discoveries by means of independent spin-off companies with cheap resources:

"... they have elected to go into the hard outside world and the sooner they learn the lessons of that world, the better.

"It would [also] be wrong for the University to underpin their operation, because the University ... could be losing [through] losing the efforts of that member of staff ..."

This is why academics with wholly-owned companies are asked to pay 15 per cent of their annual profit to the University. For those who are exploiting "hard" IP, this is in addition to any royalties due.

Where resources are concerned, ORSIL asks would-be academic entrepreneurs to write a paper detailing their needs for their business activities and the implications for their Department. The paper must have the approval of the HoD, so that he knows exactly what demands are being made of him. If it is purely a question of equipment/instrumentation, technical/secretarial support staff and communications, it is likely that these three parties - the academic, his HoD and ORSIL - can approve the package. ORSIL would expect academics founding independent spin-off companies to pay the full commercial rate, or as close to it as possible, for all these resources - including telephone calls ⁽⁸⁷⁾.

(ii) Accommodation

The only exception is the use of existing accommodation, the use of which is also agreed generally between the academic concerned, his HoD and ORSIL:

"... It can sometimes be in the University's interest, both in a real sense and a political sense, to have a company there. For example, a young company might want to go [in] for a DTI SMART award. It's in the University's interests in the political arena to be seen to be supporting that ..."

Additional accommodation, over and above the Department's allocation, is a matter for the administration to decide centrally. If this is a problem, or if they simply wish to locate off-campus, Liverpool's academics have the option of locating renting space in Liverpool's equivalent of a science park, the Merseyside Innovation Centre ⁽⁸⁸⁾. This is located adjacent to the campus, and offers not only advice to start-up companies ⁽⁸⁹⁾ but competitive rents and lease terms ⁽⁹⁰⁾.

If there is a waiting list for the Merseyside Innovation Centre, which is currently planning a major expansion, Liverpool's academics could try for space in two other "parks" which are located fairly close to the University ⁽⁹¹⁾.

(iii) Finance

Liverpool has chosen not to establish a formal seedcorn fund to provide first-round funding for academic spin-off companies. It does not see this as an appropriate activity for a University, preferring to fund research or the early stages of development. If academics propose to set up an entrepreneurial venture within the framework of the University - perhaps an institute/unit/centre - ORSIL would ask them to write a formal paper detailing their objectives and their needs. The paper would be scrutinised by the Commercial Opportunities Group. It would then go before the Academic Committee ⁽⁹²⁾ after the Vice-Chancellor had seen it. The Academic Committee would make recommendations to the

Policy & Resources Committee, which has the final right of decision. To date, few such ventures have succeeded in obtaining financial support from the University.

6.4 Business Start-Up Advice

ORSIL feels that it has a moral responsibility to give its entrepreneurial academics as much as assistance as it can, whatever type of entrepreneurship they are pursuing. ORSIL is anxious to ensure that technology is transferred efficiently and staff lay neither themselves nor the University open to criticism. Neither of ORSIL's officers have business start-up or consolidation skills, but they currently have access to two, more or less "in-house" sources of assistance: the Commercial Opportunities Group and the Director of the Merseyside Innovation Centre. When time permits, ORSIL intends to compile a complete record of Liverpool's academic entrepreneurs, partly as a management tool, but partly to act as a resource for those just starting out. ORSIL also believes that the academic Departments contain pools of expertise which could be tapped:

"... One of our fond hopes is that each University could [become] a Peat Marwick... "

Again, when time permits, it would like to construct a database of such expertise, which would-be academic entrepreneurs could access directly.

ORSIL also maintains contacts with local economic Departments, enterprise trusts and venture capitalists⁽⁹³⁾. It regrets the absence of the kind of regional public sector agency which exists in the north east of England and Scotland. There are bodies like the Merseyside Enterprise Board and the Merseyside Development Corporation. However, ORSIL finds that the university usually acts as a resource for these organisations, rather than the other way around.

ORSIL would also recommend would-be academic entrepreneurs to find an experienced partner, rather than go it completely alone:

"... Most academic staff are totally unaware of the pitfalls [of manufacturing and marketing a product]. We would nearly always advise them to try and find a partner who knows the market, has established outlets and who's got the back-up facilities ..."

7 SCRUTINY GROUP ASSESSMENT

In August 1990 Liverpool was informed that the Exploitation Scrutiny Group was satisfied with the exploitation arrangements which the University had established. A formal document was scheduled to follow, confirming the University's rights and responsibilities to exploit IP arising out of Research Council-funded projects for an indefinite period. Henceforth, the University was only required to report inventions to the Exploitation Scrutiny Group.

8 POLICY AND PRACTICE AS PERCEIVED BY HEADS OF DEPARTMENT AND DEANS

8.1 Removal of the BTG's Monopoly and Response to the Kingman Letter

(i) Awareness of the Removal of the BTG's Monopoly and the Research Councils' Offer

Until the question was put to them, two of the HoDs interviewed were unaware that the BTG had had a monopoly over IP arising out of Research Council-funded projects - and hence unaware of the Research Councils' offer, let alone its significance. One ^(C) was not working within the UK university system at the time. The other ^(B) was not only working at the University, but was also HoD at the time; he attributed his ignorance to the fact that until a couple of months prior to being interviewed, the characteristics of his discipline were such that he had no reason to pay attention to IPR matters. The other four HoDs interviewed ^(A, D, E, F) reported that they had known about the removal of the BTG's monopoly and the Research Councils' offer at the time - though they had no recollection of how they learned this. Two thought they had probably read about it in the press, while the other two were confident that the University would have circulated the information to them in their capacity as HoD. The two Deans interviewed ^(1, 2) said that they had been aware of the removal of the BTG's monopoly and the Research Councils' offer at the time; one ^(A) was certain that the SERC had sent him a copy of the Kingman letter, asserting that he could visualise it; the other presumed that the University must have circulated the information to him in his capacity as HoD.

(ii) Attitudes to the Removal of the BTG's Monopoly and the Research Councils' Offer

Questioned about their attitude at the time to the removal of the BTG's monopoly and the Research Councils' offer, both Deans and all four HoDs who knew about it reported that they had supported the idea, though with varying degrees of enthusiasm. One HoD ^(A) said he had been particularly keen, since he felt "*very bitter*" about the NRDC, which had refused to fight a challenge to a US patent application on one of his inventions; as a result, it was manufactured in the US without a licence and neither he nor his department had received any compensation. One of the Deans ⁽²⁾ reported that he had been in favour of the idea because the BTG had such a bad reputation; he had gained this impression from colleagues rather than from personal experience, however. The others said they favoured the proposed new arrangements because they "*sounded sound*", or "*sounded a resonance*", or made universities "*relevant to what is going on*". At the same time, two interviewees ^(D, 2) expressed reservations, saying that it was important that the right people assumed responsibility for IP, since by definition academics were not entrepreneurial and were therefore not the best people to make a success of the proposed new arrangements.

(iii) Perceptions of the University's Motivation in Accepting the Research Councils' Offer

Six interviewees ^(A, B, C, D, E, 2) felt that the University's decision to accept the Research Councils' offer had been motivated purely by thoughts of financial advantage. One asked: "*What other motive could one attribute to them?*" Another interviewee ^(F) suggested that accepting the offer was intended to be "*a signal of the University being relevant*", while the last ⁽¹⁾ said that on reflection, the University had probably thought it could get things

done faster than the BTG.

(iv) Awareness of and Views on the Process of Determining the University's Response to the Research Councils' Offer

Views differed on right way to determine the University's response to the Research Councils' offer. Three HoDs ^(B, C, D) thought that academics who were "*in the business of inventing things*" ... academics who were "*dealing with inventions*" should have been consulted. One ^(C) added that the views of HoDs should also have been sought, a sentiment echoed by another HoD ^(D). Yet another ^(A) suggested that the Senate should have determined the University's response. One of the Deans ⁽²⁾ thought that members of the Research Sub-Committee, the Chairman of Academic Committee and a few senior officers (Pro-Vice-Chancellors) should have been consulted; the other ⁽¹⁾ felt "*the people at the top*" should have been consulted because they had a much better idea of what was the best thing for the University. One HoD ^(F) broadly concurred with this view, suggesting it should have been the Vice-Chancellor and the Academic Secretary who determined the University's response - guided by the Assistant Registrar from the RDAS.

When told who actually determined the University's response, six interviewees expressed satisfaction with this *modus operandi*. Three HoDs ^(A, D, F) suggested that a quick response had probably been required, while another three ^(A, C, E) suggested that in view of all the external initiatives which had hit the University since 1985, it was not surprising that the University was now in favour of making "*an executive response*", rather than work through the traditional democratic processes. One ^(E) remarked that it was necessary to have faith that decision-makers would contact people "*at the coalface*" and seek their opinions. Another ⁽¹⁾ added that the then Academic Secretary was a person who "*took these matters pretty seriously*", having come from a university which was strongly associated with industry, and that the Assistant Registrar from the RDAS had always given good advice. However, one interviewee ⁽²⁾ expressed surprise that such a narrow group had determined the University's response, while another ^(B) disagreed completely with the *modus operandi* adopted, seeing the situation as one which required a "*professional decision*".

8.2 Identifying Intellectual Property Created by Academics

(i) Views on the Likelihood of Different Disciplines Generating Exploitable IP

Asked whether they thought the particular spread of science and technology disciplines in a university had an influence on the amount of exploitable IP which might be generated, four HoDs ^(A, B, C, D) felt that some disciplines were currently more likely to generate exploitable IP than others; information technology, immunology and microbiology appeared to them to fall into this category. However, two ^(B, C) suggested that universities with a more comprehensive spread of disciplines might be less likely to generate exploitable IP than less comprehensive universities, where it would be easier to devote effort and resources to this kind of activity in a more focussed way.

The two Deans and the remaining HoDs thought that the particular spread of disciplines *per se* had no influence on the amount of exploitable IP which might be generated. One ^(F) felt that the organisation of the various disciplines might have an influence, however. In his view, IP was most likely to arise at the interface between disciplines; if there was too

much compartmentalisation, academics from different disciplines would only converse by chance, rather than by design. This particular HoD welcomed Liverpool's move towards grouping Departments informally into Schools, which cut across Faculty boundaries in some cases. Another ^(B) argued that the amount of exploitable IP generated was a function of the calibre of the members of staff, that departments with "*lots of good ideas and entrepreneurial people*" would be most likely to generate exploitable IP, irrespective of the discipline. The two Deans expressed similar views. One ⁽²⁾ said that the amount of exploitable IP generated was directly related to the level of activity of the staff in a given Department and the calibre of that activity; a good rating in the research selectivity exercises was indicative of lots of activity - and lots of potential for IP. The other ⁽¹⁾ suggested that the ethos of the University influenced the amount of exploitable IP generated:

"... getting the right sort of thinking in the University ... thinking about what ... I mean, that is the whole point about being enterprising and entrepreneurial. It is your outlook, not what is available ..."

(ii) Awareness of the University's Wish to Identify IP

Asked how aware they thought staff in their department were of the University's wish to identify potentially exploitable IP, two HoDs judged that their staff were not at all aware. One ^(B) felt that his staff were all as ignorant as he was. The other ^(F) suggested that his staff were unaware because they were oriented towards the department's aspirations, rather than the University's; in his view, his staff had become disenchanted with the concept of "the University" as a result of the ever-increasing stream of demands emanating from the centre since 1984-85.

The other four HoDs judged that their staff were reasonably aware. One ^(C) commented that he always copied circulars on this subject to his staff. Two ^(A, D) remarked that general levels of awareness had increased as a result of most members of staff joining a major departmental research group. The last ^(E) attributed the level of awareness in his department to the fact that many members of staff had done contract research for industry.

The two Deans judged that staff in their Faculties were not very aware of the University's wish to identify IP. One ⁽²⁾ suggested this was because it was something they virtually never heard about. The other ⁽¹⁾ distinguished between intellectual awareness and emotional awareness; in his view, staff might be intellectually aware, but they were not emotionally aware of the University's wish, with the result that it was not at the forefront of their minds.

(iii) Responsibility for Identifying IP

Two of the four HoDs who judged that their staff were reasonably aware of the University's wish to identify IP ^(A, E) felt that their staff would take a positive view of being asked to "flag" potentially exploitable research results; indeed, one ^(A) complained that some of his staff had too positive an attitude, that they sometimes persuaded the University to patent IP which he did not think was worth protecting. The other two felt that their staff resented having this onus put upon them, but that they begrudgingly accepted it in view of the financial constraints under which the University was operating. One ^(C) said:

"... They don't like it, but it is part of the university system. The Government has taken so much money out of the system that they know it will collapse unless they go and ferret about for money ..."

The other ^(D) said:

"... we are all pretty well aware of our entrepreneurial responsibilities now. I think that up to now, it has been more involved with the generation of research income rather than having exploitable results at the end of those periods. But I think we are all pretty well aware about that ..."

One of the Deans ^(A) expressed similar a similar view:

"... I mean, it seems to me no more responsibility than getting research [funding] ... I mean, once you get into the mood of looking for money, it is as easy as falling off a wall, in a sort of way. I mean, I'll put it bluntly. Once you get into the mood of applying for research grants, it is straightforward. Or writing a paper. It is all part of this whole matter of ... I mean, it is all a matter of being constantly vigilant ..."

One of the HoDs who judged that their staff were not at all aware of the University's wish to identify IP ^(B) felt that they would probably take a positive view of being asked to "flag" potentially exploitable research results - if they knew about it, adding: *"There is enough in the sub-culture of universities these days to realise that an entrepreneurial instinct is encouraged"*. The other ^(C) did not think his staff would take a positive attitude, even if they knew about it. He said:

"... They contact [ORSIL] for all sorts of advice, but mainly in terms of procedures for developing University contracts ... They are willing to use the procedures because they can't operate in any other way. But I don't think they see it as a benefit to the University. They see it as a benefit to the Department and their [own] immediate needs. They are not motivated by the fact that the University is generating an income from it ... Because ... there is a rather iconoclastic view in the Department that the UFC ought to be [providing] it ..."

The other Dean ^(D) expressed a similar view, suggesting that unless staff in his Faculty could grasp the real benefits of "flagging" potentially exploitable research results, they would simply resent it as an extra burden being placed upon them.

Three interviewees ^(A, F, 2) said that responsibility for identifying IP should rest equally - if not principally - with the ILO; all three felt the ILO should adopt a proactive rather than a reactive approach to the task. One ^(A) felt that the ILO could be more proactive than he had been to date - for example, by organising a seminar on IP as part of the staff development programme and targeting younger researchers, rather than established ones.

Three interviewees ^(D, E, 1) felt that in an ideal world, the ILO should adopt a proactive approach, but that this was not practicable, given the size of the University. One ^(E) suggested that ORSIL should concentrate on consciousness-raising instead, on *"develop[ing] the climate to know that [staff] should go and talk to them if they have questions in this area"*. The Dean ^(A) proposed that a more effective *modus operandi* would be to delegate this responsibility to departments; he envisaged a technology transfer

correspondent being appointed and trained, as a parallel activity to departmental research correspondents.

The other two interviewees felt that the ILO should take a purely reactive approach. One ^(B) said there was no point in "*bombarding*" his particular department with "*stuff about patent agents and filing*"; he added that he would not encourage his staff to talk to members of ORSIL about applications of their research interests. In his view, ORSIL should restrict itself to talking about research funding; everything else was a waste of time. The other ^(C) simply felt that it was not practicable for the ILO or his staff to trawl around several hundred academics looking for potentially exploitable research results; moreover, even if it were, staff would perceive it as "*pestering*".

(iv) Strategies for Identifying IP

Asked to consider whether formally scrutinising research proposals, interim and/or final reports would be a useful strategy for identifying potentially exploitable IP, one of the Deans ⁽²⁾ commented that the University would need to find a "*fairly special person*" to make a success of the job. One HoD ^(C) doubted whether anyone had the necessary ability, because it is so difficult to know what constitutes exploitable IP. He cited the case of Cesar Milstein, whose monoclonal antibodies were not patented because a panel of experts brought together by the MRC did not think they were worth protecting - a judgement which transpired to be nearly as unfortunate as Oxford University's decision not to patent penicillin. Three HoDs ^(A, D, E) felt it would certainly be a waste of time and effort for the staff of the IL office to do this, since they lacked the necessary expertise; another ^(B) suggested that the staff of the IL office should scrutinise selectively, only within their own disciplines. Only one HoD ^(F) thought that scrutinising research proposals, interim and/or final reports centrally was a good idea - because in his view, academics are not business-oriented and have no eye for what is commercial.

None of the HoDs or Deans thought that this was a task which should be devolved to Faculty research committees - either because it was outwith the remit of the committee, or because committee members would resent having this burden placed upon them. However, several thought it was a task which could be devolved down to a departmental level. One HoD ^(F) suggested that it could be productive to ask the appropriate Professor to act as a scrutineer - which would have the added advantage of enabling professorial staff to find out what was going on in a very large department where communication was "*a nightmare*". One of the Deans ⁽²⁾ suggested that the HoD might use the annual appraisal system to ascertain whether staff were generating potentially exploitable IP. Most felt it was the responsibility of research group leaders, who should be alert with regard to exploitation - and who should encourage alertness in their colleagues, too.

Asked to consider whether formally scrutinising drafts of papers before submission to journals would be a useful strategy for identifying potentially exploitable IP, five interviewees ^(B, C, E, 1, 2) responded very negatively, describing the idea variously as "*horrendous*", "*a complete waste of time*" and "*an absolute non-starter*". One recalled that he had been obliged to do this when working for an American charity; in his experience, the scrutineers tended to think a research result looked "exciting", only to decide several months later that it was not; in the meantime, publication had been delayed. Several commented that staff in their department wrote 50-70 papers a year, so on logistical grounds alone, it was out of the question. Another remarked that there was enough paper floating around the system as it was, while yet another was against the idea of the

University or the department forcing individual academics to submit drafts of papers to anyone for any reason.

One HoD ^(F) felt that in principle, it was a worthwhile strategy for someone in the department to scrutinise drafts of papers; in practice, though, he thought it would present administrative difficulties which would be impossible to overcome. Only two ^(A, D) responded positively to the idea; both felt that research group leaders should act as scrutineers for papers emanating from their own group - though informally, rather than formally. One ^(A) pointed out that in any case, no well-regulated research group should allow individual members to publish without the research group leader's permission - or without the research group leader having quality-controlled the paper.

8.3 Ownership of Intellectual Property Created by Academics

Asked whether they thought it was more appropriate for IP to belong to the University or to the academic(s) who created it, four interviewees ^(A, B, F, 1) said that it should belong to the University. All but one explained their answer in terms of the fact that the University provided the environment in which the IP was created; the other ^(A) commented that there was no longer a tremendous difference between researchers working in industry and those working in academia - so there was no reason for UK patent law to distinguish between them.

Two interviewees ^(C, 2) suggested that joint ownership might be the most appropriate. The HoD acknowledged that the University supplied the environment, but he pointed out that the University did not supply the ideas, that academics themselves assumed responsibility for the direction of their work. He added: *"It seems almost blood-sucking to let someone make a discovery and then take it away from him and not give him any rights whatsoever"*.

The two remaining HoDs ^(D, E) felt that the IP should belong to the academic(s) who created it. One ^(D) observed (erroneously) that the University's policy made it clear that it would assert sole ownership and added:

"... It does seem perhaps a little bit strange that if I, as a member of staff, come up with a brilliant idea which had enormous potential for exploitation, this could be whisked out of my hands without the slightest by your leave ..."

The other commented that if the University was prepared to assume responsibility for protecting and arranging the exploitation of the IP - and the associated costs, yet give half the proceeds to the academic(s), this was probably *"the best of all worlds"* from their perspective.

8.4 Protecting Intellectual Property Created by Academics

(i) Attitude to Protecting IP Created by Academics

Seven interviewees ^(A, B, C, D, F, 1, 2) agreed in principle with the general concept of *"protecting"* IP generated by academic research, as did both Deans. Two ^(A, B) explained this in terms of national interest:

"... I think there is everything to be said for stopping the Americans - and I would say the Germans next, the French, the Japanese and everybody else - getting our ideas before we do ..."

"... I think if one stood out against it, then I think you ... I think the hawks of this world would get you ..."

Another ^(E) explained his support for the concept in terms of the benefit to the University:

"... Well, because, you know, if there is an honest penny to be turned by the University, that is obviously a reasonable way of doing it ..."

Several drew attention to associated problems, however. For instance, one ^(C) observed that world-wide patents were the only ones which companies could not get around, and that the cost (financially and in terms of the temporary but doubtless lengthy restrictions on publication) meant that universities should be highly selective about protecting IP in this manner.

The other interviewee ^(E) was against the general concept of "protecting" IP generated by academic research, saying:

"... It would kill, in my view, the development of science and engineering. At present, I feel I can go anywhere in the world in any laboratory in the world (sic) and openly talk to the people, I mean, the top people in charge of the laboratories, about research we are doing now or what we will be doing next year or what we did last year, with no problems at all. We share information backwards and forwards like that by correspondence ... and so on. If what you are suggesting came to pass, all that would go and I think it would just kill it ..."

When asked to consider the fact that universities are not legally obliged to patent patentable IP, that they have the right to "protect" it by treating it as secret know-how instead, this same HoD ^(E) expressed surprise and concern, saying that he had no idea that the law allowed the University to dictate that a research discovery should be kept secret. Another ^(E) was of the opinion that secret know-how militated against the idea of what a university stood for. One of the Deans ^(A) felt it was appropriate to distinguish between publicly- and privately-funded research; in his view, it would be wrong to allow research discoveries which had been publicly-funded to be "hived off" as secret know-how. One HoD ^(C) suggested that the decision to treat a discovery as secret know-how should be made by the academic(s) concerned, not the University, since they, rather than the University, would have to suffer the restrictive consequences. Another ^(A) suggested that the correct approach was not difficult to determine:

"... If you have a good idea that is workable and there is some national value in protecting it [by treating it as secret know-how], then you should protect it. If you have any other kind of good idea that will do something for the national reputation, the reputation of your university, then you should not [protect] it. You should publish it ..."

Two interviewees ^(B, 1) had no problem with the idea of treating academic research discoveries as secret know-how, suggesting that the end justifies the means. The Dean remarked that if the University wanted to act as a resource to the community, this was a price which might sometimes have to be paid; he added that it was not so different from, say, a member of the Faculty of Law giving advice on a criminal matter - which would clearly have to be kept secret.

However, half the interviewees ^(D, E, F, 2) concluded that if there was a choice, patenting IP was preferable to treating it as secret know-how.

(ii) Who Decides Whether and How to Protect IP Created by Academics?

Only one of the interviewees ⁽¹⁾ was correct in his estimation of how the University proposed to handle a situation in which the IL office and the academic(s) concerned disagreed about whether and how to protect IP which they had generated - *ie.* the Senior Management Team would be called upon to decide. Three interviewees ^(D, E, 2) guessed that the Vice-Chancellor would reserve the right to decide, while another ^(B) suggested that in the final analysis, if the Vice-Chancellor and the academic(s) concerned were at loggerheads over this question, the Chancellor would be called in to arbitrate. One HoD ^(F) confessed to having no idea how the University would handle this, while the remaining two ^(A, C) observed that in reality, whatever the University decided, the academic(s) concerned could decide, since it would be impossible for the University to prevent them from publishing, if they were so minded.

Three HoDs ^(B, D, F) felt it was appropriate for the University (*ie.* the Senior Management Team) to make this kind of decision, provided the academic(s) concerned were given a genuine and fair hearing. One ^(F) suggested that taking the decision centrally would result in a better decision, since academics were frequently unable to see the value of what they were doing and were therefore a poor judge of matters commercial. The other three HoDs ^(A, C, E) disagreed; all three felt that the academic(s) concerned should have the right to make the final decision. One ^(E) indicated that he would be "*terribly unhappy*" if academics could be overruled in this way. The other two were not unduly concerned, however; both felt that in practice, it would be impossible for the University to prevent academics from publishing - indeed, one ^(C) remarked that if necessary, he would instruct his staff how to get around the University's ruling.

The Deans were loathe to agree or disagree. One ⁽²⁾ expressed concern about the danger to academic freedom if the University chose to prevent academics from publishing; he conceded, however, that the climate had changed during the previous decade, with the result that everybody in the University was "*hugely conscious*" of the need to generate an income.

(iii) Attitude to the Logistics of Protecting IP By Patent

None of the interviewees took issue with the University's policy of immediately bringing in a patent agent to draft patent specifications - unless the academic(s) concerned preferred to produce the first draft themselves. However, two HoDs felt that, having voluntarily assumed this responsibility, academics should simply find the time to produce the requisite patent specification, without being assisted by their colleagues. One ^(F) suggested that if they were motivated enough to report their discovery to the IL office and to assume responsibility, it should not present a problem. The other ^(E) saw no reason for other

members of his staff to help the academic(s) concerned to reap 50 per cent of the resulting profits.

A third HoD ^(A) said that in practice, his staff would probably have to find the time, too, though where some members of staff were concerned he would be sympathetic to the idea of a temporary reduction in their workload, if at all possible. He recalled that he had once been given a month off undergraduate teaching by his HoD to help him produce seven research proposals; in his view, the department was still run on the basis of this kind of "*practical common sense*". Another ^(D) remarked that everyone in the department had a heavy workload, and it would be wrong for anyone to automatically expect colleagues to assume part of their workload just because their research results happened to be potentially exploitable. On the other hand, he was sympathetic to the idea of trying to help by temporarily reducing lecturing and administrative commitments - if the case warranted it; he observed that the spirit of the department was sufficiently good that, if asked face to face to help out, no member of staff was likely to turn him down.

Only one HoD ^(C) indicated that he would be prepared to formally create the time for the academic(s) concerned to draft their patent specification - if it was "*something terribly exciting*". In his view, the department was big enough to give someone the equivalent of a brief sabbatical, in order to do the job well. He acknowledged that members of staff who were asked to undertake extra work were likely to be resentful; he indicated that he would make sure the extra work was shouldered by those who could not or would not generate an income for the department.

One of the Deans ⁽¹⁾ felt that drafting a patent specification should not be singled out as a task requiring more assistance than any other. However, he was also of the opinion that departments needed to be altogether more flexible than most of them were - "*standing in for each other at the drop of a hat*"; in his view, most members of staff in the Faculty needed to make "*an intellectual and emotional jump*" and see the value to be gained from helping out - *eg.* gaining insights into another specialist area through temporarily teaching outside their own specialisation.

8.5 Entrepreneurially Exploiting IP Created by Academics

(i) Exploiting "Hard" Intellectual Property

Asked to give their views on the idea of exploiting "hard" IP entrepreneurially instead of licensing it to an existing company, five interviewees ^(A, B, C, E, F) signified their approval-in-principal, while three ^(D, 1, 2) were more ambivalent. One ^(B) remarked that Liverpool had started to discuss this idea - and the idea of a science park - as far back as the 1970s, but that it had "*missed the boat*" through being too cautious; unlike certain other universities, Liverpool had not been prepared to "*[go] ahead, pick up the ball and run with it*" until well into the 1980s. He attributed this to the ambivalence of the Vice-Chancellor of the time. Another ^(A) commented that, thanks to its lay officers, the University was still too cautious; in his view, the University should show a degree of imagination and take £5m from its investment income and invest it in its staff on a high-risk basis - recognising that it might "*blow it all*" - but on the other hand, it might make £100m. A third ^(C) observed that the University was full of plant and equipment which was lying around unused for half the year when it could be exploited commercially, as long as the University had first call on it. He recalled visiting another UK university which had built itself an unusually picturesque staff house; it was rented out on Saturdays as a location for wedding

receptions - a concept which he had found very strange until he thought about the advantages.

Some interviewees were equally in favour of independent academic spin-off companies, joint ventures and university companies. One ^(B) commented that in a such a large university with such diverse disciplines, it was essential to be able to "*develop companies*" by as many different mechanisms as possible. Other interviewees felt that some types of spin-off company were more appropriate than others. One ^(B) was in favour of university companies and joint ventures with members of staff but was less happy about independent academic spin-off companies. He felt that if a company did well, it was certain to impinge on the academic's departmental responsibilities; in the end, the academic would be forced to choose between the University and the company. He was concerned not about losing a member of staff but about how long it might take before it became obvious that making a choice was desirable - because the academic concerned was writing fewer and fewer papers and obliging colleagues to shoulder his responsibilities. Conversely, one of the Deans ^(A) was happy about the idea of independent academic spin-off companies, but less enthusiastic about joint ventures and university companies; in his view, academics should be encouraged to go out and be "*buccaneers*", but this should be done at arms' length. He acknowledged that the University's latest joint venture had apparently been a tremendous success; he attributed this to the fact that the technology to be exploited was extremely simple and that everyone had wanted the venture to succeed, with the result that considerable time and money was devoted to the project. He did not see how the University could afford to devote that much time and money to a whole series of joint ventures and university companies.

One HoD ^(D) confessed that he had long been mildly curious about the benefits and penalties of exploiting "hard" IP entrepreneurially, but that he had never found the time to indulge his curiosity. The other Dean ^(C) admitted that he had never devoted much thought to such questions, either.

(ii) Exploiting "Soft" Intellectual Property

Interviewees were asked for their views on three mechanisms by which academics could exploit "soft" IP: personal consultancy, commercial arms of departments and various types of spin-off company.

As we have seen, by custom and practice academic staff at Liverpool are allowed up to a day a week for personal consultancy - which two of the HoDs ^(B and F) did not know. Only one of the Deans ^(C) was unequivocally in favour of having a time limit, though one HoD ^(D) remarked that it was not unreasonable to have one. Another HoD ^(E) suggested there should be a guideline, rather than an absolute time limit, because some members of staff could comfortably handle more consultancy work, while others would be hard pressed to do half as much. Two interviewees ^(B, 1) felt it was simply not tenable to impose an arbitrary time limit. In the Dean's view, academics should be treated like adults and allowed to decide for themselves how much consultancy they should do; if they did too much and their work suffered, this should be made clear to them at their annual appraisal. He felt that imposing a time limit reflected the University's "*dog in the manger attitude*" to academics who earned money over and above their salary, rather than genuine concern about the possible affect on their work. Two HoDs ^(A, F) said that it was not the amount of personal consultancy which could present a problem so much as the type; both stressed

that they actively discouraged "routine" or "bread and butter" consultancy, but not consultancy which was liable to yield contract research in an area which the department wanted to develop ^(A) or otherwise unattainable data and the resources to exploit it ^(B).

Reactions to the particular time limit specified by the University varied tremendously. One HoD ^(C) suggested that if staff could get paid for upto 20 per cent of their time from outside sources, this was surely to be encouraged? He also asked how the time limit should be interpreted, given that most of his staff were working about 100 hours a week. Another ^(D) expressed concern about the high proportion of the working week which the University time limit allowed his staff to devote to personal consultancy. One of the Deans ^(E) felt that a day a week should be regarded as the upper limit, rather than the norm. Another HoD ^(A) described the limit as "*a figment of the Vice-Chancellor's imagination*", because he could not think of a single member of the department who had done anywhere near that much personal consultancy. Asked what proportion of their staff actually did personal consultancy, HoDs' estimates varied considerably. One ^(C) said that only 5 per cent of his department currently did personal consultancy, while another ^(B) suggested that in his department it was closer to 25 per cent. Two felt ^(E, F) that between 33 and 50 per cent of their department would do some personal consultancy over the course of a year. One ^(D) was unable to put a figure on it. All six HoDs emphasised that none of their staff ever devoted to personal consultancy anywhere near a day a week, averaged out over the year. Indeed, one ^(F) reported that his staff spent no more than a day a year on it. Another ^(A) estimated that his staff did no more than a week a year, adding that his was a "*pure*" department in which personal consultancy was "*frowned upon*".

Most interviewees acknowledged that there were advantages and disadvantages to their staff doing personal consultancy. It was suggested that personal consultancy could have a negative impact on their interest in discovering and understanding new knowledge ^(C), their ability to do research ^(B), their publication rate ^(A, E, F, 2), the attention which they paid to students ^(B, F, 2), their administrative workload ⁽²⁾ - or that it would simply mean that they were not around when they should be ^(A). On the other hand, it could also yield valuable connections ^(B), provide access to facilities which the University could not afford ^(C), enable staff to gain new expertise ^(B), open their minds to what goes on outside academia ^(D), provide new material for undergraduate classes ^(E), suggest new research areas ^(E), - and bring contract research money into the Department ^(B, C).

Only one of the HoDs interviewed ^(F) reported that his department had set up a commercial arm - in fact, two - to market the expertise of various members of staff. The other five felt that a commercial arm would not be appropriate in their department. One ^(A) said that his staff were already working "*flat out*" and there was no point in creating a mechanism which would bring in even more work. Two ^(D, E) said that staff were efficient enough at attracting consultancy work without the need for a formal mechanism. Another ^(B) referred to this as a "*tetchy subject*", explaining that similar departments in other universities had set up commercial arms to market routine test facilities - which made a lot of money but which diverted people's energies from academically productive projects. Only one ^(C) indicated that the department might set up a commercial arm in the foreseeable future - to market both equipment and expertise.

The first HoD ^(F) recalled how he had inherited two commercial arms which had been created on the strength of a "bottom-up" rather than a "top-down" initiative - though both had the University's blessing. Both did academic research as well as commercial consultancy and both were gaining an international reputation; however, each operated on

an appreciably different basis. The first had a dedicated technician and secretary and paid individual members of staff a daily consultancy fee to do consultancy work as and when required. The second ploughed all its consultancy income back into the unit and used it to pay for a temporary lecturer so that the senior lecturer involved could devote more time to marketing staff expertise. Each had been the cause of considerable resentment within the department. In the HoD's view, the second enabled "*a flush of young post-docs*" to go through the department, which was a tremendous asset. One of the Deans ⁽¹⁾ felt that neither model was a good one, since neither directly benefitted the host department financially; this was his principal criticism of the commercial arm of another department which had been set up in the 1970s, which the University spun-off as a separate company at the end of the 1980s.

Asked what they felt about the idea that academics who do a lot of consultancy tend eventually to set up their own business, one HoD ^(A) remarked that it was nonsense for anyone to imagine that academics sit around all day waiting for things to do, and that becoming an academic entrepreneur was simply one of the options open to them:

"... I would have said that half the academics in this Department ... without any entrepreneurship at all, they are working 50-hour weeks. So, I don't see any reason why anybody should consider that they should, apart from doing admin, teaching, research, sitting on ... well, in my case, 35 committees, they should really be expected to be entrepreneurs as well ..."

In his view, academic entrepreneurship was to be regarded positively only if an academic wanted to devote extra hours to it, and if it was for the benefit of the area.

Despite their concern about the disadvantages of extensive consultancy, several HoDs claimed they saw academic entrepreneurship as a positive side effect of it. One ^(B) described academic start-up companies as one of the important contributions a university could make to the outside world. Another ^(C) felt that if staff chose to exploit their expertise via an independent academic spin-off company, this might solve the problem of them undertaking so much consultancy that it impacted on the work of the department as a whole. He pointed out that an independent academic spin-off company had no responsibility for teaching, administration or research; it could concentrate wholly on consultancy, if it chose to, recruiting other staff to keep up with demand, if necessary. The two Deans also felt that if there was an association between extensive consultancy and academic entrepreneurship, this was no bad thing; it was to the national advantage if academics got involved in wealth-creating activities ^(D) and if they ended up leaving the University, this should bring new blood into the University ^(E). Only one HoD ^(F) suggested that an association between extensive consultancy and academic entrepreneurship might be a cause for concern - though he felt it was probably wrong to generalise. This particular HoD based his views on knowledge of academics from other universities but from his discipline who had become entrepreneurs:

"... it is almost invariably to the detriment of the department and the university and the students, particularly. They are not such useful, flexible university servants, you know, at a departmental level, as they are when they are not doing this sort of thing ..."

8.6 Support for Entrepreneurial Academics

(i) Time

None of the HoDs and Deans interviewed took issue with the idea of would-be academic entrepreneurs devoting the time they normally spent on consultancy to trying to start up a company to exploit their research discoveries/expertise; as we have seen, though, staff in these particular departments apparently devoted considerably less time to consultancy than the day per week which they were allowed.

There was less of a consensus over the idea of helping academics start a company to exploit their research discoveries/expertise by formally reducing their workload for a period while continuing to pay their full salary. Four HoDs were against this idea. One ^(A) argued that company start-up was nothing to do with an academic's primary responsibilities, which he saw as teaching and research; he would therefore resist suggestions that such activities should constitute part of a member of staff's departmental workload, even on a temporary basis, unless the Vice-Chancellor requested such an arrangement. Should that ever happen, he did not envisage any logistical problem, since his was a large department in which the same courses were taught for many years; as a result, it was not difficult to find another member of staff to stand in for someone at short notice. A fellow HoD ^(B) took the opposite view, claiming that formally reducing a member of staff's normal workload for a period would present him with a major logistical problem; setting up a workable sabbatical system in his department had been "*a major struggle*", even though it was essential for the development of individual members of staff. Since it had been so difficult to achieve the flexibility required for this traditional university activity, this particular HoD indicated he would prefer not to ask staff to adopt an even more flexible *modus operandi*, whatever the reason. A third HoD ^(D) remarked that he would not be sympathetic towards members of staff who wanted partial remission of departmental duties in order to devote time to company start-up - or, indeed, to any activity done of their own volition and for their own benefit. He made no distinction between academics wishing to start up independent spin-off companies and those who might be involved in joint venture with the University, classing the latter as "*more in line with the man who is doing work [on] his initiative, for his own benefit, rather than a man doing work for the department*". However, if the company interacted with the department and financially benefitted the department - in the long term at least, then he would be prepared to include such entrepreneurial activities in his assessment of the overall load carried by the member(s) of staff concerned; the scale of the reduction would take account of the extent to which the member(s) of staff concerned benefitted personally from the company, not just the benefit to the department. The fourth HoD ^(C) felt that even if the department was likely to benefit financially from a member of staff's entrepreneurial activities, it was inappropriate to reduce their normal departmental duties so that they could devote more time to business:

"... the payback to the University is not ... the payback may be a bit financial, but you are not going to get an intellectual trade back from these sort of companies ... Salford is [a university] that is into these sort of things ... Salford were (sic) a downtrodden university which needed to get money in, okay? They did get money in this way, but the level of academic achievement at Salford - academic as opposed to getting money from industrialists - is very small ..."

This particular HoD also thought that helping staff with their entrepreneurial ventures in this way would trigger a conflict of interests:

"... in the end, when you get involved in these companies, it becomes all-embracing and your raison d'être is not academic. I think that they have moved outside the university sphere ..."

Two HoDs were open to the idea of formally reducing a member of staff's workload for a period to help them to start a company up to exploit their research discoveries/expertise. One ^(b) argued that logistically it was no different to organising sabbaticals, and that it should not be difficult to get other people to shoulder a would-be academic entrepreneur's teaching and supervision for a while; however, he would only sanction this on condition that the University gave both moral and financial support to the department. One of the Deans ⁽²⁾ also argued that the University should consider providing financial support to cover the cost of bringing in a part-time lecturer, to prevent colleagues from becoming resentful about the extra burden they would otherwise have to bear. However, the other Dean ⁽¹⁾ was sceptical about the extent to which a reduction in an individual's teaching load need burden fellow members of the department. He remarked that academics have a tendency to "over-teach" and that temporarily reducing a would-be academic entrepreneur's workload would provide an ideal opportunity for the department to rethink how it went about its teaching. He added that someone who was trying to become an academic entrepreneur should be treated in the same way as a member of staff who wanted to work in industry for a spell, or become an MP; academic entrepreneurship was yet another manifestation of the links increasingly being forged between the University and the community. As such, he felt it was not something to be decided purely at a departmental level; the Senior Management Team should also be involved. The other HoD ^(c) was of the view that temporarily reducing a member of staff's workload to help them to start up a company should certainly be considered - if the University or the department stood to gain in the longer term from the entrepreneurial activities of the member(s) of staff concerned.

The two Deans felt that switching would-be academic entrepreneurs to a part-time contract for a period was preferable to temporarily reducing their workload but continuing to pay them on a full-time basis. One ⁽²⁾ remarked that you could always get would-be academic entrepreneurs to devote the hours they worked in the University to cover essential teaching and departmental administration. The other ⁽¹⁾ commented that a part-time contract was a particularly appropriate mechanism to employ with regard to would-be academic entrepreneurs, because it helped promote the movement of people into and out of the University, thus preventing stagnation.

Three HoDs were in favour of this means of supporting would-be academic entrepreneurs, too, despite perceived difficulties. One ^(a) said that the early retirement scheme had demonstrated that part-time contracts offered an acceptable solution to the problem of retaining the skills of members of staff who wished to pursue interests outside the framework of the University. Another ^(c) pointed out that academics were already being seconded on a part-time basis to departments like continuing education, where the objective was to earn money for the University by low-grade activities such as teaching, not to engage in high-grade academic activities. In his view, this was certainly justifiable in the case of individuals whose research was faltering, whose allegiance to the department would not be compromised, who could be relied upon to fulfil their remaining departmental commitments; it might also be wise to sanction part-time contracts for

dynamic researchers, since people were more productive if you helped them to follow the route which they wished to travel. The third HoD ^(B) felt that options like this should certainly be in the University's "*armoury of possibilities*", despite attendant difficulties.

The other three HoDs did not regard switching would-be academic entrepreneurs to a part-time contract for a period as preferable to temporarily reducing their normal workload but continuing to pay them on a full-time basis - largely because of the attendant difficulties. One ^(D) pointed out that although the University had originally envisaged HoDs having maximum flexibility when devolved budgets were introduced, in practice this flexibility had not materialised. HoDs were forced to work towards savings targets imposed by the centre, with the result that they could not necessarily use the salary saved to provide teaching cover for members of staff who wished to switch to a part-time contract; in individual cases, the University might occasionally be persuaded to agree to a HoD using the salary saved, but there would inevitably be a considerable time-lag before the department could get permission to do so. The same point was made by two fellow HoDs ^(A, F); one ^(E) added that, even if the University agreed to a temporary, part-time appointment, it would insist on appointing someone on the lecturer scale - which usually meant a low-calibre appointment. This particular HoD felt that complete leave of absence might be marginally less problematical, because the calibre of full-time temporary staff tended to be higher; however, they were usually inexperienced when it came to departmental administration, whether they were full-time or part-time.

Most HoDs interviewed indicated that granting would-be academic entrepreneurs complete leave of absence was equally problematical. Nonetheless, several felt they should be supportive, upto a point. One ^(C) observed that his attitude would depend on the type of company which the would-be academic entrepreneur wished to set up; he did not have a positive view of "*widget-producing companies*" because they involved "*no academic input whatsoever*". Two ^(B, D) said they would support a request for complete leave of absence for a maximum of one year, but would not endorse an extension to the agreed period of absence. One ^(B) described extensions as "*a sort of nightmare scenario*" and added:

"... If somebody said - I want to go for a [further] year to set up this commercial enterprise, then I think there is a very severe question mark against them in terms of their future in the department" ...

In his opinion, the priorities of would-be academic entrepreneurs who took leave of absence would soon conflict with the priorities of the department. One of the Deans ^(A) saw this quite differently, suggesting that HoDs should not only support applications from would-be academic entrepreneurs for complete leave of absence, but should also lobby for an extension to previously agreed periods of absence, provided they had concrete evidence of what the academic and his company were trying to achieve. He added:

"... a bit of change of identity is what is needed. I mean, what people don't worry about is people getting ossified. I mean, people have been in this University for 30 years! I've been here myself [for] 20 years now. You know, although I move around, it's not the same as actually changing job. Really changing job ..."

One HoD ^(A) was very much in favour - in principle - of academics being given complete leave of absence for entrepreneurial purposes. He said:

"... I asked [the Vice-Chancellor] th[is] question: If you want to do something for Liverpool, what you should do is allow the fifteen best entrepreneurs in the University to get out there and be entrepreneurs. And he said that he was totally in favour of that and had never refused anybody permission ..."

In practice, though, he indicated he would find it hard to support members of staff in his department who wished to pursue this course, because the University did nothing to facilitate this process - either from the department's perspective or the would-be academic entrepreneur's:

"... I mean, the sort of things that I thought would be a good idea is if the person could actually do that but stay in the pension scheme and maintain tenure ... Keeping the chance to come back, to minimise the risk to them personally. So, if it goes wrong, they have got a job to come back to ..."

The other Dean ⁽²⁾ thought that granting complete leave of absence to would-be academic entrepreneurs would present serious logistical problems in most departments in the Faculty - unless the HoD was adroit enough to find a way around them. In principle, he was not against the idea - or against extending previously agreed periods of absence, provided it did not lower the morale of the department; in practice, he thought that the entrepreneurial academic's relationship with fellow members of the department was probably crucial - particularly if the University was not prepared to help out the department with financial support.

- (ii) Equipment/Instrumentation, Support Staff, Communications, Accommodation

None of the HoDs or Deans interviewed was aware that the University was prepared in principle to let entrepreneurial academics have access to these facilities, provided they paid the full, market rate for all of them except existing accommodation, for which no charge was made.

Upon hearing that this was the University's policy, four HoDs ^(B, C, D, F) and one of the Deans ⁽²⁾ signified their approval. One ^(F) added that he had just independently introduced a similar set of regulations within his department to govern the use of departmental resources for contract research; this had been necessary to avert "*head-on rows*" about using them for non-traditional purposes. Nonetheless, this particular HoD felt there should be an element of departmental pump-priming in the start-up phase, in order to help get entrepreneurial ventures like academic spin-off companies or commercial units off the ground: "*I [would] say: this technician is at your disposal. Let's see if we can make a go of it*". One of the Deans ⁽²⁾ thought that whether this sort of pump-priming was done as consciously as this or not, entrepreneurial academics inevitably benefitted from the University's witting or unwitting generosity during the start-up phase:

"... Businesses don't go from not being in existence to being in existence. Somebody doesn't pay [nothing] and then suddenly start paying immediately the activity starts. There is usually a gradual change ..."

He felt that, within reason, the University should be happy to be supportive in this way:

"... I think that in most cases it is in the University's interest to retain good relations with people of this sort ... I am pretty sure that if you sour relations early on, then, you know, if success does come to that individual, the University would not benefit from longer-term collaboration and cross-fertilisation in research support [in] the way it could have done if it kept good relations ..."

Another HoD ^(B) expressed similar views, saying he thought that the University's insistence on charging the full, market rate could militate against academic entrepreneurs getting their company off the ground. He advocated flexibility, especially if the University stood to gain from the company in one way or another in the longer term. The other Dean ⁽¹⁾ argued in favour of a flexible approach, too, suggesting that the University should judge the charges to be paid for use of such facilities on a case-by-case basis, taking account of individual circumstances. Another HoD ^(C) pointed to the advantages inherent in receiving a *quid pro quo* in kind, or as an indirect financial benefit, rather than a direct financial benefit.

Only one HoD ^(A) felt that the University's policy of charging the full, market rate would present a problem in practice - because of the relatively small size and portability of the equipment and instrumentation used in his discipline:

"... If a person wants to use a high-speed oscilloscope, he will nip into the next lab and borrow one. Nobody will say - what do you need it for? Because, you know, equipment circulates around at an enormous rate. I've no idea where it is ..."

(iii) Financial Support

None of the HoDs and Deans interviewed was aware that the University was not prepared to provide financial support for entrepreneurial academics in the form of an innovation grant or a "soft" loan or equity. Upon hearing that this was the University's policy, one of the Deans ⁽²⁾ speculated about the University's reasons, concluding that it was probably insufficiently experienced in such matters as to be confident that it would not lose a lot of money. A HoD ^(B) felt it was typical of the University's extremely cautious attitude and added:

"... I find that difficult. I think it depends on what it is. If someone said - look, I've just got a new anti-AIDS drug and I've tested it against this retrovirus and it does work, I think the University would be crazy not to put money into it ... If you have got a good guy with a good idea and a good background, fine. Back him!"

The other Dean ⁽¹⁾ commented that if he were Vice-Chancellor, he would establish an innovation fund - precisely for this kind of purpose, while another HoD ^(B) thought that the University should not rule out the possibility of putting money into academic spin-off companies. He added that he saw no distinction between the University getting a return on research discoveries via royalties from patents which it paid for and getting a return via a company set up to exploit research discoveries - in which it had an equity stake. Several interviewees ^(A, B, 2) added the caveat that in general, the University should decide whether or not to provide financial support for entrepreneurial academics on the basis of the same objective criteria which it employed with regard to its conventional investment activities. Only two ^(A, C) felt that another, less objective criterion should be taken into account - namely the value to the community of investing in a spin-off company located in

Liverpool.

Just one HoD ^(D) spoke against the idea of providing any kind of financial support for entrepreneurial academics, saying that funding was so short for "*so many pressing, urgent needs of the University's own activities*", the University was right not to make this a priority.

8.7 Incentives and Disincentives

(i) Exploitation of "Soft" IP

None of the HoDs or Deans interviewed knew whether Liverpool imposed an earnings limit on academics who choose to exploit their expertise via personal consultancy, though one ^(A) suggested that the University would be unhappy if anyone reported earning more than 20 per cent of their salary from personal consultancy. All but one felt that there was no need for an earnings limit, because the crucial point was not how much academics earned from extra-mural activities, but the amount of time they devoted to them; two remarked that if an academic could do his job well and earn lots of money from personal consultancy, "*jolly good*" ^(C) and "*best of luck to him*" ^(E). Just one HoD ^(D) suggested that an earnings limit might have value, in so far as it would define what constituted excessive, obtrusive consultancy; in view of academics' different earning power, it would need to be a guideline rather than a hard and fast rule, however.

All the interviewees except one ^(I) knew that the University levied a "tax" on academics' earnings from personal consultancy, but only three ^(A, B, E) knew that the "tax rate" was currently 25 per cent. Two ^(C, 2) had no idea what the "tax rate" was, while two believed it was still 10 or 20 per cent ^(D, F). Five ^(B, C, D, E, F, I) agreed in principle with Liverpool's policy of levying a "tax", but three ^(C, D, E) felt it was rather a high percentage rate, even though it covered the cost of professional liability insurance. Some interviewees ^(C, D, I) could not articulate why they were in favour of the University levying this "tax", while others ^(B, E) said the University had to cover the cost of the professional liability insurance it conferred on academics. One ^(F) regarded the "tax" as compensation to the University for time spent on non-academic activities, though he added the caveat that the University should distinguish between "*bread and butter*" consultancy and consultancy which, by virtue of breaking new ground, could be regarded as perfectly legitimate university work.

Two interviewees ^(A, 2) disagreed completely with the principle of levying a "tax". Both regarded it as a major disincentive to doing consultancy. Both felt that as long as academics paid for the resources they used, the University should acknowledge the benefits it reaped from individuals doing personal consultancy. One ⁽²⁾ pointed out that most departments in the Faculty would be even more-hard pressed to identify real-world undergraduate projects if they could not draw upon problems solved by individual members of staff acting as consultants. The other said:

"... [the University] should not clobber those people who are bringing in large research grants and are pump-priming those research grants with very small bits of consultancy, which is what is happening in almost every group in the School ... I invariably found that if somebody phoned and said - can we have a chat about something, within a year's time I'd have a big research grant to look at that thing. So, for instance, I think I got four or five Alvey grants by that. Every single one came that way. Of the three son-of-Alvey-type programmes, every single one came

that way. But if the University is so short-sighted as to think that I am going to spend my own time on a Sunday working to give them 25 per cent, then it's quite clear that I won't do it ..."

Opinions were divided as to whether consultancy was one of the criteria for promotion. Four HoDs ^(B, C, D, E) said they believed that consultancy was taken into account; one ^(B) reported that he remembered this being discussed at the highest level in the mid-1980s, and a formal decision being taken that it should count. Another ^(F) felt that "*creative consultancy*" was taken into account, while "*bread and butter consultancy*" was discounted. One Dean ⁽¹⁾ said that consultancy would only be taken into account if the case was properly argued, while the other ⁽²⁾ was sceptical about consultancy playing any part at all in the committee's deliberations. The remaining HoD ^(A) was certain that consultancy was not taken into account, no matter what the University's policy said; as a result, he went out of his way to deter young academics from doing consultancy - or short courses, or anything but research:

"... my advice to every young member of staff is - concentrate on your research. If you must do other things, do them if you've got time. But if you have got the time, my suspicion is that you are not going to get promoted ..."

Most interviewees felt that consultancy should count as a criterion for promotion, but that it should carry less weight than publications or a good track record in bringing in research income. One ^(D) said that consultancy was an indicator of an academic's external standing, while another ^(C) felt it was a service to the community.

(ii) Exploitation of "Hard" IP

Three interviewees ^(B, C, F) did not seem to know that the University had instituted financial incentives to encourage members of staff to "flag" potentially exploitable IP - though they knew about the percentage split of overheads between the centre and the department. Four ^(D, E, 1, 2) were aware that the University split the income from the exploitation of "hard" IP between the academic(s) concerned, the department and the centre, but were unaware of the relevant percentages. One ^(A) accurately detailed the split between the BTG and the University, but did not know how the University split the proceeds.

When told how the University divided income from the exploitation of "hard" IP, none of the interviewees felt that the 25 per cent which went to the department would act as an incentive to HoDs to encourage members of staff to "flag" potentially exploitable research results. One ^(B) pointed out that it was an insignificant percentage when compared to the 90 per cent which departments retained in overheads. Another ^(A) said that in principle it was "*nice for heads of department to get a bit of soft money kicking around from the exploitation of IP*"; in practice, it was a meaningless incentive; the centre gave money with one hand but took it away with the other, marking it down as departmental savings. One ^(C) remarked that as a matter of course he encouraged members of staff to "flag" potentially exploitable research results, irrespective of this supposed incentive; in his view, it was not really an incentive, in any case, since there was no guaranteed reward for someone taking the trouble to notify the University. Another ^(D) doubted it was worth HoDs trying to encourage their staff since, unlike their counterparts in France, British academics were motivated by the intrinsic value of their research, rather than by the thought of deriving an income from it. This particular HoD felt that if their research happened to generate an income, academics in his department would probably want the

money to be spent on their research group, rather than keep it personally. Four interviewees ^(B, E, F, 2) thought that this was a very individual thing, that some academics would want their personal share of income from IP to go to their research group, while others would prefer to put it towards the ubiquitous BMW. Two ^(A, 1) felt their staff would - and should - want to keep their personal share of the income, whereas another ^(F) regarded this as a corrupting influence:

"... I think that is really a rather dangerous route. I suspect a lot of people would be [swayed by the prospect of generating an income] ... It wouldn't be serendipity next time round, would it?"

Only three interviewees ^(A, D, E) were aware that it was Liverpool's policy to levy a "tax" on the income which academics make personally from entrepreneurially exploiting "hard" IP arising from their research - though none of them knew the basis upon which this "tax" liability was calculated. Upon hearing that it was either 15 per cent of the company's annual profit or 25 per cent of the income paid to the academic entrepreneur personally, one HoD ^(F) felt it was appropriate for the University to be recompensed in this way:

"... I don't regard an academic as employed from 9-5. I regard him as employed seven days a week and therefore the commitment to the University is bound to be diluted in some way if they are doing that ..."

Two HoDs ^(B, D) initially applauded the University's flexibility *vis-a-vis* the way in which the "tax" was calculated; on reflection, both came to the conclusion that since the University was not taking any of the risk, it should not expect to share in either the company's or the individual's profit. One of the Deans ⁽²⁾ expressed the latter view initially but decided on reflection that it was fair to "tax" academics with companies on the same basis as those who did consultancy without sheltering behind a company framework. Three interviewees ^(C, E, 1) said they had not formed an opinion about this; after further reflection one ^(E) made the same analogy with the "tax" on consultancy. The remaining HoD ^(A) pointed out that it was possible to circumvent this "tax" if the circumstances warranted it; he cited an instance of a would-be academic entrepreneur who approached the Vice-Chancellor directly and was told at the end of the discussion: "... good on you, don't tell anybody".

Four interviewees ^(B, F, 1, 2) said they had no idea whether academics who took the trouble to "flag" potentially exploitable IP were liable to be rewarded in terms of promotion. Only two ^(A, D) knew that the promotions criteria made no reference to the protection or exploitation of IP. One ^(A) interpreted this as an indication that academics' contributions to technology transfer would not be taken into account, while the other ^(D) felt that the promotions committee would take account of commercial success, as well as academic success. A fellow HoD ^(C) said that on the basis of past experience, the University was certainly prepared to promote staff who generated a large income for the University - by whatever means, while the remaining HoD ^(E) was of the opinion that IP played no part in the criteria for promotion. Asked whether they thought that IP which was successfully protected and/or exploited should be a criterion for promotion, only two interviewees gave an unequivocal answer. One ^(F) said he would be "*horrificed*" if this was regarded as important by the promotions committee. The other ⁽¹⁾ felt it should depend on the calibre of the IP and the academic's contribution towards its successful exploitation; one patent might be worth twenty papers in refereed journals - or it might be insignificant; an academic who had driven his discovery forward in a fiercely competitive situation could

be regarded as demonstrating ability on an international scale.

Asked whether they thought entrepreneurial exploitation of "hard" IP arising from research was taken into account by the promotions committee, one of the Deans ⁽²⁾ felt it would be seen as negative, since it was bound to divert academics from the activities which were rewarded by promotion. One HoD ⁽³⁾ thought that entrepreneurial exploitation of "hard" IP was an outside activity which had no bearing on the promotions process, while the other Dean ⁽¹⁾ thought the promotions committee would take the view that there was less of an intellectual case to be made for business activities than for consultancy or patenting. Another HoD ⁽⁴⁾ simply said:

"... If [a] guy is bringing in a large research income and is publishing and his teaching is adequate, we can get him promoted. If he is a good teacher and a superb entrepreneur, we can't ..."

A fellow HoD ⁽⁵⁾ thought that it depended on the membership of the promotions committee; some people might wish to discount activities which generated an income for the academics concerned on the grounds that they had already had one reward. Only one HoD ⁽⁶⁾ felt that entrepreneurial activity would be included in the criteria for promotion.

Asked whether entrepreneurially exploiting IP should be a criterion for promotion, one interviewee ⁽⁷⁾ dismissed this as a purely extra-mural activity, while another ⁽¹⁾ said that academic entrepreneurs were already getting a financial reward and he would not lose any sleep if their business activities were not taken into account. However, one HoD ⁽²⁾ said that entrepreneurial exploitation of IP should be a criterion for promotion because it enhanced the image and status of the university in the community, while a second ⁽³⁾ felt that in some cases, an academic's entrepreneurial activities could benefit the department and the university, as well as the community. This particular HoD said that in principle he would lobby for the promotion of academic entrepreneurs who fitted this description, but observed: *"in the kind of culture I live in, in the Faculty of [...], the case would have to be an extremely good one"*.

STRATHCLYDE UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

Strathclyde University's roots go back to 1795, when the John Anderson, Professor of Natural Philosophy in the University of Glasgow, bequeathed the bulk of his property to the public "*for the good of mankind and the improvement of science in an institution to be known as 'Anderson's University'*". Anderson's Institution, known subsequently as Anderson's University and then Anderson's College, was the first of a number of institutions providing a technical education in Glasgow. In 1886 these were amalgamated into the Glasgow and West of Scotland Technical College. In 1912 King George V directed that it should be known in future as the Royal Technical College. In 1913 the Royal Technical College was affiliated with the University of Glasgow and in 1919 it was recognised as a University College by the newly-founded University Grants Committee. In 1956 it was renamed the Royal College of Science and Technology, while in 1964 it merged with the Scottish College of Commerce, whose roots go back to 1845. One month later, in June 1964, it received its Charter as the University of Strathclyde. Strathclyde is usually equated with the former Colleges of Advanced Technology which were raised to university status in 1966.

1.2 Size

By the beginning of the 1980s Strathclyde was a medium-sized university by UK standards, measured in terms of student FTEs. In 1981 Strathclyde was advised by the UGC in 1981 to reduce the number of home students registered in 1979/80 by 4 per cent within the next three sessions. As **Figure 2** revealed, this was slightly below the national average, but at the time Strathclyde was already recruiting 12 per cent of its students from overseas, which was slightly above the national average. At the same time the UGC announced that Strathclyde's recurrent grant would be reduced by 18 per cent between 1980/81 and 1983/84. As we can see from **Figure 2**, this was slightly above the national average. By most methods of reckoning, then, Strathclyde was treated neither particularly harshly nor particularly leniently by the UGC.

In 1986 the UGC indicated that Strathclyde should increase its student numbers by 10.03 per cent over the next four sessions ⁽¹⁾. In fact, Strathclyde managed to increase its student intake by some 20 per cent over the decade ⁽²⁾. Over the course of the 1980s, Strathclyde was also able to increase its full-time academic/academic-related staff by around 12 per cent, while the number of part-timers increased by a factor of three over the same period ⁽³⁾. In the process, Strathclyde increased its size relative to certain other universities during the 1980s.

Structurally, Strathclyde underwent a number of changes during the course of the 1980s. It started the decade with the four Schools provided for in its Charter: Science, Engineering, Arts & Social Sciences and Architecture. During the 1980s Strathclyde reorganised the first three into Faculties of the same name and established a separate Business School, while the former School of Architecture merged with the Department of Building Science and became part of the Faculty of Engineering.

1.3 Science Base

In 1988/89 the Faculty of Science incorporated ten Departments: Mathematics, Physics & Applied Physics, Computing Science, Chemistry, Applied Geology, Bioscience & Biotechnology, Pharmacy, Physiology & Pharmacology - and Statistics, which was founded prior to the start of the 1989/90 session, but did not entail the acquisition of new staff ⁽⁴⁾. The Faculty of Engineering grouped together six Departments: Design, Manufacture & Engineering Management, Mechanical & Process Engineering, Electronic & Electrical Engineering, Civil Engineering & Environmental Health, Mineral Resources Engineering and Architecture & Building Science.

On an aggregate basis these 15 Departments accounted for about 60 per cent of the University's academic/academic-related staff at the end of the 1980s ⁽⁵⁾. They were responsible for 57 per cent of Strathclyde's undergraduates and 76 per cent of registered research students ⁽⁶⁾.

As we can see from **Figure 6a**, in the UGC's 1985/86 assessment of universities' research strengths in the natural sciences, engineering and technology, no subject areas at Strathclyde were rated as outstanding, five were rated as above average, six as average and seven as below average ⁽⁷⁾. It was suggested that if the ABRC's recommendations were ever implemented, Strathclyde would be assigned to the "X" category; accordingly, the university would be able to offer "teaching across a broad range of fields and substantial research activity in particular fields, in some cases in collaboration with others" ⁽⁸⁾.

Figure 6b shows that in the 1988/1989 assessment of universities' research strengths in the natural sciences, engineering and technology, one "unit of assessment" was awarded a "5", four were awarded a "4", nine were awarded a "3", five were awarded a "2" and four were awarded a "1" ⁽⁹⁾.

1.4 Research Grant and Contract Income

Figure 41a reveals that in 1984/85, Strathclyde ranked 11th in terms of £ earned in external research grants and contracts, but 23rd in terms of the percentage of its total income which this external revenue represented, namely 14.9 per cent ⁽¹⁰⁾. In that year Departments in what are now the Faculties of Science and Engineering brought in over £5m, accounting for close to 80 per cent of the university's total income from research grants and contracts ⁽¹¹⁾. By 1988/89, as we can see from **Figure 41b**, these same Departments had nearly doubled their 1985 earnings, generating over £10m and accounting for 82 per cent of the university's total income from research grants and contracts ⁽¹²⁾. The University as a whole was attracting more external research grant and contract income than any UK university without a medical school ⁽¹³⁾.

Although the science base was able to maintain - indeed, slightly increase - its share of the University's total external research and contract funding, the pattern of sponsorship which it attracted was noticeably different from the pattern four years earlier, as we can see by comparing **Figures 345** and **346**. There was a significant drop in the proportion of funding received from industry/commerce - indeed, in 1988/89 this sector contributed less in terms of hard £ than it had in 1984/85. In contrast, there was a significant increase in the proportion of funding from local authorities, "all other sources" - and some increase from the EC, too; this is difficult to quantify since the EC was not treated as a separate

category in 1984/85. The proportion of funding from the Research Councils and charities - which usually grant ownership of IP to the University - showed little change. In 1984/85 they contributed 39 per cent of the research grant and contract income earned by the science base. By 1988/89, the proportion had risen marginally - to 40 per cent. In the same year, the participating universities attracted no more or proportionately less funding from the Research Councils and charities than they had four years earlier.

2 HISTORY OF IP EXPLOITATION

2.1 Background

Strathclyde's interest in both industrial liaison and technology transfer dates back to the 1960s. In fact, where industrial liaison was concerned, the University was continuing a tradition started by the Royal College of Science & Technology. The Royal College had appointed two part-time ILOs at the beginning of the 1960s ⁽¹⁴⁾.

2.2 Structures

(i) "Soft" IP

Once it became a university, Strathclyde appointed two full-time ILOs, who reported to the HoD of the Business Studies Department. In 1968 they were replaced by two new ILOs - both with industrial experience ⁽¹⁵⁾ - who were asked to report to the HoD of the Production Engineering Department. Their remit was to make "soft" IP - *ie.* the expertise of University staff - available to solve industry's problems. It was seen as a service which the University - and several other HEIs in Scotland ⁽¹⁶⁾ - provided, not as an opportunity to make money. The ILOs in all these institutions were part-funded by the Ministry of Technology, which contributed close to £300,000 to Strathclyde alone ⁽¹⁷⁾.

(ii) "Hard" IP

The University does not appear to have inherited a patent portfolio from the Royal College. However, due largely to the influence of a former Bursar, "*a very shrewd businessman*", Strathclyde was quick to recognise the long-term value of identifying, evaluating, protecting and exploiting "hard" IP. Although this was not part of the ILOs' remit, initially the University did not set up a dedicated/partly dedicated structure to identify, evaluate and protect IP. The onus was on individual researchers to flag potentially exploitable research discoveries. The Bursar's office ⁽¹⁸⁾ would try to evaluate them by seeking the opinion of a patent agent and peers within the University:

"... It [was] an instinctive judgement by him and perhaps one or two senior academics [whom] he talked to casually ..."

Strathclyde's first patent application dates back to 1972. The size of the University's patent portfolio by 1984 ⁽¹⁹⁾ suggests that Strathclyde adopted a fairly liberal stance towards protecting IP which academics "flagged":

"... Anybody coming forward with what seemed like a reasonable invention could be fairly sure that it would be treated seriously and would receive protection if it looked half worthwhile ..."

(iii) Development and Exploitation

Strathclyde did set up a structure dedicated to developing promising research discoveries into products or processes which could be exploited commercially. It was able to do this as a result of financial support provided by the Ministry of Technology. In 1968 ⁽²⁰⁾ it established the Centre for Industrial Innovation (CII) with its own laboratory and workshop, in its own, purpose-built building. The CII was the first university-wide unit in the UK to try to systematically develop and exploit "hard" IP. It had departmental status but unlike other departments, it had a manager and a devolved budget. It was not part of the existing School structure and it reported to the Court ⁽²¹⁾.

In 1973/74, Government funding for this programme was axed without warning. Strathclyde immediately terminated its industrial liaison activities, but was obliged to retain the two industrial liaison officers ⁽²²⁾. The University decided to try and keep the CII going on a largely self-funding basis. In its heyday, the CII employed close to 30 full-time members of staff. This was reduced to single figures in the early 1980s, following the downturn in the economy.

In 1983, Strathclyde's new Principal closed down the CII, believing that it was not the best mechanism to achieve the University's objectives. The CII had found, to its cost, that marketing the products and processes it had developed was no easy matter. However, it was not simply a question of financial viability:

"... The fatal flaw was that by the time it had acquired four or five projects, it became very inward-looking. That was its task. It dedicated its resources to having some sort of success with those [projects]. It tended to reject or rebuff anybody else who came along who wanted to add to its projects. It was fully stretched.

"... people ... were very upset that their own particular work - which they regarded, of course, as being very important, as [having] potential value (and they were probably right) ... and disappointed that the University, through its CII operation, just gave them the cold shoulder, wouldn't take any interest. And there was nobody else who had the time or willingness to help ..."

"... [the CII] lost the sympathy of the academic staff. They ended up saying that it was no use to anybody, a burden on the University ..."

(iv) Interregnum

Responsibility for ensuring that "hard" IP was developed and exploited passed back to the Bursar's office, which pursued a policy of retaining ownership of IP rather than assigning it. The Deputy Bursar actively sought out licensees and demonstrated an ability to negotiate business-like agreements to exploit "hard" IP. This included Strathclyde's single most successful discovery to date - the drug "Atracurium" ⁽²³⁾. Moreover, although he concentrated initially on licensing to existing companies, by the early 1980s he had licensed IP to one joint venture started at CII's initiative and to two spin-off companies founded by members of the academic staff. Indeed, he was instrumental in turning what might have been independent

spin-off companies into joint ventures, with the University providing a proportion of the start-up capital required ⁽²⁴⁾.

Despite their jaundiced view of the CII, members of the academic staff were still bringing new discoveries to the administration's attention. The University commissioned consultants to advise it on how best to exploit its IP and provide a service to industry ⁽²⁵⁾. As a result of their report, two separate structures were established.

(iv) "Soft" IP Revisited

Since the service provided by the ILOs had come to an end nearly ten years earlier, Strathclyde Technology Transfer Ltd (STT) was set up at the end of 1983 to identify areas of technological need, to employ its own full-time consultants in these areas and to contract members of the academic staff as an additional consultancy resource when needed. Although STT was primarily designed to market Strathclyde's service capability, it was also intended to market its research capability. STT was backed by a grant of £187,000 over three years from the Scottish Development Agency and the University. It was expected to be self-financing by the fourth year and reported to a Board of Directors on which the University had a majority. Its Chairman was a lay member of Court.

(vi) "Hard" IP Revisited

Early in 1984 Strathclyde set up R&D Services (RDS) to handle "hard" IP more effectively than the CII had. Strathclyde was able to fully support RDS from general funds ⁽²⁶⁾ - unlike the CII, it was effectively funded by the UGC from the recurrent grant. Initially, RDS was staffed by a Director ⁽²⁷⁾, a Deputy Director ⁽²⁸⁾ and one secretary. The RDS's budget was determined each year by Court at the same time as the administration budget was set - *ie.* RDS was funded separately from both the academic and the administrative budget. This reflected RDS's unique status, sitting between the administration and the academic sector.

The decision to set up RDS, its remit and approach were determined by the new Principal alone, not by a University committee or working party. His vision for RDS was strongly influenced by a series of conferences which he attended ⁽²⁹⁾, and by the negative impact which the CII had had on the academic community. RDS was very much the Principal's "baby" and the Director, appointed in March 1984 on administrative grade 6, reported directly to the Principal.

2.3 Policy

It was the Principal's wish that RDS should operate - and be seen to operate - in a very different way to the CII. This was the rationale underlying a number of policy decisions which he took. Firstly, no member of the academic community was obliged to use RDS to get his discovery evaluated, protected and exploited ⁽³⁰⁾:

"... [in 1984] the attitude was: the CII was a failure. Here's the Principal setting up a new R&D Services Department - the same thing by a different name. Another financial burden that the University has to carry. This means that [fewer] academics will be employed and more administrators instead.

"The atmosphere was really quite negative and ... if the Principal had said: you will do this, you will use this - by law ... there would have been some very long debates in Senate. Whereas [RDS] was presented as a voluntary organisation [which] had to earn [its] spurs ..."

Secondly, in order to attract academics to use RDS, it was given a remit which was considerably wider than CII's. RDS was made responsible for all aspects of external research grants and contracts - from providing extensive information on sources of funding ⁽³¹⁾ to costing projects, drafting proposals, negotiating contracts and administering successful grants/contracts. Prior to this, Strathclyde's contribution had been limited to administering successful grants/contracts, a service provided by the Bursar's office.

Thirdly, if academics chose to bring a discovery to RDS' attention, they would not be rebuffed - nor would their discovery be "*taken away*" from them. The manner in which it was evaluated, protected and exploited would be decided by consensus and implemented on the basis of teamwork. They could benefit from access to RDS' patent budget, from RDS' negotiation skills, even from RDS' business skills.

This reflects the fourth policy decision: RDS should be far more proactive, indeed, far more entrepreneurial than its predecessor:

"...[the Principal] realised it was a business activity to transfer [technology]. It wasn't liaison. It wasn't just a question of acting as an intermediary. It was going out and doing the business. That's what he saw ..."

2.4 Incentives

Strathclyde - and the Royal College before it - had always relied almost exclusively on individual researchers having sufficient awareness, interest and initiative to consider the commercial value of their discoveries and to tell the appropriate authority if anything looked promising. From the earliest days the University had instituted a simple financial incentive to encourage individual researchers to do this: all revenues generated by the exploitation of their discovery were shared after reimbursement of costs on a 50:50 basis between the inventor(s) and the University, with no upper limit. Since five or six discoveries were generating an income of around £300,000 p.a. by the mid-1980s, this was a very real incentive for a handful of researchers. They were the lucky ones; there is little doubt that CII's inability to deal with more than a certain number of projects sometimes led to IP being squandered and researchers being denied their just reward. For most researchers, though, it was not only a hypothetical incentive; many were not even aware it existed.

2.5 Regulations and Documentation

Despite its long-standing interest in "hard" IP, Strathclyde did not produce a dedicated document which summarised the University's policy *vis-a-vis* IP. Academics were obliged to deduce it from isolated paragraphs and sentences in the Staff Handbook. The 1978 Staff Handbook, for instance, reflected the University's focus at that time on "hard" IP. It indicated that - on the basis of practice ⁽³²⁾ - the University made a claim over "*inventions and developments for which members of staff [were] responsible*". It intimated that this might include inventions and developments arising from certain types of outside employment, too. It was stated that "*no public disclosure should be made in respect of any invention until the*

possibility of obtaining patent protection has been considered by the University and the inventor(s)" ⁽³³⁾. It was unclear who had the final right of decision in a publish/patent conflict.

The Staff Handbook stated that, even if a patent application had already been filed, academics were expected to assign to the University their "*rights and interest in the invention in consideration for which the University binds itself to share with the inventor(s) any royalty income which may arise from exploitation of the invention*". The basis on which the royalty income was shared was outlined elsewhere ⁽³⁴⁾. It was indicated that the CII was responsible for "*actively pursu[ing] the further development and commercial exploitation of the invention ... in consultation with and with the participation of the inventor(s)*".

These were the only written references to IP; Strathclyde's terms and conditions of employment made no reference to IP.

3 THE KINGMAN LETTER

When Sir John Kingman's letter arrived, Strathclyde's Principal passed it straight to the Director of RDS, asking how the University should respond. This was more a question of courtesy and detail than a fundamental question about whether Strathclyde should accept the Research Councils' offer. Neither the Principal nor the Director of RDS had the slightest hesitation in accepting the offer:

"... [It] fitted our policy very tightly and I had no difficulty persuading ... it was instinctive to the Principal that we should go it alone ..."

For some time Strathclyde had been dissatisfied with its existing relationship with the BTG:

"... I used to object, in the old days, to the University's having effectively to bundle up the year's research results and send them off down to the BTG, who would take six months to say no to 99.9 per cent of them. A thoroughly negative process!"

... and had already been trying to take the initiative:

"... We [had already been] knocking on BTG's door and saying - are you going to say yes or are you going to say no, because if you are going to say no, we want to run with it ..."

The Director of RDS drafted a 4-5 page response to the Kingman letter, which was duly approved by the Joint Management Committee ⁽³⁵⁾. Together with 33 other universities and colleges, Strathclyde's proposals were accepted by the Scrutiny Group in its first round of deliberations. The letter of authorisation was sent on 23 July 1986.

4 CURRENT POLICY AND STRUCTURES

4.1 Structures

(i) "Soft" IP

In the intervening years, one of the structures set up in 1983/84 in the wake of the consultancy report has been wound up. The business plan proposed for STT presumed that the University would allow it to employ its own, full-time consultants. In fact, experience of CII deterred the University from following this recommendation. Strathclyde decided that all consultancy work should be undertaken by members of the academic staff. Since they expected to be paid at rates close to those which STT was able to charge, STT had to operate on very reduced margins. Moreover, its volume of work was inhibited by the University's ruling that no member of staff should spend more than 25 days per year on consultancy. Although STT's service activities became self-financing by the fourth year, as required ⁽³⁶⁾, reduced margins obliged it to sub-contract to RDS the marketing of the University's research capability. Moreover, STT was not popular in the Departments:

"... The biggest inhibition to operating within [STT] was the fact that we were seen to be spongers on their activities. There we were, taking their percentage ..."

In 1989 Strathclyde established an Enterprise Office, which is designed to achieve certain of STT's objectives in a different way. Instead of dealing only with individual academics, the Enterprise Office will try to encourage suitable groups of academics to provide a service by exploiting their expertise collaboratively. These groups form what Strathclyde refers to as "business units" ⁽³⁷⁾ within Departments, with profits shared between members of the group and the Department. The Enterprise Office is a central overhead on the University ⁽³⁸⁾, but the cost is perceived less clearly at the Departmental level than STT's 50 per cent was. Like RDS, academics use the Enterprise Office because they choose to, not because they are obliged to.

(ii) "Hard" IP

In the intervening years, RDS has expanded considerably. In 1989/90 it had a Director, a Deputy Director, a Liaison Officer, a Marketing Officer, a Contracts Officer and - from 1987 - the only dedicated IPR Officer in a UK university, an internal appointment ⁽³⁹⁾. There were also two administrative assistants plus secretarial support. RDS was originally treated as a service activity and fully funded by the University. It is still treated as a service activity which currently costs Strathclyde around £0.3m p.a. However, when the IPR Officer was appointed, it was agreed that within five years, the identification, evaluation, protection and exploitation of IP should become a self-financing activity. Having a dedicated IPR Officer makes it possible to gauge the cost fairly accurately ⁽⁴⁰⁾. It is a substantial cost; when the IPR Officer assumed responsibility for the University's patent portfolio, patenting costs alone were running at £140,000 p.a. However, management of the University's patent portfolio, as opposed to administration of it, has already generated savings of around £70,000 p.a. ⁽⁴¹⁾. RDS envisages no problem in meeting this particular target; within 12 months of being appointed, the IPR Officer had generated his own salary from newly-identified IP ⁽⁴²⁾. RDS does not believe it will require another "Atracurium" to cover all the direct costs connected with identifying, evaluating, protecting and exploiting IP:

"... The chances of coming up with "Atracurium II" are statistically quite remote, but one could build a portfolio of licenses, some quite modest, which - over a period of 5, 6, 7 years - would approach [the earnings from] "Atracurium" ..."

Strathclyde has no plans to make RDS as a whole self-financing:

"... It's not arithmetic that you can do very sensibly because if we were to set up RDS as a small company [paying] for itself, [we] would have to take a commission off projects. [We] would be a successful or an unsuccessful company depending on whether [we] took 20, 30 or 40 per cent commission.

"[RDS] is not a company. Its just a construction. Therefore, doing the bottom line calculation is just meaningless. I think it is foolish of organisations like mine to pretend that they run a business, when in fact the bulk of the business is carried out by the academic staff ..."

4.2 Regulations and Documentation

Strathclyde does not state anywhere what constitutes IP or the basis of the University's claims over it. Moreover, neither the Staff Handbook for 1989/90 nor the terms and conditions under which academics are appointed make reference to the 1977 Patent Act or the 1988 Copyright, Designs and Patent Act. The Guidelines which are given to new appointees simply state that they will be required to assign to the University all rights in IP which they generate, without indicating the basis on which this assertion is made. Neither RDS nor Strathclyde's administration see an immediate need to be more specific. In the light of legal advice, Strathclyde believes it would not have to go to court to enforce its rights as an employer over members of staff who were contravening them. If, at some future date, the terms and conditions of appointment are redrafted, RDS would consider including a reference to the 1977 Patent Act, however.

Nor does RDS see the necessity for a dedicated document which outlines the different types of IP and summarises its policy *vis-a-vis* identifying, evaluating, protecting and exploiting IP:

"... [We] would resist putting it down in detail because you are then coming up with definitions that are capable of being disputed or argued [about] ..."

Academics who are not in close contact with RDS are still obliged to deduce from the Staff Handbook what to do if they believe they have discovered something exploitable. The current Staff Handbook has changed in only one respect since 1978: it refers to "*the Research & Development Office*" (*sic*) instead of CII. However, the Personnel Office has drafted more detailed information on Strathclyde's policy and practice *vis-a-vis* exploitation of research results for inclusion in the next edition of the Staff Handbook. This indicates that the University owns all IPR generated by its employees in the course of their duties but that it waives its rights to copyright in respect of academic articles, journals and books. It reminds members of staff that the University has authority to exploit all inventions arising from Research Council sponsorship. It states that members of staff are required to "*execute all documents which may be required relating to exploitation, including an inventorship declaration document in respect of patentable inventions*". It adds that the interests of the University and researchers should be preserved with regard to the development and commercialisation of research, but - "*notwithstanding the academic requirement to publish*" - academics should consider the possibility of commercialising their discoveries before

disclosing them publicly in written, oral or other form. Discussions with industry should take place under "conditions of confidentiality" using "agreements and procedures" which RDS recommends.

4.3 Incentives

(i) Financial

Strathclyde still has only one formal incentive to encourage the academic community to think in terms of the commercial potential of their research discoveries and take appropriate steps - a financial incentive. However, during the course of 1989/90, following recommendations from the IPR Officer, there were changes in the way that this incentive operates. The IPR Officer was concerned about the fact that the University centrally kept 50 per cent of the revenue, instead of sharing it with the Department which generated the IP:

"... I said it had to be [changed] or else my job [was] impossible. In my job I target HoDs as extremely important players. Without their assistance ... they can say - no, we're not taking this project on ..."

Since the University returns a proportion of overheads to Departments ⁽⁴³⁾, RDS regarded this as "a complete anomaly". Initially, the IPR Officer proposed a 40:40:20 split between the inventor(s), the centre and the Department. Later, he suggested that some form of sliding scale be incorporated, to prevent the income from IP creating "haves" and "have-nots" in the University:

"... If you take the Department of Pharmacy - if there were a 40:40:20 split [with no sliding scale], they would be getting £200,000 in addition to everything else they got. Because you couldn't cut it off arbitrarily. Then it wouldn't be an incentive any more ..." ⁽⁴⁴⁾

A working party was established to examine IP and revenue-sharing arrangements ⁽⁴⁵⁾. Its report was accepted first by the University Management Group and then, in April 1990, by Court. Details of the new scheme were announced in the following university newsletter ⁽⁴⁶⁾.

(ii) Career Progression

RDS is also under pressure from the academic community to lobby for changes in the promotions criteria, which do not formally take account of the effort involved in identifying, evaluating, protecting and helping exploit IP - or in doing contract research for industry. RDS believes that in practice some of this is taken into account:

"... If somebody has got good commercial contacts and has a number of patents that are being exploited and hence has published a number of papers, it's a natural reaction that that will be taken into account."

"There is a lot of pressure on us. It is a very active topic. They say that Strathclyde University is very much a high quality interface with industry, that staff are being encouraged to do all sorts of things in conjunction with industry, patents included, and they would be all the more willing to do it if this was formally recognised.

"They want a kind of balance. They do training courses for industry, and that's not really taken into account. If you go and work for industry, you end up with less academic papers, perhaps ..."

RDS feels that where IP is concerned, any changes would need to be handled very sensitively:

"... If a very vigorous promotions aspect was incorporated into the system for someone who was doing very well generating commercial interest in the University, that might be sneered at. It might be counter-productive. You know - I'm carrying this lecture load and you're going off to do your bit in the commercial world ... I'm as worthwhile as you are - and there you are getting a professorship whilst I'm carrying a load. It would have to be very delicate ..."

RDS is not lobbying for IP-related work to be explicitly included in the promotions criteria, despite the fact that it sees development, protection, licensing and forming companies as *"part and parcel of the continuation of research"* and quite in keeping with the University's Charter. It feels researchers should be rewarded for doing this - but that there are two kinds of reward: *"academic brownie points"* and *"commercial brownie points which tend to come in the form of £1-notes"*. Researchers should recognise that, the further down the exploitation route they go, unless they publish their discoveries, the reward changes character accordingly. Where spin-off companies are concerned, academics should make an informed choice:

"... Those people who have spun-off companies somewhat ruefully say that it queers their academic career, rather than supports it ..."

"... You either follow an academic career or, if you go and run a company or get involved with your own company, you're following a different career to your peers ... It's difficult to claim you are both a full-blooded academic and a full-blooded entrepreneur ... What you lose on your academic career, you're going to gain - with the Jaguar parked outside your office - from your commercial career. You can't have all things ..."

(iii) Flexibility

There is, perhaps, a third incentive. RDS believes that the way it operates - as opposed to the way the CII operated - should encourage academics to bring research discoveries to its attention. It is a very flexible organisation which can take over much of the exploitation process, if that is what an academic wants. Equally, it will involve academics in every stage of the exploitation process, if that is what they want.

4.4 Sanctions

If an academic chose to publish a potentially exploitable research discovery instead of first bringing it to RDS' attention and having it protected in some manner, Strathclyde would regard that as his choice:

"... Nothing would happen. It would be regarded as an academic freedom. It's a tradition that if somebody wants to publish their work, they are free to do so ..."

In some cases RDS would consider that it had failed in its mission and would immediately "*do missionary work*" to reinforce the point that one can often both protect and publish. However, there would be no question of sanctions:

"... I get more from the system if I seem always to be balancing my commercial disciplines against academic freedom. I'm seen to participate in that debate and I'm seen to be part of the balancing mechanism. If I work in that way, I get much more acceptance and co-operation from academic staff. If I'm seen as strictly commercial, then they are always at arms' length from me. They always think: he's working because he's got a bottom line he's got to toe ... We've always [worked] through debate and discussion rather than saying - here's a bit of paper, it's got Court authorisation and you will do this ..."

On the other hand, if it was found that a researcher had used IP which he generated for his own or another company's benefit, excluding the University, it would be dealt with at the highest level. This has already happened once:

"... The Principal has given him reprimands. The Dean of Faculty has given very aggressive reprimands academically. The Principal has looked at both the academic side and the commercial side. I've given him an inquisition in this office. We've gone through it in detail ..."

In this situation, Strathclyde did not cite the 1977 Patent Act. It simply stated that as an employer - and as a contractor to the SERC - it had ownership of the invention.

The IPR Officer believes that where software is concerned, this is probably a frequent occurrence; it would be naive not to think so. He feels that Strathclyde's approach should always be to recoup what it can commercially. However, neither RDS nor the University sees it as grounds for dismissing the member of staff.

5 THE EXPLOITATION PROCESS

5.1 Interpretation of Government Statements

It could be argued that Strathclyde's approach to identifying, evaluating, protecting and exploiting IP operates in precisely the way that Sir Keith Joseph envisaged. The Secretary of State expressed the hope that universities would encourage academics to exploit their discoveries themselves and give help and guidance to those who wished to do so. Strathclyde certainly believes it is fundamentally wrong to "*take away*" a researcher's discovery and handle it "*out of sight*". It sees it as essential for academics to be "*deeply involved*" in the transfer of their technology, and to support and guide them in their efforts, whether this

involves licensing to an existing company or to a start-up company founded specifically to exploit the IP in question.

However, the Secretary of State's statement left considerable scope for interpretation. It was discussed at some length at Strathclyde, which saw it as naive:

"... We threw out the literal interpretation, which mean that they should all become mini R&D Services and form companies themselves.

"If we allowed that to happen, we recognised we would have chaos on our hands ... There [would be] too much enthusiastic ignorance. People would be making an awful mess of it. We said that exploitation carried out on the back of commercial innocence [and] ill-conceived agreements could end up in lawsuits for everybody, or at the very best, major disappointments. At worst we could be taken to court for not fulfilling our agreements ..."

Strathclyde encourages academics to become involved in exploiting their discoveries. It supports and guides them. However, the University never delegates or relinquishes authority to a member of the academic staff ⁽⁴⁷⁾.

5.2 Identification

Despite having a dedicated IPR Officer, the ratio of RDS staff to academic staff means that Strathclyde still has to rely heavily on researchers bringing potentially exploitable discoveries to its attention. RDS' tactics - which concentrate on information/ awareness raising - are geared to making this happen. Informal, rather than formal tactics are regarded as the most effective, as are non-bureaucratic rather than bureaucratic ones:

"... you can lead an academic almost anywhere but you can't push them ..."

The academic community at Strathclyde was not immediately informed about the removal of the BTG's monopoly, the Research Councils' offer or the Strathclyde's response, though *"anyone who was an active player in IP at that time was told [informally]"*. However, when the IPR Officer was appointed in December 1987, he used the University newsletter to explain that the post had been created in response to the University being given rights over and responsibility for IP arising out of Research Council-funded projects. When Research Council grants are awarded, the IPR Officer sends a standard memorandum to grant holders, reminding them of the conditions under which projects are funded, in particular the conditions relating to commercial exploitation. Grant holders are asked to arrange a meeting with the IPR Officer *"to discuss the potential for the exploitation of the results from this project"*. At present, academics whose research is funded from other sources do not receive targeted reminders of this nature.

In general, the IPR Officer believes that face-to-face reminders are more effective than *"junk mail"*. He has instituted a seminar programme which is designed both to raise his profile and raise awareness of IP. He has concentrated on specific Faculties, or specific Departments within a Faculty, rather than a University-wide programme. He encourages HoDs to invite him into Departments to give seminars. Attendance is voluntary but they are usually given over sandwiches at lunchtime to avoid conflicting with other commitments. The IPR Officer recognises that not everyone shares his *"burning interest"* in IP and tries to keep the seminars *"light"*. He has two major objectives. The first is to describe different types of IP, to outline

the five different ways in which IP can be protected, according to type, and to emphasise that publishing and patenting need not be mutually exclusive. The second is to change the attitude of the 25-30 per cent of the academic community which does not see the need to think about exploiting IP:

"... [The ones who say] - I don't get involved in any of this company stuff. Money is dirty. Let me get it from the SERC. These people are unaware of condition {13a}. Even the Research Councils insist, they make it an obligation that you must think about commercial exploitation, you must think about money, this dirty stuff that nobody wants to touch ..."

The IPR Officer feels he is able to get this message across more successfully because he himself has been a scientist:

"... It's a really important aspect of it that I am not some sort of cold, grey administrator. I might look that way now, but I [am] a scientist who [has become] an administrator. So, I know what it is like. I [was] in the Department for 17 years ... I know [all about] trying to get on with the job ..."

RDS does not believe that certain subject areas within the science base are necessarily more likely than others to generate exploitable IP:

"... It comes down very much, I think, to the style of a particular Department and the Head of that Department ... The Bioengineering Unit ... happens to be very applications-oriented and there is always a steady stream of patentable material coming through it ..."

"... If [someone] were to come and say - of course, IT is a key area, I would say that kind of analysis is nonsense. It just so happens that IT doesn't produce a great deal of IP for licensing. But the same positions filled by a different type of academic ... I think it could be a flood ..."

Strathclyde has not tried to raise the academic community's awareness of IP on a University-wide basis. The IPR Officer has not contributed a session on IP to the University's Staff Development Programme; nor has he considered speaking at the Staff Induction Programme.

Ideally, RDS would like to implement one or two fail-safe mechanisms, such as scrutinising research reports for potentially exploitable IP which the researchers have not flagged, for one reason or another. RDS holds copies of all interim and final reports and tries to ensure that they are read before they are sent to sponsors. However:

"... I wouldn't want to imply that we held a working party meeting with one or two selected academics to go through them thoroughly.

"... I wish we did [but] it's labour-intensive [and] it requires a knowledge of the subject to spot what's important ..."

Neither does RDS ask academics to submit drafts of papers for scrutiny before sending them for publication, though it is something which the IPR Officer has considered. At present, RDS does not have the resources to employ sufficient people with the requisite

skills to do it.

RDS does not feel this is something which could be formally delegated to Faculties or Departments, even though some are beginning to institute local research committees:

"... I would very much hesitate to give Departments or Faculties more formal tasks at this time. They would just react against it. They are so over-burdened with all sorts of reporting mechanisms and financial controls these days that one more would be very badly received. So, I don't do it that way ..."

Instead, RDS tries to keep abreast of research discoveries through regular communication with research groups and HoDs. In some Departments individual researchers have been nominated to or voluntarily assumed the role of interface between the Department and RDS.

Strathclyde is also open to the idea of giving access to certain outside organisations to trawl for IP. The University has a confidentiality agreement with DTE; it made an approach to 3i Research Exploitation Ltd (in its former incarnation as the Research Corporation) but heard no more. RDS makes a spare office, telephones and secretarial support available to the BTG's representative whenever he is in Glasgow. In return, the BTG minutes for RDS' benefit every discussion it has with researchers at Strathclyde.

5.3 Evaluation

Whilst Strathclyde relies on its patent agents to gauge the novelty value of "hard" IP, it is very selective about seeking the help of outside agencies when it comes to assessing the market value. RDS feels that it cannot justify the cost unless the market appears to be large and diverse. If that is the case, RDS uses private sector consultants with expertise in the relevant area, with financial assistance from the SDA. It does not generally use the SDA's own staff to evaluate discoveries.

Otherwise, Strathclyde relies heavily on the opinion of the researcher who generated the IP:

"... we have an advantage over many universities in that awareness of the market is as high here as anywhere, because of the long tradition of working with industry. A lot of the academic staff have had some experience of industry."

"Quite a number of people who come to see us have a view of the market, the scope of the marketplace for their technology. That's not to say, of course, that we don't also get those who have absolutely no idea at all ..."

In that event, RDS tends not to worry about the market value. It relies on the inventor(s) to give it some indication of likely commercial applications of the discovery:

"... If somebody says - yes, I think this is the biggest thing since the motor car, we take his word for it, essentially ..."

RDS does not routinely check with the academic's HoD in case this is perceived as patronising:

"... Politically, it's a very sensitive issue, that. You've got to be politically sensitive in this job ..."

This would only happen if the academic concerned were younger, less experienced and more used to being supervised. If RDS feels that older academics are not fully aware of possible commercial applications, it might occasionally discuss the discovery with his colleagues, rather than his superiors. In practice, RDS often arrives at some idea of the market value of a discovery later on, once it has filed an initial registration and set about finding a corporate partner.

Occasionally, RDS asks the BTG to evaluate its IP, if it fits into their declared areas of interest.

5.4 Protection

(i) Philosophy

Strathclyde's policy *vis-a-vis* its IP is to retain ownership and protect it - if this can be done in a manner which is acceptable to both the academic who generated it and the industrial partner. This means that Strathclyde rarely assigns IPR and where "hard" IP is concerned, if it is possible to patent, RDS prefers this to treating it as secret know-how. There is one exception - live cell lines:

"... We prefer to keep our cell lines secret and licence them as such. We feel that the patent route is capable of abuse ..." ⁽⁴⁸⁾

Otherwise, RDS will only countenance secret know-how agreements if the publishing embargo is no longer than 2 years - and if the researcher agrees. RDS regards UDIL's recommendation of a 5-year maximum as far too long. However, RDS concedes that it is in business and that everything is negotiable.

(ii) Practicalities

The University has no formal limit on delays in publishing. If a major corporation proposed a 3-year embargo in exchange for £0.5m, RDS would ask the academic concerned if he could live with that - and be guided by his reply. If researchers feel the need to publish at once, they may. If their discovery is patentable, RDS asks if they would consider delaying for 4 weeks so that an initial registration can be filed first. RDS recognises that, in commercial terms, this is not the optimum situation:

"... The compromise that we end up with, of course, is that we take out an instant patent application to allow them to speak at a conference ... It means that we patent early and we can't withdraw and refile. I think that is a compromise we have to live with.

"It's a hard fact that universities ... usually patent too early because of the compromises they make ..."

In RDS' experience, fewer than 40 per cent of researchers will agree to keeping their discovery quiet for 12 months - and succeed in doing it. This means that more often than not, the University cannot abort its initial registration and reapply, thereby preserving its

priority date and presenting a stronger patent specification.

Strathclyde asks academic inventors to help draft patent specifications, so that they are involved at every stage; it is also cheaper. The patent agent is brought in for a preliminary dialogue about potential applications, following which researchers find the time to produce an initial 10-15 page draft. This is then refined by the patent agent. RDS usually patents via the Patent Co-operation Treaty, since this is cheaper in the short-term. It works on the principle of delaying expenditure for as long as possible. It also feels that the Patent Co-operation Treaty offers an advantage in not having to decide until the last minute on the countries in which to file.

(iii) Finance

RDS has the authority to decide whether or not to file a patent application. It pursues a fairly liberal policy of initial registrations and refilings. Whereas researchers have a considerable say in whether their IP is protected and how, they have less influence on the decision whether to acquire full patent protection. It is unusual for RDS to proceed if there is no sign of an industrial partner on the horizon.

Strathclyde's annual patent expenditure is currently running at between £70,000 and £80,000 p.a. Each year RDS agrees the amount in each budget heading with the Bursar's office. However, since it has virament between budget headings, it sometimes exceeds its patents allocation:

"... It is quite a major task to manage the patent budget. Patents are unforgiving. It's very easy to overspend - particularly, we discovered, when you have company formation, where the patents form the basis of the company. Somebody has to protect [them] and keep [them] going until the brand new company has got the money to do that [itself]. You can go through some fairly painful phases with small companies before you get repaid ..."

Moreover, the ratio of applications to patents granted tends to be high ⁽⁴⁹⁾. Because of the unpredictability surrounding patents, RDS tries not to poach on its patents budget to support other activities. Ideally, RDS would like to have the increase in its patent budget linked to the increase in income which the portfolio is yielding. However, current financial stringencies mean that at best, the budget is linked to inflation.

For reasons of expense, Strathclyde does not insure its patent portfolio against litigation. RDS recognises that this leaves it in a vulnerable position. The University would not formally challenge a company which was apparently abusing its IPR unless it was certain where it stood. It has already tried informally, via its patent agent, to challenge a Japanese company. The company wrote back saying - prove it!

(iv) Ownership

Strathclyde vests its patents solely in the University's name. However, if it has no interest at all in a discovery or it decides to abandon fruitless efforts at exploitation RDS automatically writes to inventors to tell them. On behalf of the University, RDS offers to waive or assign its rights, as appropriate. There is no official time-scale laid down for doing this, however. Strathclyde does not retain any interest in IPR which it has waived or assigned in this situation. It recognises that this is perhaps not the best commercial practice, but it believes

that trying to recoup its costs would "rattle" academics. In any case, RDS is not aware of any researchers ignoring its negative evaluation and proceeding with a full application on their own initiative.

5.5 Commercialisation

(i) Independent Academic Spin-Off Companies

During the late 1970s and early 1980s Strathclyde licensed its IP to existing companies - small and large - and to companies founded/co-founded and run by the academics who generated the IP. This second commercialisation route proved to be fraught with difficulties.

(ii) Joint Ventures

Whilst Strathclyde has not altogether ruled out commercialising IP by this route, it prefers to license to joint ventures between academics and the University which have been set up with RDS' guidance and which are run by a professional CEO. Between March 1984 and the end of 1989 Strathclyde had helped spin-off about a dozen joint ventures on this basis. In each case, the companies were formed on the initiative of and as a result of a considerable amount of work on the part of the researchers whose IP they were designed to exploit. Since 1984 Strathclyde has only once licensed IP to an independent spin-off company - *ie.* one set up and run by its academic founders/co-founder; from RDS' perspective, it did not transpire to be a successful partnership.

(iii) University Companies

If company start-up is an appropriate way to exploit a piece of IP - yet the researchers concerned do not have entrepreneurial inclinations, Strathclyde would not consider forming a dedicated, wholly-owned campus company to exploit it. There are two main reasons for this. Firstly, it is seldom possible for the University to provide all the capital required. Moreover, as a matter of principle, the University prefers to spread the risk between a number of partners. It does not wish to acquire majority shareholdings. Secondly, if the academic staff who generated the IP do not wish to be involved in company start-up, RDS sees no value in trying to do it without them:

"... Trying to get a small company set up and funded with an academic who is really not that interested does not turn on your venture capitalists ..."

"... We rely on the initiative of academic staff to spin-out the results of their research. It is their technology. If they wish to do it, we'll support them ... If the academic staff concerned [do] not wish to form a company, we wouldn't form a company. It's their business ..."

Strathclyde forms wholly-owned campus companies only if it feels it needs a limited liability buffer. These are effectively shell companies, to which it may assign its IP:

"... [We do this only] if we have a funny feeling up our spine that we ought to limit the liability ..."

Strathclyde's objective is not to walk away from mistakes it makes:

"... We don't form [such] a company to do something wrong and then get out by the back door ... But what you can walk away from is vindictiveness on the part of people one is dealing with. If, for example, you've got technology in this buffer and you license that to a joint venture or some other company. Suppose they misbehaved and would not fulfil their side of the agreement. Then you have the right to terminate. And you do terminate! The chances are that if that company is misbehaving over one thing, it will misbehave over the next thing. It will serve injunctions and just mess about in the courts, just try to frighten you into withdrawing your termination. It's very nice then to have a limited liability company. You can just raise two fingers and walk away ..."

(iv) Licensing

Strathclyde licenses a considerable proportion of its IP to existing companies. Because researchers use RDS on a purely voluntary basis, they are free to approach potential licensees on their own initiative - and free to conduct the license negotiations themselves. Since RDS alone has the authority to sign license agreements, researchers must involve RDS at the end of the process, but what they have negotiated is accepted as a *fait accompli*.

If researchers choose to involve RDS at an earlier stage, they are encouraged to identify a few likely candidates for a license agreement. Where there is no positive response, RDS and the researchers try to identify a further 20-25 candidates, using an in-house database. If that fails, a further one hundred or so are identified, and so on. The IPR Officer prefers to make the first approach to potential licensees himself, to ensure that discussions take place within a proper framework, using a confidentiality agreement. If it becomes necessary to approach a large number of companies, RDS may send a dedicated brochure bearing the legend "*A New Product Opportunity*", together with details of the product, the projected markets and any development requirements⁽⁵⁰⁾. As a matter of course, RDS regularly distributes to industry copies of "Report", a quarterly review of all industrially-relevant research taking place in the University. In addition, RDS is planning to distribute a "Report"-style publication which concentrates on specific areas, *eg.* semi-conductors.

Once a confidentiality agreement is in place, researchers are encouraged to play as active a part as they can in "*selling*" their discovery. Researchers also form an integral part of the team which negotiates the terms of the license agreement:

"... [We] brief and help them. We want them present, because ... the credibility of the technology is often in the hands of the academic. [This] Office has no credibility in science ..."

RDS concedes that academics can sometimes handicap the negotiation process but regards this as a risk which it must take:

"... They can also be of great benefit ... A good majority, once they have been through the process once, second time around they are old hands. They are 90 per cent of the way with you. They are more ready to introduce technology to you, to bring forward companies who are going to be licensees ... Involving them in this way means that [our] team of 8 becomes a team of 80 ..."

Strathclyde tends to let the technology determine the nature of the license agreement:

"... Exclusivity has a price and is negotiated away with care, very much determined by whether we think there is a single market sector - in which case it is much more likely to be exclusive and we'll get a better price for it.

"But if it is multi-sector ... [or] if there were 20 large companies who could benefit from it, I think we would be very wary about locking ourselves into an exclusive deal with one.

"However well you write your license agreement, if they shelve your technology, getting it back can be messy even if you have a termination clause ..."

(v) BTG

Strathclyde does not rule out exploiting its IP by means of the BTG:

"... We use them selectively ... What we are doing now is to present them with four or five situations a year, which we have well researched and maybe taken out patent applications on - and then decided: this is better handled by the BTG. I invite them to come and bid for the business. And they respond to it. They always come ..."

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy

Until the late 1980s, Strathclyde did not have a formal policy *vis-a-vis* academic entrepreneurship. It was something which the University had supported in principle for a number of years. This was discreetly articulated in the Staff Handbook throughout the 1970s⁽⁵¹⁾. In the 1980s it was articulated fairly forcefully by the new Principal at meetings of Court, seminars and conferences, both inside and outside the University. During the course of 1989, it was given formal expression for the first time, not as a stand-alone policy but as one of the Business Venture Group's⁽⁵²⁾ stated objectives. Strathclyde is now formally committed to "*encourag[ing] staff to form spin-out companies and inculcat[ing] an enterprise culture*" and to "*invest[ing] in selected ventures to earn dividend income and capital growth where this is seen as the optimum means of achieving commercial development*"⁽⁵³⁾.

Committed to paper in broad brushstroke form, Strathclyde's policy on academic entrepreneurship via RDS and the Business Venture Group has been formally communicated to the academic staff. During 1989/90 RDS also set about formulating a policy to govern academics who choose to be entrepreneurial within the university system, via research institutes/centre/units *etc.* This was not scheduled to be debated by Court until the following session.

RDS expects both policies to provoke controversy, since some senior academics - members of Court - have already expressed doubts:

"... initially there wasn't a great deal of controversy. Or if there was, it wasn't articulated very well. It has really come about in the last 2-3 years, with financial cutbacks and budgets which are very tight. Then, to see the Business Ventures Group spending money on individual members of staff exploiting their projects and forming new companies and potentially making gain - that was seen as a little bit [questionable] ..."

RDS made a presentation on the Business Venture Group's activities at the annual meeting of Court, portraying the money spent on academic spin-off companies as an investment rather than a drain on resources. RDS recognises that it will probably have to conduct similar exercises at Departmental level:

"... It's the old situation in a university. When you are doing something like this, you've got to promote it ten times more aggressively internally than you do outside ..."

Moreover, RDS knows from experience that personal jealousies are likely to influence the attitude of some academics ⁽⁵⁴⁾.

Until the mid-1980s the University paid more attention to ensuring that academic entrepreneurs conformed to the conditions of Outside Employment approved by Court in 1971, than to the mechanisms by means of which they pursued their entrepreneurial activities. At Strathclyde, academic entrepreneurship has manifested itself in a number of different ways over the years. Several academics have been instrumental in setting up units/institutes/centres which function as the commercial arm of their Department/School/Faculty ⁽⁵⁵⁾. Although they are not obliged to formally ask permission, in practice they usually seek financial support. In order to get that, they are obliged to present a viable business plan to RDS/the Enterprise Office. Moreover, they would have to operate at full commercial cost and repay part of their profits to the host Department. These academics chose to be entrepreneurial within the university system and this is a model which the new Enterprise Office is now hoping to promote where "soft" IP is concerned.

There has been no opportunity at Strathclyde to pursue entrepreneurial activities outside the conventional framework of the University, yet under the umbrella of a wholly-owned campus company, or a subsidiary of a wholly-owned campus company. However, towards the end of the 1970s two companies were formed by academics to exploit "hard" IP which they had generated. They were both independent in the sense that the academic concerned assumed the role of CEO. From a financial perspective, they were effectively joint ventures. There were also independent spin-off companies set up by academics to exploit "soft" IP; however, some simply provided a framework for offsetting the costs of consultancy against tax.

It was not until RDS was founded that anyone paid serious attention to the mechanisms by means of which academics pursued their entrepreneurial activities. In the intervening years RDS has evolved a coherent policy, informed by experience of failure and success. Strathclyde is now reluctant to allow academics to exploit "hard" IP which they have generated via independent spin-off companies or even joint ventures with the University/a third party, unless they assume a role other than that of CEO.

"... I don't regard these companies as being viable if they're run by the academics. They don't have the business experience. Equally, you can't get the level of investment you want from outside sources on the basis of an academic CEO. You've got to bring in somebody with a track record ..."

Since Strathclyde is committed both to encouraging academic spin-off companies and to members of staff using RDS because they choose to, not because they are obliged to, this is not a hard and fast rule. However, it is not a foregone conclusion that academics going it alone would be granted rights to exploit the IP they had generated. They would have to convince the University - in practice, the Principal and RDS - that their company was "*an adequate vehicle*". Moreover, they would have to explain why they did not want to benefit from the resources at RDS' disposal.

If RDS is involved and an academic presents a "*half viable*" proposition - which includes a realistic assessment of his contribution - he is likely to receive RDS' support. That support, whether it is tangible or intangible, is given on three conditions. Firstly, RDS requires between 20 and 25 per cent of the equity to be allocated to the University *gratis*. Secondly, Strathclyde reserves the right to appoint a non-executive member to the board. Thirdly, RDS insists on companies making their accounts and other relevant management information available. RDS feels that if it is aware of impending difficulties, it may be able to avert disasters and avoid crisis management.

Academics who participate in joint ventures with the University are usually allocated - *gratis* - a share of the equity. The proportion depends on the size of the start-up operation ⁽⁵⁶⁾. It also depends on the view of the investors in the company:

"... Some are more generous than others. Some understand very well the need to motivate academic staff in the early years. They set them the challenge - do well with your first round of funding and you hold a large chunk of the company. Spend money like water and come back for second, third and fourth [round funding] and it must [get] diluted. The generosity is for phase I. The generosity seldom goes beyond phase II ..."

The details of RDS' policies have not been committed to paper - nor are they likely to be:

"... [We] find it much better to have face-to-face contacts with the relevant people. There are so many variations on the theme which could take place in the University, it is not too clever for the centre to be too cut and dried about what can be done and what can't be done. There's always somebody who comes along and says - you never thought of this, did you? And yet when you see it, it is first class ..."

Moreover:

"... people just do not sit down in universities and read and digest complicated documents. They just don't. You can send paperwork round till you are blue in the face and nobody has ever heard of anything. But the people that we talk to and involve in things that relate specifically to them ... they listen and they learn. That is the best way of communicating the University's policy ..."

6.2 Business Start-Up Advice

RDS probably has more extensive in-house sources of business expertise than most such university units. The full benefit of that expertise is made available to all entrepreneurial academics, including those who might be given permission to set up and run "hard" spin-off companies independently. RDS does not subscribe to the "*all or nothing*" philosophy, preferring always to "*work things round to a more balanced position*". It also advises academics running "soft", R&D-based companies. RDS is motivated by a perceived need to ensure that staff do not place themselves in a conflict of interests, something which is known to have happened at least once.

Where joint ventures are concerned, RDS acts as stage manager. It assigns the different roles, explaining what is needed, why it is needed and how to do it. As far as possible, would-be academic entrepreneurs are given carefully controlled tasks, such as preparing a business plan, doing patent searches, market research, helping locate a CEO *etc* ⁽⁵⁷⁾. It is a highly interactive process. RDS' long-term objective is to create a business-literate academic community at Strathclyde through action learning. In RDS' view, there is already a significant number of business-literate academics.

Once the company has been set up and the CEO appointed, Strathclyde exercises no further control. RDS can only hope it has made a wise appointment. It has made one mistake to date, but has around a dozen successes to offset against it.

6.3 Making Time

If academics want to help set up a company to exploit their research discoveries, RDS' agreement depends on their readiness to devote the necessary time to it. Strathclyde allows academics 25 days a year for consultancy activities, but RDS does not see this, combined with evenings and weekends, as a realistic approach:

"... It would be hopeless. I would not recommend that kind of company founding ..."

In RDS' view, this level of activity should be reserved for the pre-start-up phase, before anyone is committed to proceeding. Equally, RDS sees no value in making minor adjustments to an academic's teaching load or administrative load, *etc*. It encourages academics to negotiate three years' Leave of Absence, which also allows the Department to appoint a temporary lecturer of a higher calibre than a shorter period generally attracts. Would-be entrepreneurs are never released for 100 per cent of their time; this is not seen as necessary since they do not assume the role of CEO. It is usual to negotiate a part-time contract, with the academic retaining perhaps 30 to 50 per cent of his workload. Since he is still an employee of the University, his pension plan is unaffected. Whatever proportion of the week he works, the would-be entrepreneur receives his full salary and the company pays the University for the time it has bought out. Since Departments have fully devolved budgets, they are free to spend the money as they see fit.

Since there may also be non-financial considerations to take into account, the decision is taken by an extraordinary meeting of the Faculty Board ⁽⁵⁸⁾, which will agree only if the would-be entrepreneur's colleagues support the application. RDS prefers to have a rolling one-year notice built into the arrangement, in case it takes longer than anticipated to establish the spin-off company to the point where the academic can reduce his input and his departure his

critical to the success of the company. However, this is becoming increasingly difficult to negotiate due to growing pressures on staff:student numbers. RDS does not participate in the negotiations:

"... It is quite a sensitive area. I usually do a certain amount of lobbying, but I do it discreetly. I stand back because I regard it very much as something which academics must sort out between themselves. I find that it is detrimental if I step in and say there are good commercial reasons why this chap should be given it. They all say - well, there is an even better academic one why he shouldn't. So, I leave them to discuss it amongst themselves and I wait for them to turn round to me and say - we've had our discussion. Is the commercial justification really worth it? Then I'm invited to say my piece ..."

All of Strathclyde's academic entrepreneurs have returned to their Department after three years because they want to do research more than they want to run a business. A few opt to continue having foot in both worlds, with a permanent part-time contract. In RDS' view, that is an arrangement which works to everyone's advantage.

6.4 Other Resources

(i) Equipment/Instrumentation, Support Staff, Communications

Strathclyde is happy for academic entrepreneurs to have access to equipment, instrumentation, provided they pay the full market rate for them. RDS' constant refrain is "*no hidden subsidies*", for sound business reasons:

"... It is very unlikely that these companies will survive on their first tranche of funding. After a couple of years, when they have begun to trade ... they are going to need a second round of funding [either] to survive or to change gear.

"If at that point you bring in a venture capitalist and say you want an extra £0.5m ... and you say you are worth backing because you are now breaking into the real world and making it by yourselves, the venture capitalist says - but you are subsidised, you aren't a real company!

"You lose an awful lot of credibility. What they want to see is somebody who has survived in the hard world and has a commercial head on their shoulders ..."

Equally, Strathclyde expects its academic entrepreneurs to instal a separate company telephone line and to provide their own secretaries and technical support staff, though in some Departments, if the pressure on existing staff is not too great, they may be able to buy part of their time.

For all these resources, the full market rate is usually determined locally, by the Department concerned, rather than centrally.

(ii) Accommodation

Due to pressure on space, Strathclyde has not allowed academics to pursue their business activities on-campus. Those who have tried have soon been "*stamped on*": they have been presented with a *pro-rata* bill of £20 per sq.ft. per year. Together with Glasgow

University, Strathclyde was instrumental in co-founding the West of Scotland Science Park ⁽⁵⁹⁾. This is located several miles away, but presents a considerably cheaper option ⁽⁶⁰⁾. Several of Strathclyde's spin-off companies located there once they had established themselves. However, if there was a waiting list, or if people were deterred by the distance, or the units were simply too big, until 1990 they were obliged to pay local commercial rents.

In January 1990 Strathclyde opened an incubator unit ⁽⁶¹⁾ on campus:

"... We wanted something on campus which would allow ... members of staff to begin to explore commercial opportunities. They can have very small amounts of cheap space which progressively gets more expensive, till they get thrown out after three years. They buy meeting rooms, conference rooms, secretarial services etc as they use them ..."

The reasons for setting up the incubator unit, its *modus operandi* and its opening were all documented in the university newsletter ⁽⁶²⁾. By the end of 1989/90, ten of the twenty the units had been let. Although not intended as an exclusive resource for academic spin-off companies, all the occupants fell into that category.

(iii) Finance

Since the end of the 1970s, Strathclyde has effectively provided part of the start-up capital for academic spin-off companies. This has usually come about because the University felt obliged to fund development work which could not attract funding from other sources. It proved to be an expensive way of proceeding. In 1984/85, at the insistence of the Bursar, a Commercial Development Fund was created and minuted by the University Court. Strathclyde finances the fund privately, rather than out of its UFC grant. It is replenished in part by "royalty income from those ventures in which investment from the Fund has directly generated IP" ⁽⁶³⁾.

The University is now consciously acting as a minor venture capitalist. Where company start-up is seen as the optimum means of achieving commercial development, it is prepared to invest from £5,000 to £50,000, thereby helping solve the problem of raising sums smaller than £100,000. This is first-round funding, usually provided in the form of equity, giving the University a maximum stake of 50 per cent. The University has no interest in a controlling stake:

"... We are not in business to run businesses. We haven't got the mentality or the management structure ..."

Alternatively, it may be provided in the form of preferential shares or convertible loans - at commercial rates. The return to the University is limited to royalties, dividends and the eventual sale of the company or its stake in the company:

"... We look to exit at some stage in the future but we take a fairly soft line on that. We are not venture capitalists in that sense. If it hurt the company for us to extract ourselves, we wouldn't do it ..."

Strathclyde looks for no return on academic entrepreneurs' personal income from their company activities. In part, this reflects the fact that it does not take a percentage of academics' earnings from arms' length consultancy activities, despite extending professional liability/indemnity insurance to them. However, it is more than a question of being consistent:

"... We say - good luck to them! We expect them to earn a lot more ..."

RDS' final contribution to the process of helping academics found companies to exploit their research discoveries is to locate external sources of funding. To date, it has been adept at raising investment capital, both for first-round and subsequent- round funding. However, RDS would not shoulder that particular burden unless the University's shareholding warranted it.

7 SCRUTINY GROUP ASSESSMENT

In August 1990 Strathclyde was informed that the Exploitation Scrutiny Group was satisfied with the exploitation arrangements which the University had established. A formal document was scheduled to follow, confirming the University's rights to IP arising out of Research Council-funded projects for an indefinite period. Strathclyde is now required only to report inventions to the Exploitation Scrutiny Group.

8 POLICY AND PRACTICE AS PERCEIVED BY HEADS OF DEPARTMENT AND DEANS

8.1 Removal of the BTG's Monopoly and Response to the Kingman Letter

(i) Awareness of the Removal of the BTG's Monopoly and the Research Councils' Offer

Six out of the seven interviewees at Strathclyde reported that they had been aware of the removal of the BTG's monopoly in 1985; the seventh ⁽¹⁾ said he had known nothing about it until the question was put to him in the course of being interviewed for this study. One of the six ⁽²⁾ recollected reading about the removal of the BTG's monopoly in the press, while another ^(A) said he had been on the University's Research Committee at the time and had heard about it through RDS which used to report to the Research Committee; a third HoD ^(C) thought he had been told about it directly by RDS staff. The other three interviewees had no clear recollection how they learned about the removal of the BTG's monopoly, but each assumed that the information would eventually have percolated down to their level in the department by the usual means.

Only five interviewees ^(A, C, D, E, 2) knew that at the same time the Research Councils had offered the University the chance to assume the rights and responsibilities previously held by the BTG. One HoD ^(B) reported that he had wondered about the implications of the removal of the BTG's monopoly; despite being a well-established HoD at the time, he had not heard about the Research Councils' offer - either then or during the intervening years.

(ii) Attitudes to the Removal of the BTG's Monopoly and the Research Councils' Offer

Questioned about their attitude at the time to the removal of the BTG's monopoly and the Research Councils' offer, three of the five said they had welcomed it. One characterised it as "*a move in the right direction*" ^(B); another ^(C) felt that where the exploitation of IP was concerned, the more input the University and individual departments could have, the better; the last ^(D) pointed out that the University had a good relationship with a large number of industrial collaborators and that since the appointment of the present Director of RDS in 1984 its approach had been just as professional as the BTG's - so why have intermediary organisation adding another layer of discussion and bureaucracy?

Two of the five reported that they had not been particularly enthusiastic. One ⁽²⁾ attributed this to his lack of experience and interest in the exploitation of IP; the other ^(A) said he had perceived patenting to be a highly technical and expensive activity - and he had also wondered whether Strathclyde (or any UK university) had the necessary expertise to market inventions.

(iii) Perceptions of the University's Motivation in Accepting the Research Councils' Offer

Nonetheless, all seven interviewees felt that the University had been right to accept the Research Councils' offer. Asked what they thought the University's motivation had been, three ^(B, D, 2) described it as just the kind of entrepreneurial opportunity which the Principal relished. One ^(B) said:

"... it's very much in the entrepreneurial style of [the Principal]. I mean, I think that is just the kind of challenge he would fancy and he thinks that the rest of us should fancy. I think he is probably right in that ... I think the University's motivation is really ... a kind of recognition that the world [was] changing under Thatcher and entrepreneurial activities were going to be rewarded. And really, if something is on offer, you should take it ..."

Three ^(A, C, 1) felt it was entirely in keeping with Strathclyde's tradition of being involved in technology transfer. One ⁽¹⁾ said:

"... I cannot conceive of [Strathclyde not accepting the offer] ... We are supposed to be a technological university. That means we are somewhere between a straightforwardly academic institution and the marketplace ..."

One HoD ^(C) pointed out that for a number of years Strathclyde had been putting pressure on the Research Councils to give it the freedom to make its own decisions about the exploitation of IP, while another ^(D) said people genuinely felt that they could operate more efficiently than the BTG, which had been so slow that it had undoubtedly missed commercial opportunities.

Only two interviewees ^(C, 1) suggested that Strathclyde had been motivated by the chance to get "*a bigger slice of the cake*".

(iv) Awareness of and Views on the Process of Determining the University's Response to the Research Councils' Offer

None of the interviewees knew that the University's response to the Kingman letter had been determined by the Principal in consultation with the Director of RDS alone and ratified by Court retrospectively. Three ^(C, E, 2) thought the the ILO would have helped the University Management Group to draft recommendations for submission to Court, which would have formally determined the appropriate response. One ^(D) thought that there would have been a wider consultation process initially - but omitted to specify who should have been consulted. Another ^(B) thought the initial consultation process should have extended to senior administrators and Deans, while a third ^(A) felt that the matter should have been debated by Senate and Court, not just rubber-stamped. The remaining interviewee ⁽¹⁾ felt there was really no need for a decision-making process:

"... I think it is obvious that if somebody hands you the right, you take it - because potentially there's a large amount of money [in it] ..."

On learning what actually happened, one HoD ^(B) simply said that it was typical of the Principal's style of management, while two interviewees ^(C, 1) declared that they weren't concerned, since the Director of RDS was involved in the decision and they would probably have made the same decision themselves. Two ^(D, E) sought to explain it by suggesting that the decision probably had to be taken quickly and that in any case, it was not possible to involve the departments in every decision. Another ⁽²⁾ doubted whether it was true that the Principal had taken the decision in consultation with the Director of RDS alone; he then sought to explain this in terms of the fact that the University Management Group was only just coming into being in 1985, that the management structure of the University had been in a suspended state at the time. Only one HoD ^(A) maintained his original position, saying that it should have been debated by Senate and Court in view of the wider issues and ramifications associated with it.

8.2 Identifying Intellectual Property Created by Academics

(i) Views on the Likelihood of Different Disciplines Generating Exploitable IP

Asked whether they thought the particular spread of science and technology disciplines in a university had an influence on the amount of exploitable IP which might be identified, five HoDs felt that some disciplines were currently more likely to generate exploitable IP than others. The disciplines they singled out ranged from electronics and electrical engineering ^(A, C, D), information technology ^(A, E) and computer science ^(A, C, E) to molecular genetics ^(A), the biosciences ^(D, E) and pharmacy ^(A, E). Two also singled out disciplines which they thought were currently less likely to generate exploitable IP, namely mathematics ^(D), statistics ^(D), the population dynamics area of physics ^(D) mechanical engineering ^(E) and civil engineering ^(D).

The two Deans thought the amount of exploitable IP identified was more likely to be influenced by the extent to which the staff in a university's science and technology base had an applied outlook ⁽¹⁾ and had developed a relationship with industry ⁽²⁾; the first said that very "academic" departments would also generate exploitable IP - but they would not recognise the fact. The remaining HoD ^(B) suggested that the amount of exploitable IP identified was a function of excellence; in his view, if a university concentrated its

resources on those areas in which it excelled, it was more likely that those areas would generate exploitable IP.

Where Strathclyde itself was concerned, two HoDs felt that the research bias of their own department was likely to generate more exploitable IP than similar departments in other universities. They attributed this to concern with "real-world problems" rather than historical or theoretical scholarship and the emphasis on applied or industrially-funded research. Another said that, given his department's emphasis on industrial research, it should generate more exploitable research than similar departments elsewhere; in fact, however, much of this research concerned the development of ideas initiated elsewhere. This particular HoD found it ironic that in the 1980s most of the novel, patented IP emanating from universities had come from departments oriented towards fundamental research. A fellow HoD ^(C) remarked that his department had already generated IPR which had earned more for the University than similar departments anywhere in the world had earned; however, this had been due to chance and in other respects, he could think of several sister departments in other universities which were just as likely as his to do so. One HoD felt it was impossible to answer this question, since it depended less on the department than on the individuals who belonged to it.

(ii) Awareness of the University's Wish to Identify IP

Asked how aware they thought staff in their department were about the University's wish to identify potentially exploitable IP, only one HoD ^(D) said he felt this was very widely known. Another ^(C) thought that those members of staff capable of generating exploitable IP were very aware, whilst a third ^(E) said that his staff were reasonably well aware, but did not really think it applied to them. The other two ^(A, B) judged their staff to be no more than "vaguely aware".

The two Deans took a more optimistic view, saying that the staff in their Faculties were "all very aware" ^(A) or "pretty aware" owing to all the publicity there had been ^(D).

(iii) Responsibility for Identifying IP

All but one of the HoDs questioned felt that their staff would take a very positive or reasonably positive view of being asked to "flag" potentially exploitable research results. The other ^(E) said that his staff would be positive, but for the pressure of time:

"... the more interesting staff are just beaten into the ground. I mean, I'm not complaining when I say this, but I work a 12-14 hour day five days a week and probably a 4-5 hour day on Saturday and Sunday. And that goes on year after year. Now, I'm not unique in that. A lot of staff are working pretty well like that. And that is just to cope with their duties and the things you have to do, and to make sure the ship stays reasonably well afloat. To find time in there that you would need to find if you were going to take an idea and pursue it a bit to see if it was exploitable, there just isn't time. And I think that is one of the major problems. If there was a little bit more slack in the system, I suspect - given the climate today - because the climate is better for it, you know ... ten years ago we didn't have the climate for it in universities. Well, unfortunately, now that we've got the climate for it, there's no slack in the system ..."

One of the Deans ⁽¹⁾ claimed that, unlike staff in other Faculties, those in his Faculty would normally go to RDS immediately if they thought they had an exploitable idea. The other ⁽²⁾ lent credence to this view, saying that, with certain exceptions, the staff in his Faculty probably had a negative attitude to being asked to "flag" IP. He characterised them as suspicious of activities conducted at the centre instead of in departments, suggesting that this attitude stemmed from the fact that the allocation of resources was now explicit; staff could now see what proportion of the overall budget was consumed by the centre.

All the interviewees but one felt that the Director of RDS should adopt a proactive approach to identifying IP. Definitions of what constituted being "proactive" varied considerably, however. One ^(B) assigned the Director of RDS a strategic role, saying that he should furnish the University with a vision of the research and development it should pursue over the next decade. The others defined it variously as spotting corporate opportunities and bringing people together to capitalise on them ^(D), keeping track of what was happening in departments ⁽¹⁾, educating staff about the benefits of IP and encouraging them to generate more ^(C) and making face-to-face presentations at departmental meetings to overcome academics' tendency to bin information conveyed on paper ⁽²⁾. One ^(E) suggested that the Director of RDS should restrict himself to jogging people's memory now and then about the value of IP; staff would regard anything more as "*someone in administration pestering them when they are so busy*". Just one interviewee ^(A) felt that the Director of RDS should adopt a reactive approach to identifying IP; in his view, trying to ferret out IP would be a waste of time, though "*the occasional ra-ra session to remind people*" might be worthwhile.

Three interviewees ^(C, D, E) felt that the Director of RDS was "*doing quite a good job*" and being "*reasonably proactive*", while another three ^(B, 1, 2) said that he could be a lot more proactive. All three said they recognised that the Director of RDS was constrained by the resources available (*ie.* time and staff). One ^(B) felt that more resources should be made available to facilitate professional management of the University's research. Another ⁽¹⁾ observed that RDS had made tremendous efforts to keep abreast of what was happening in the Faculty; he welcomed the University's promise of sufficient resources to permit RDS to make two or three more appointments.

(iv) Strategies for Identifying IP

All but one interviewee ⁽²⁾ dismissed the idea of research proposals, interim and/or final reports being scrutinised for IP which might have been overlooked by the researchers involved. The reasons given ranged from the immense amount of time it would take ^(A, E, 1), the need to maintain confidentiality on industrial projects ^(A, C) and the difficulty of finding scrutineers with the requisite expertise ^(A, C, D) to scepticism about the return on the time and resources invested ^(E, 1). One ⁽¹⁾ said he did not believe that new science often led to new technology - and hence to new IP.

Most interviewees also responded very negatively to the idea of scrutinising drafts of papers before submitting them to journals. They cited similar objections and added a few more. One ⁽¹⁾ remarked that it would upset academics because it would delay publication by at least a month - and probably longer if exploitable IP was identified; in his view, it would be a counter-productive exercise. This was echoed by another ^(D), who said:

"... If we want to get more exploitable IP, we need to get more encouragement for people to do work. We don't need to add additional filters and dampers on their ability to communicate ..."

However, one interviewee ^(C) said that, if a way could be found to scrutinise papers quickly - within one to two weeks of submitting them, it would be to the University's benefit to institute this kind of safety net. Another ^(A) remarked that everybody had a mortgage to pay and that many people would be happy to have their papers scrutinised in this way, if it could be done efficiently; he suggested it might be worthwhile introducing this kind of scrutiny on a voluntary basis.

8.3 Ownership of Intellectual Property Created by Academics

Asked whether they thought it was more appropriate for IP to belong to the University or the academic(s) who created it, only two interviewees ^(C, D) answered unequivocally that the University should own it. In the view of one ^(D), research was generally conducted in teams in universities; if one individual - for instance, the team leader - claimed ownership of a discovery, this would be very demotivating for junior staff. This problem would be overcome if the University was deemed to own the IP, because it had the same relationship with every member of staff and could ensure that team leaders only benefitted financially from the exploitation of IP if they had genuinely contributed to its generation. The other ^(C) felt that the University should own the IP because it provided the facilities required to generate it and should get a reasonable return on its investment.

Two interviewees ^(A, 2) were unhappy with the idea that the University could claim "blanket" ownership of IP which was connected with one's work - indeed, one ^(A) commented: *"I'm really interested that you are so positive about this. I think there is certainly a lot of doubt in academics' minds"*. Both distinguished between IP which could not have been generated without the use of University facilities and IP which was generated independently - eg. by the mathematician sitting in his bath and dreaming up a significant equation or by academics working at home in the evenings and weekends. In the former situation, both thought the IP should belong to the University; in the latter, it should belong to the individual academic.

One HoD ^(B) did not believe that UK intellectual property law awarded ownership of IP generated by academics to their employer. If he was mistaken and it did, in his view it was wrong:

"... I think academics do work in a different way from industrialists. I mean, having been in both camps ... as an industrialist, you are usually working on a product or some artefact for your company which is their bread and butter. And so you do that. You are paid to do it. There is often much more of a total effort involved in anything that is done. Whereas academics have the freedom to work in ... wherever they care. They are not directed in their activity and many of them will spend long hours of their own time pursuing things they are interested in with usually very little help or very little support from the University. In those circumstances, I think it would be very difficult to say that the University has an absolute right to that activity ..."

8.4 Protecting Intellectual Property Created by Academics

(i) Attitude to Protecting IP Created by Academics

Three HoDs ^(A, C, D) said that they supported the concept of protecting IP generated by academic research. All three HoDs explained their support in terms of the various benefits conferred by protecting IP:

"... I think both at the personal and national level, you know, if we don't try to protect something and develop it in Britain and Scotland, it will end up in Japan or Germany ..." ^(A)

"... there is inevitably going to be a delay in communicating results but I don't think that these days anyone could consider British academic institutions as charitable foundations that can simply afford to do things and let everybody else take what they like. If we were being given totally altruistic funding, then I might say something different, but the situation is not like that. I think that we have to be able to exploit what we produce at least to some extent for our own benefit and then see that the information becomes public ..."

One of the Deans ⁽²⁾ disagreed with the concept of protecting IP generated by academic research - on the ground that the results of academic research should be admitted to the public domain. The other ⁽¹⁾ felt it was a matter of individual choice; he remarked that he personally never got involved with formal consultancy agreements so that he was never prevented from talking openly about his work - but he would not necessarily expect other academics to see this the same way. One HoD ^(B) reported that had never thought about this, adding that he therefore had no opinion.

When asked to consider the fact that UK universities are not legally obliged to patent patentable IP, that they have the right to protect it by treating it as secret know-how instead, three interviewees ^(C, D, 2) said that they were opposed to this course of action. One ^(D) remarked that if there was a choice, neither the academic nor the University was entitled to treat a discovery as secret know-how. Another ^(C) recalled that the University had just formally decided to resist pressure from industry for an indefinite moratorium on doctoral theses, adding:

"... I'd be very unhappy about having my ideas sat on by my employer, if I deemed that they should be patented ..."

A third ^(B) declared that he could not see why a company would want IP to be treated as secret know-how rather than patented, where there was a choice, since it was very difficult in academia to prevent ideas from "leaking out". The other Dean ⁽¹⁾ suggested that treating something as secret know-how might be acceptable provided sufficient money changed hands as recompense - of which the academic(s) concerned should receive a significant share. Only one interviewee ^(A) accepted the idea of protecting IP by treating it as secret know-how - provided the academic(s) concerned were happy with the terms of the agreement. In his view, unless you had tremendous confidence in a patent and were prepared to spend £millions to defend it, treating it as secret know-how was "smarter"; for this reason, he did not feel that patenting was necessarily preferable to secret know-how. He also commented:

"... I think probably from the academic point of view, if he was getting a good deal from a company, the fact that a patent is a publication in one sense wouldn't be very important. I suppose the question of public funding comes in, but I would have said ... if you are dealing with a UK company, then the public interest may well be served better by letting it be developed by a UK-based company than putting it in the public domain and, even on a license basis, [letting it] go abroad ..."

The other interviewees all felt that patenting was preferable if there was a choice.

(ii) Who Decides Whether and How to Protect IP Generated by Academics?

Three interviewees ^(A, C, D) believed (correctly) that academic(s) who generate exploitable IP have the right to decide whether their IP should be protected - and how, if there is a choice. Two believed (incorrectly) that these decisions would be taken either by the Director of RDS ^(E), the University Management Group ^(F) or the Principal ^(G), while another ^(H) thought that the University Management Group should arbitrate if there was a conflict between the wishes of the Director of RDS and those of the academic(s) who generated the IP in question.

Three HoDs ^(C, D, E) agreed with the University's policy. The two Deans were more ambivalent. One ^(I) remarked that as an academic he would resent the Director of RDS or some other representative of the University telling him he could not publish his research findings because of their commercial value; on the other hand, as Dean he felt that the University should reserve the right to do just this, if the commercial value of the IPR warranted it. In his opinion, Strathclyde should start to be more directive about this than it had been to date - because the University needed additional income. A similar view was expressed by another HoD ^(A). The other Dean ^(J) said that while he was all in favour of academics putting their research discoveries into the public domain, the University Management Group should possibly impose a period of restraint if it looked as though opportunities for profit might be lost. Upon reflection, however, he opted for the academic(s) concerned having the right of final decision.

(iii) Attitude to the Logistics of Protecting IP By Patent

None of the HoDs or Deans interviewed questioned the University's policy of paying a patent agent to write patent specifications, rather than ask academics themselves to produce the first draft - unless they particularly wanted to. However, one HoD remarked that the University should be selective, in order to avoid running up a huge bill. It was his impression that Strathclyde had spent as much as £0.25m a year on patenting costs at one time; in fact, the University's largest annual expenditure on patents was £120,000.

Asked how they would respond to members of staff who volunteered to produce a first draft requesting a temporary adjustment to their workload in order to facilitate this process, the HoDs expressed differing views. One ^(D) said that he had no objection to members of staff reaching informal agreements to stand in for each other, without involving him. In his view, formally reducing someone's workload would be impossible because IP was too unpredictable to allow for rational planning; the best he could offer was increased secretarial support. Two ^(C, E) said that their response would depend on the merits of the case; both indicated that if it was important to patent a discovery quickly, a way would be found to let the academic concerned to devote the requisite time to drafting

the patent specification - particularly if exploitation of the IP was liable to yield the department substantial revenue. One ^(E) suggested that he would informally arrange for the work in question to be dispersed among the other members of staff, while the other ^(C) preferred a more formal approach; he added that this was no different to providing cover for colleagues who were away conducting research. However, both HoDs had caveats: one ^(C) commented that the research selectivity exercise due in 1994 (*sic*) might make people less willing to be flexible, while the other ^(E) said that his staff would be less willing to take on the extra work if it meant that some members of staff benefitted financially, while others did not; in his view, the University's recent decision to share any revenue with the department made this less problematical.

One of the Deans ^(A) was not optimistic about the prospect of HoDs in his Faculty responding sympathetically to requests for a temporary reduction in their workload while the petitioner drafted a patent specification:

"... I don't want to give you a gloomy picture of HoDs within the University - it's not true. But there have been examples, I think, where the career of an individual member of staff hasn't meant all that much to their HoD. In those very rare circumstances, there ought to be some appeal against their decision ..."

He suggested that the Director of RDS should speak to the HoD on behalf of the inventor(s) and indicate the importance of the discovery in question.

8.5 Entrepreneurially Exploiting Intellectual Property Created by Academics

(i) Exploiting "Hard" Intellectual Property

Asked to give their views on the idea of exploiting "hard" IP entrepreneurially, instead of automatically licensing it to an existing company, HoDs and Deans signified qualified approval of the idea. All seven agreed with Strathclyde's policy of refusing to allow "hard" IP to be exploited via independent academic spin-off companies - but gave different reasons. One HoD ^(C) remarked that scientists were amateurs when it came to business and that it was good to see that the University was learning from its earlier mistakes. Another ^(D) echoed this view, saying that if the University was to be believed, independent academic spin-off companies had been *"very poorly successful"* and were not an effective way to exploit "hard" IP. One of the Deans ^(D) commented that he did not believe academics could serve two masters; academic entrepreneurs could not run two things at the same time unless they were *"very, very talented and very energetic"*. The other Dean ^(A) made a similar response, saying:

"... [An] analogy [is] someone trying to run a practice at the same time as being engaged in the University. It is almost impossible not to give the practice priority ... The fact is that the external world exerts certain pressures and [doesn't] observe the rhythms of the University ..."

Three interviewees ^(A, B, 1) were concerned about individual academics exploiting either "hard" or "soft" IP for private gain when University resources had contributed to the creation of the IP in question.

The University's policy of becoming involved in joint ventures with academics who generated "hard" IP met with the approval of most interviewees, though with a number of caveats. One of the Deans ⁽¹⁾ thought this was a good way to exploit "hard" IP, provided it remained a peripheral University activity - notwithstanding the fact that many of the companies in Silicon Valley in California had spun out from local universities and that the UK company Barr & Stroud had been founded by two academics from Leeds University. One HoD ^(A) spoke against the University's practice of emulating venture capitalists by devoting large sums of money to joint ventures with members of staff. He felt that the University should set aside around £100,000 for such activities and should "recycle" this sum, rather than continually expand it. In his view, this would "bring discipline" to a system ...

"... where there are always tremendous pressures to keep pumping in more money once somebody has backed a certain project ... These entrepreneurial-type people are exactly people who can convince those who are ready to be convinced that just another £10,000, just another £100,000 will make it commercial and the University is going to make millions out of it. And that's the danger area ... I just feel that our involvement as a University ... public money should be kept quite modest and once you go beyond that, then one should leave it to the supposed experts who are people like the Scottish Development Agency and the venture capitalists ..."

This particular HoD believed that the University's policy had resulted largely in losses and it was time for RDS to draw up a balance sheet and present it to both Senate and Council; he felt it was not at all clear that either was in possession of the facts. This sentiment was echoed by another HoD ^(D), who commented that members of the Business Ventures Group had "red faces" on account of their poor investment record - "but not so red because they have not been outside, in public".

One HoD ^(D) was ambivalent about the idea of joint ventures between members of staff and the University. On the one hand, he said that in principle he would prefer academics to focus on academic work, rather than divert their energies into commercialising their research findings; on the other hand, he remarked:

"... I don't believe in limiting people's opportunities. The University has two jobs, in the crudest sense. There's the overall academic jobs and there's things that arrive ... [transferred] into the community, which can be products, just as much as knowledge. I don't see why if people have something that needs chasing up, we shouldn't give them the chance to. Because there is no doubt that if we don't give people the chance to chase them, they won't work ..."

One HoD ^(C) was not in favour of the idea of exploiting "hard" IP by means of joint ventures between the academic(s) concerned and the University. He felt that the joint ventures established to date had not lived up to everyone's expectations; in his view, the business world was extraordinarily complex and the University was no less amateurish than academics. He also expressed concern about the potential for conflicts of interest of the kind witnessed in the US, where academic entrepreneurs had been members of committees regulating drugs produced by companies in which they had an interest - with the result that the US College of Pharmacy was being investigated by the US government.

Most interviewees seemed to be unaware that the University had eschewed the idea of setting up wholly-owned companies to exploit "hard" IP - indeed, one ^(A) believed (incorrectly) that many of the joint ventures established by the University were actually wholly-owned companies. None of the interviewees had clear views on the question of wholly-owned companies.

(ii) Exploiting "Soft" Intellectual Property

Interviewees were asked for their views on the three mechanisms by which academics could exploit "soft" IP: personal consultancy and commercial arms of departments, as well as various types of spin-off company.

As we have seen, Strathclyde imposes a limit of 25 days per year on the amount of time which academics may devote to personal consultancy. Only one interviewee ^(A) disagreed in principle with the idea of imposing a limit, saying:

"... I think for those who do and want to do [consultancy], it could be extremely beneficial, because it gets them away from the sort of grind that academic life has become ... A few days out of the office here and there, a different environment ..."

He added:

"... I think there are many academics who are very good at it and it is very important that the University sector has more of an impact [on], or at least an input to technology, industry and commerce. So, I don't like to limit it as long as ... I mean, that may be the entire research role of a member of staff. And don't forget that, very crudely, the UFC funding is 60 per cent for teaching and 40 per cent for research ..."

The five HoDs agreed in principle that there should be a limit, though two ^(A, B) thought it should be regarded as a guideline, rather than an absolute limit and one ^(C) remarked that a global limit was a crude instrument in so far as it made no distinction between revenue-earning consultancy and consultancy of a scholarly nature. The other Dean ⁽²⁾ agreed in principle with the idea of a limit, too; in practice, though, he felt it was difficult to reach an acceptable definition of what was meant by 25 days, difficult to monitor even if a definition could be established - and therefore open to abuse - particularly by HoDs:

"... Genuinely, I think, the abuse tends to occur at the top of the ladder, rather than the rungs below. Because it can be controlled, by and large, by HoDs, in so far as anyone can, but no-one controls the controllers ..."

Two HoDs ^(B, D) thought that a limit of 25 days per year was on the generous side, while another ^(E) saw it as academic, since none of his staff did anywhere near that much consultancy. Asked what proportion of their staff actually did personal consultancy, two HoDs ^(A, B) suggested that it was around 50 per cent, while another two ^(B, D) thought it was closer to 20 per cent; the last ^(C) estimated that 10 per cent of his staff did consultancy. Only one HoD ^(B) felt that some members of his staff (around 10 per cent) were probably exceeding the limit.

Most HoDs perceived advantages in their staff doing personal consultancy. Only two cited examples of the disadvantages they perceived to be associated with extensive consultancy. One ^(A) said it led to neglect of students while the second ^(C) felt it led to the neglect of scholarly research:

"... If you are consulting and making money, you can't be doing scholarly research at the same time, on the whole. And I can think of certain areas where I'm sure that the UFC ratings were linked to large-scale consultancy work. I can think of a number of faculties, for example, or departments in faculties throughout the UK where the first selectivity exercise caught a lot of people on the hop ..."

The others observed that consultancy was often the first link in a chain which led eventually to large contract research projects for the department ^(A, D), that staff could only benefit from interacting with scientists in industry ^(D) and that academics had a moral duty to do consultancy ^(B):

"... There's too many people in universities think that the taxpayer owes them a living and I think they have to go out there and show what we can do for society - and actually do it ..."

However, this particular HoD was against the idea of personal consultancy, arguing that staff develop expertise by virtue of being in the University - and they should therefore be required to do all their consultancy in-house for the benefit of the department. A similar view was expressed by one of the Deans ⁽²⁾, who said that the University should require all consultancy to be done in-house and levy an overhead so that the academic community as a whole benefitted.

Views on the value of commercial arms to departments varied. Three HoDs ^(A, B, D) had no commercial arm to their department. One of the departments in question had previously had a commercial arm, which was eventually spun-off as a separate company, having grown so large that departmental staff complained that "*the tail was wagging the dog*". In another department an attempt had been made - on the initiative of one member of staff - to establish a semi-commercial arm; the attempt had failed, partly due to the reluctance of the academic concerned to accept either the business plan or a contract of employment which made him responsible for generating his own salary. The HoD in question reported that there was also a widespread belief in the department - based on experience of a self-funding research unit which had evolved out of a conventional academic research group - that the return would not justify the cost to the department in terms of space and resources:

"... [That unit] is commercially orientated. It [has] always seemed to be on the edge of bringing in a contract which [will] bring in overheads and in a sense pay back some of the investment of the Department. But this particular group has never paid 1p in overheads in 15 years ... because it has never had any overheads. Most of [its £1m income] has been from public money, from the University, from ... Charities don't pay overheads."

"... It has occupied space and used the basic infrastructure of the Department. I mean, you know, we got into arguments the other day about who telephones. The charity who came round were not impressed when they found his telephone had been cut off. But, I mean, he was running up a telephone bill. He is not on my staff, basically, so I don't have a budget to pay for his telephones. But he didn't have a budget to pay and he wanted to go round and round ... Well, I've agreed to pick up so much until he gets this money in, which will then pay it back ..."

In the third department the issue of a commercial arm had been debated but no conclusion had been reached. However, the HoD in question said he would be surprised if the department did not have a genuinely commercial arm within two or three years, with its own budget and dedicated staff.

The other two HoDs ^(c, b) reported that their departments had set up several successful commercial arms - each operating on an idiosyncratic basis. One was underwritten by the University for the sum of £50,000 - but had never called upon this; it had its own, dedicated staff - including a salaried director, its own equipment and accommodation within the department. Another - in the same department - was underwritten by the University for the sum of £100,000 over a three-year period. Set up to exploit "soft" IP from four departments, a professor ran it on a part-time basis; it had no dedicated staff, relying instead on input from existing members of staff - who ploughed their fee income back into the department to fund the cost of additional research personnel and equipment. The HoD reported that some members of staff had initially seen this commercial arm as a threat to their personal consultancy activities; in his view, this attitude was dying out:

"... I think the environmental culture is that if you have got a good idea, you can market it, as it were, formulate it through [the commercial arm] in a more co-ordinated way than you could if you were working on your own. It is the team approach ..."

The second department had also persuaded the University to provide underwriting of £50,000, to enable it to set up a commercial arm employing three or four dedicated staff who were expected to generate their own salary. No charge was made for accommodation or equipment - nor was an overhead charged, because the staff calibrated and serviced departmental equipment as a *quid pro quo*. The department was obliged to call upon the £50,000, however; in the HoD's view, this was because the staff had been given too long a contract to have a sense of urgency when it came to generating their salaries; the staff are now given a three-month rolling contract. The department itself underwrote its second commercial arm, which functions in a similar manner, keeping software up to date and fixing computer breakdowns as a *quid pro quo*. The HoD remarked proudly: *"We didn't even tell anybody [about it]. We just did it!"* He observed, though, that if pressure on space continued to grow, it might not be possible to continue on this *quid pro quo* basis.

One of the Deans ⁽¹⁾ felt that Strathclyde should establish a University-wide consultancy service and outlaw personal consultancy, rather than rely on individual departments to establish commercial arms. The other ⁽²⁾ was more concerned about the confusion which different commercialisation mechanisms were likely to create from the perspective of potential sponsors of research - particularly if a department had one or more commercial arms and an associated spin-off company.

Asked what they felt about the idea that academics who do a lot of consultancy tend eventually to set up their own business, one HoD ^(A) remarked: "*You know, I do subscribe to the concept which used to be known as 'route 66' (sic) outside Glasgow, if I can put it that way*". However, this particular HoD said later that if an academic spin-off company grew to the point where it was employing consultants, with the result that the academic concerned had managerial responsibilities, he would question whether he or she was able to devote sufficient time and effort to the University. Another HoD ^(B) said that academic entrepreneurship raised the profile of the University in a very important way. However, a third ^(C) thought it depended on who benefitted from the entrepreneurial activities:

"... If somebody is using their position in the community to be entrepreneurial for self at the expense of the community, I do not regard that as positive. What I do regard as positive is if somebody is doing that either on a fair shares basis or directed more towards the community than the person ..."

A fourth ^(D) thought that the University's policy *vis-a-vis* "hard" IP should apply to "soft" IP, too - *ie.* academics should be obliged to exploit this via a joint venture, rather than an independent academic spin-off company. This view contrasted with one of the Deans' ⁽¹⁾, who was against this exploitation mechanism, commenting that it was impossible to "*serve two masters*", irrespective of whether the spin-off company in question was "hard" or "soft". The other ⁽²⁾ felt that a "soft" academic spin-off company was more acceptable than a "hard" company, however.

8.6 Support for Entrepreneurial Academics

(i) Time

Surprisingly, perhaps, given the diversity of their views on joint ventures, all five HoDs and both Deans professed to agree in principle with Strathclyde's policy of supporting academic entrepreneurs by allowing their company to buy out a percentage of their time for two or three years. One HoD ^(D) observed ruefully that this was far better than an alternative arrangement which his Department had negotiated with the University some years earlier:

"... To some extent, we drove this. And we drove it because [the academic concerned] was a cost on our resources. We weren't actually getting any academic [return] ... He had lost his motivation and his academic direction. He wasn't giving the academic leadership that was necessary. So, a rather special deal was worked out which was highly beneficial to him personally and that was allowed to run for a period of time ... It was for four years, but he ended up doing six ... It won't be repeated ..."

He described the new arrangement as sensible, adding: "*It concentrates the mind. It is clear-cut for the HoD. People know what has to be done for a 2-year period*". A fellow HoD ^(A) also described this arrangement as "*nice and clear-cut*", while another ^(C) commented that this was far better than trying to be creative with a member of staff's normal workload. He added:

"... you do get conflicts of interest then and I do think people ought to be free to go away and devote themselves properly to something ..."

Asked whether they thought that implementing this particular policy would present a problem, the interviewees expressed a variety of views. One of the Deans ⁽²⁾ said it would depend on whether the HoD concerned was supportive, observing that this was not always the case:

"... One doesn't want to undermine the HoD, but I could foresee ... certain circumstances in which a HoD might take an unreasonable ... unreasonably obstructive line. I know of one case where it happened ... That HoD [has since] retired ... Now [the academic in question] is being released, but I feel it might be a little too late in that person's career ..."

Two HoDs ^(B, C) commented that their departments set their teaching schedules for the following academic session in early summer, and that any academic planning to buy out a percentage of their time would need to notify the HoD before then. Two ^(B, C) added that their response would depend on the importance of the academic concerned to the department's teaching portfolio and the likelihood of finding a replacement. Another HoD ^(D) said that he would require only a couple of months' notice to implement this particular policy; this would allow him time to consult his Dean about funding for a replacement. A fellow HoD ^(E) claimed that he could implement this policy immediately: *"Well, if it was important enough, we'd do it today. You know"*. In his view, his department already exhibited this kind of flexibility when accommodating members of staff who went on sabbaticals or who were awarded funding for very ambitious research projects.

That particular HoD remarked that the department would simply use some of its funds to hire part-time teaching cover. None of the other HoDs saw this as quite so straightforward - because budgets at Strathclyde were not totally devolved to HoDs. One HoD ^(C) said:

"... the philosophy is very plain. If you are making the money, then you can normally spend it. But virement is not totally established, or indeed very well established here. It would be very nice to think that virement would eventually be total, along with devolution, so we could spend the money wherever we wanted ..."

In the meantime, as another HoD ^(A) explained, Strathclyde was operating a system whereby Faculties were expected to balance their collective budget; thus, even if one department was in surplus, that surplus might be earmarked to offset a deficit in another department in the Faculty, rather than made available to spend.

Opinions were divided on the question of extending previously agreed periods of absence, should the academic entrepreneur feel that being forced to return at that time was critical to the success of the company. One of the Deans ⁽¹⁾ felt that his particular Faculty was likely to adopt a less generous approach than the University where this was concerned, to ask what the Faculty would get out of granting an extension; he added that this need not be measured in financial terms, however. Two HoDs ^(A, B) regarded extensions as problematical; one ^(B) commented: *"It is all a bit limiting and difficult to plan"*, but conceded that retaining around 30 per cent of the academic's time would *"sweeten the pill"*. Another ^(D) felt that extensions should not present an unsurmountable problem, provided the academic concerned gave six months' notice. The other two ^(C, E) foresaw no real problem - indeed, one ^(C) was very much in favour of the idea of extensions, commenting: *"I think it is a very good thing. We should be flexible"*.

(ii) Equipment/Instrumentation, Support Staff, Communications, Accommodation

Only two interviewees ^(C, 1) were aware that Strathclyde was prepared in principle to let entrepreneurial academics have access to certain of these facilities. While another two ^(B, 2) guessed at some of these resources, the remaining three ^(A, D, E) admitted they had no idea.

Only one interviewee ^(C) knew that academic entrepreneurs were expected to pay the full, market rate for all resources except communications, which were charged at cost. One HoD ^(B) guessed they might be charged at cost, while another ^(E) commented: "*The system these days is very flexible. Most things seem to be negotiable*". One of the Deans ⁽¹⁾, judging on the basis of academic entrepreneurs in his own department, thought that no charge was made:

"... They didn't pay for a bloody thing, quite frankly ... There was a letter from [the previous Principal] which they held over and [the current Principal] never had the guts to retract that letter, which he should have done ..."

The other Dean ⁽²⁾ was equally surprised, saying: "Yes?! Does this operate most of the time?" Upon being told what Strathclyde's policy was, one HoD ^(A) questioned whether it was appropriate for academic entrepreneurs to have access to such facilities at all:

"... What do you think this is, a sort of service area? ..."

He was sceptical about the real cost ever being recouped:

"... It seems to me to some extent that there should be a separate pot for encouraging commercial spin-off. And any expense incurred in this sort of activity should come out of a separate pot rather than from a straight UFC training activity. You know, philosophically I want to encourage this sort of activity but I don't think education is funded strongly enough that we can afford to be decanting money from the education fund into these activities. And one appreciates over the years it is possible for very substantial amounts of money to move into these areas, compared to what we've got in [academic] budgets ..."

In contrast, several interviewees ^(B, 1, 2) felt that the University should "*featherbed*" academic entrepreneurs, especially in the early stages. All three suggested that they should be charged at a marginal rate initially, until their companies were well established - especially where accommodation in the incubator unit was concerned. Another ^(E) felt that charges should be determined in the department concerned, rather than centrally:

"... I have a very ... you may think this is a narrow view, but I have a fairly clear view of things in my area. (a) I want to encourage them, almost whatever they are, provided they are sensible and (b) we should try and do that with as little outside help as possible. In other words, if we can contain something within the Department, if we can set up organisations like that and they can fly with our own resources within our own boundary, then we don't need to get involved in the arguments about who pays for the space or the rent or whatever. Now, it seems to me, if you can encourage departments to do that within their own resources, then they are doing rather well ..."

Only two interviewees ^(A, C) agreed uncritically with the University's policy, while a third ^(D) agreed but added a caveat: "*if you've got something that is full-blown commercial*".

Neither Dean felt that departments in their Faculty were likely to experience difficulty when it came to giving entrepreneurial members of staff access to such facilities in practice. This was not the perception of the HoDs, however. Four commented that it would be difficult or impossible to give access to accommodation ^(A, C, D), equipment/instrumentation ^(D), or secretarial/technical support staff ^(D, E). However, one of these ^(C) commented that equipment/instrumentation presented no problem, since the department was actively trying to market them in any case. Only one HoD ^(B) foresaw no problems at all in implementing this aspect of the University's policy.

(iii) Financial Support

All the interviewees at Strathclyde were aware that the University was prepared in principle to provide financial support for entrepreneurial academics, though several were uncertain as to the form which this support took. Upon hearing that Strathclyde had moved from providing development grants and/or "soft" loans to taking equity stakes in companies started on the initiative of academics, all of the interviewees agreed with this in principle. One ^(B) said:

"... you have to take chances to progress. It is no different from taking over [a famous city centre hotel] and making it into [a student residence]. You have to ... what is the word? ... speculate to accumulate ... It is no different than saying - let's create a new Chair in something that is important ..."

However, two ^(A, 2) felt the extent of this support should be limited, though one ^(A) was unsure how this could be achieved:

"... That, I think, is the nub of the problem, isn't it? Because at the end of the day, the person we employ, in a sense, to be a financial overseer of these projects is the person whose, in a sense, empire and career is promoted by developing more and more [of these]. So, to some extent the director of R&D Services has a career incentive to divert more University funds though his office into all sorts of venture activities.

"... I don't want to talk about [this] in an accusing way. I'm just trying to sort of ... analyse the situation that I think to some extent the director of R&D Services is in a position of being judge and jury at the present time ..."

Several interviewees emphasised that there should be more information about this kind of activity:

"... The only worry I have about [this] is where the Business Venture Group's money comes from originally ... I mean, essentially, I think this is the biggest worry in this University, and that is whether money that is really intended for core academic activities is finding its way into things [of this sort], or what money is used ... The problem with the Business Ventures Group is that because of its nature, it does not have a direct managerial contact with Court ... " ^(D)

"... My difficulty is that ... as a member of the University Management Group, we don't hear about that. And I think these things should all ... We get a report once a year from the Business Venture Group, which doesn't tell us about any of their negotiations or any of the deals they have done. It just gives us a global [picture] ... I want to see ... I expect full documentation of the activities of the Business Venture Group, which we don't get ...

"... [I have suggested this] to the University Management Group ... Well, the University Management Group agrees with me. But the University management - being the Principal, the Registrar - doesn't. Who knows why people want to keep stuff out of the public domain. I don't know. They don't give me any satisfactory reason ..." ⁽¹⁾.

8.7 Incentives and Disincentives

(i) Exploitation of "Soft" IP

All the interviewees but one ^(A) knew that Strathclyde imposed no earnings limit on academics who chose to exploit their expertise via personal consultancy. All but one agreed with this policy, provided academics fulfilled their primary academic responsibilities. One HoD said that he did not care how much someone earned, provided this condition was met. Another ^(A) observed:

"... If some firm is prepared to give you a phenomenal amount of money for half a day's consultancy ... I mean, what is unreasonable, anyway? The rates for [some] consultants would probably be between £100 and £200 a day, but if you are a circuit judge, it is £600 per day!"

The HoD who felt there should be an earnings limit ^(B) acknowledged that in practice it would be difficult to impose one, partly because of wide differences in fee-earning capability.

All the interviewees but one ^(A) knew that Strathclyde levied no "tax" on academics' earnings from personal consultancy even though it provided insurance cover for those who reported their activities to their HoD. One HoD ^(C) suggested that the University wanted to levy some percentage "tax", however. The HoD who thought that the University already levied a "tax" quoted a figure of 20 per cent. Opinions were divided as to whether the University should levy some percentage "tax". Three HoDs ^(C, D, E) were against the idea. One ^(E) pointed out that in the years since the University had stopped levying a "tax" of 30 per cent, all the "underground stuff" had been brought out into the open; this provided valuable management information and enabled the University to advertise the breadth of companies which its staff had assisted. Another ^(D) said:

"... Well, I think if the University has gone through the procedure of saying - we are going to be covered by our costs for this and they have already said that you are entitled to do upto 25 days' consultancy, then they have said you can do it. They shouldn't expect to give with one hand and take with another. That's bad policy ..."

The third ^(C) took issue with the University's presumed justification for levying a "tax" - ie. that it owned academics 365 days per year, 24 hours per day:

"... I think that [the University has] been trying to have [its] cake and eat it ... Whose time is it, anyway? Whose man are you? Whose effort is it, anyway? ... There's got to be some general understanding. As I say, I don't even know what my vacations are. I've taken two weeks a year and statutory holidays while I've been here, Easter and Christmas while the University is shut. But I've worked at home. Who gives a damn about that? Who gives a damn about working till 1 o'clock every morning when my wife goes to bed and, you know, you don't see her for weeks, effectively? You go to work together in the morning. Who gives a damn about that?"

"So, I think all of that needs to be clarified and I am absolutely of the opinion that someone can legitimately say - if I am using my own home facilities, my own brain, my own body, outside 9-5 and on Saturday and Sunday, whatever I get, I get to keep. And I'll squirrel it away in Switzerland or Panama or wherever. I think that is quite legitimate ..."

While one fellow HoD ^(A) was undecided about this question, another HoD ^(B) and one of the Deans ⁽¹⁾ were completely against the idea of academics doing personal consultancy at all. Both wanted all consultancy to be done through the University - either through the department ^(B) or through a University-wide consultancy company ⁽¹⁾, with the University taking the profit and the academics who did the work receiving at best a small percentage. One ^(B) said:

"... Supposing we were a company, not a University, you couldn't just have it that folk are going out and doing things which bring them money. It all has to be done through the company. And that would be the expected morality of the thing. I mean, I am all for commercial exploitation, but ..."

Most interviewees were aware that Strathclyde's promotions criteria made no explicit mention of consultancy; however, opinions were divided as to whether consultancy was taken into account in practice. Three HoDs ^(C, D, E) and one of the Deans ⁽¹⁾ felt that it was taken into account, both at Faculty and University level; the other Dean ⁽²⁾ felt that it was only taken into account if the Dean lobbied effectively:

"... The Faculty review committee is an elected group, professorial and non-professorial, chaired by the Dean. And they vet the proposals and advance those that they think have merit ... Then it goes to a central review panel, which looks across the Faculties and makes decisions. I have found that when you get from the first stage to the second stage, there are problems in the University recognising the value of industrial connections of the sort that you are talking about. Primarily from the [...] Faculty. They don't regard this as really being research ... [They] take a much more curious view of what we ought to count as research for promotion. Now, the two years I carried this forward, all of the Faculty nominations were accepted, but the debate was there and I could see that under other circumstances ..."

The remaining HoDs ^(A, B) felt that in practice, consultancy was not taken into account. One ^(A) observed:

"... This has been totally killed by the selectivity exercise ... Universities have been evaluated for research which is published and research income from charities and Research Councils. Very little attention has been paid to industrial income, patents or anything else ... As a Department, I've got to - if I want to raise the rating of my Department - I've got to reward those things which UFC research selectivity rewards. Which is publications, which is Research Council income ..."

Most interviewees felt that consultancy should count as one of the criteria for promotion, though one ^(B) had a caveat: it should only count where it was done as in-house rather than personal consultancy, on the grounds that this enabled the department to objectively evaluate its importance and worth.

(ii) Exploitation of "Hard" IP

Both Deans and four of the HoDs interviewed knew that Strathclyde had always had financial incentives to encourage members of staff to "flag" potentially exploitable IP. Despite having been in the University since the late 1960s, the fifth HoD ^(B) had only discovered this "very recently", through a chance conversation with the Director of RDS; as a result of no-one in his department appearing to know this, staff who had worked for many years on a software tool which was very successful commercially had received no personal share of the proceeds, which were ploughed back into the project instead.

When asked how the University divided income from the exploitation of "hard" IP, three HoDs ^(A, B, E) said they had no idea, while two interviewees ^(D, 1) quoted the 50:50 split between the University and the inventor(s) which had operated until April 1990. Only one HoD ^(C) knew that a new sliding scale which also benefitted the department concerned had been accepted by Court at that time and was able to quote it more or less *verbatim*. One of the Deans ⁽²⁾ knew that there was a sliding scale, but could not quote it. The other Dean ⁽¹⁾ claimed (as did a number of interviewees) to have been the person who initiated the change; however, he was one of the six interviewees who was completely unaware that this had been sanctioned by Court seven months earlier.

Most interviewees welcomed the fact that departments generating IP which was successfully exploited would now share in the proceeds. Several volunteered the information that the University's earlier intransigence on this matter had occasioned widespread resentment and bitterness in the light of the many £millions which the drug "Atracurium" had yielded in royalties. One HoD ^(B) was very much in favour of the department benefitting, but totally against the idea of the academic(s) concerned benefitting personally. He spoke at length about the commercially successful software tool developed in his department:

"... the number of people who have worked in [this unit] over the years is about forty. That is not including the secretaries and the technicians and the women who come in and clean the ashtrays. I mean, you actually can't produce anything ... I mean, I am caricaturing it somewhat, but who says somebody has one idea, somebody has another. Somebody writes this bit of code, somebody debugs it. Other people spent their time going out trying to earn the money to keep the team going, while the next bit of development took place. How on earth can you actually begin ... And everybody is coming out of the woodwork saying - look, I want ... I belong to a bit of this. It is ridiculous!"

He also observed that the software tool in question could not have been refined to the extent it had been if the proceeds from earlier versions had been divided among team members instead of being ploughed back into the project.

Opinions were divided as to how effective an incentive the division of royalty income was from the perspective of individual academics. One of the Deans ⁽²⁾ said he had no way of knowing, since this had not affected anyone in his Faculty. Two interviewees ^(0, 1) did not think that this really acted as an incentive; one ⁽¹⁾ characterised it as a reward rather than an incentive; the other ⁽⁰⁾ said:

"... I think the University mustn't delude itself. Academics do what they do because they are interested in that area of science. They are not there, at least very few are there to make major personal gains out of invention. They will follow that track, if it is open, but that is not the primary motivation. So, I don't think [this] is going to have a major motivatory impact ..."

A similar view was expressed by another HoD ^(C), who nonetheless saw the division of royalties as "a very real incentive" to encourage academics to "flag" potentially exploitable IP if they happened to generate it. A fellow HoD ^(A) thought the division of royalties would probably have a limited impact, acting as an incentive to academics already "in that sort of area". Only one interviewee ^(B) said unequivocally that this would act as an incentive to individual academics. Nonetheless, all interviewees but one ^(B) thought that academics would be happy to keep their personal share of any income yielded by their IP, rather than channel it back into the department or their own research group.

None of the interviewees had ever thought about the income made personally by academics (eg. from dividends, director's fees) who tried to entrepreneurially exploit "hard" IP arising from their research; as a result, none of them had any idea how the University treated this income. Upon hearing that, unlike some universities, Strathclyde did not attempt to levy a "tax" on it, five interviewees ^(A, D, E, 1, 2) agreed with this policy, though two ^(0, B) felt that this policy should only apply to "clear-cut situations", not impenetrable ones. One ⁽⁰⁾ said:

"... Where we get into situations which are difficult is where the ground rules have not been laid down clearly at the outset, so that HoDs can check that somebody is getting money that perhaps they feel they shouldn't because of the time they are spending away from the department ..."

The other ^(B) was concerned about members of staff who were associated with the commercial arm of their department and an ostensibly independent spin-off company located adjacent to the department:

"... there are situations within the University where there are companies very close to departments which seemed to be mixed up with research units and their academic staff and their postgraduates ... The problem is, if you mix up funding that is associated with students with hard funding that comes from industry, it is a very difficult thing to separate ...I think [people] have asked but I mean, maybe they asked the wrong people. But I don't think the numbers have been forthcoming ..."

One HoD ^(C) felt that he would like more time to think about this issue; if large sums accrued to someone who had been given time off by the University, maybe the University community should share in the proceeds. The remaining HoD ^(B) entertained no doubts: the University should levy a "tax" on the income which accrued to academics from their entrepreneurial activities: *"I don't think there should be gain personally ... While they are out doing that, other people are covering for them"*. In his view, the "tax" should be levied even if the academics concerned devoted only evenings and weekends to their entrepreneurial activities: *"I don't know any senior academic who has weekends and evenings free"*.

Four interviewees ^(C, D, E, 2) were aware that the promotions criteria at Strathclyde made no explicit reference to the protection or exploitation of IP. Three of these ^(C, D, E) said they thought that in practice, this would - and should - be taken into account - as part of the whole picture, rather than in some mechanistic way such as equating patents with publications. The fourth ⁽²⁾ indicated that he had been lobbying for some time for the promotions criteria to be made altogether more explicit, and that this should certainly be included: *"If we want to encourage this area of activity, it should be made explicit"*.

Asked whether they thought entrepreneurial exploitation of "hard" IP arising from research was taken into account by the promotions committee, one interviewee ^(A) thought it would inevitably have a negative impact, while two ^(C, 1) felt it would have no impact at all and another two ^(B, D) believed (incorrectly) that it would have a positive impact, since it inevitably entailed a joint venture with the University. The remaining HoD ^(E) thought that entrepreneurial exploitation of "hard" IP would be taken into account, but the impact would depend on the individual's performance against other criteria - *ie.* it could have a positive or a negative impact. Opinions were divided as to whether or not this kind of activity should be taken into account. Two ^(B, 1) thought that it should not be taken into account under any circumstances:

"... I think that is really another side to the career which has its own promotional prospects, its own reward ..." ^(B)

"... the launching of companies and things like that is a commercial operation for which they get well paid in general terms. And therefore I don't take that into account, okay?" ⁽¹⁾

One HoD ^(A) said that he would be very unhappy about promoting somebody just because of their entrepreneurial activities, but that he would be prepared to make a very special case if there was *"some reasonable academic activity going on alongside it"*. Three HoDs ^(C, D, E) thought that it should be taken into account, if it was "all legal and above board" ^(D) - because the academic concerned would also be generating wealth for the community ^(C).

YORK UNIVERSITY

1 VITAL STATISTICS

1.1 Origins

Two abortive attempts to create a university at York were made in the 17th century, followed by another abortive attempt in 1947. In 1959 a further, successful approach was made to the UGC. York was the second of the new "plate-glass" universities created to accommodate the expansion in the university sector which was required as a result of the post-war "baby boom". It received its Royal Charter in 1964.

1.2 Size

By the beginning of the 1980s York had become one of the larger of Britain's small universities, measured in terms of student FTEs ⁽¹⁾. York was one of only eight UK universities which was not advised by the UGC that year to reduce its home student intake, as **Figure 2** revealed. At the same time, however, the UGC announced that York's recurrent grant was to be reduced by 6 per cent between 1980/81 and 1983/84. This was the lowest cut inflicted on any UK university; only one institution fared better than this - uniquely, Manchester Business School was awarded an increase in its recurrent grant. There is a school of thought which explains York's relatively lenient treatment at the hands of the UGC as tacit recognition of the fact that the university had been consistently under-resourced since its foundation ⁽²⁾. There were nonetheless staff losses, principally in the arts and in services, but the resulting savings were redistributed to other departments. Structurally, York ended the decade much as it had begun, with 18 departments informally grouped into three broad subject areas: sciences/engineering, social sciences and arts.

In 1986 the UGC indicated that York should increase its student numbers by nearly 7 per cent over the next four sessions ⁽³⁾. In fact, by the end of 1980s York had managed to increase its student numbers by 20 per cent over the decade ⁽⁴⁾. Moreover, by 1988/89 York had not only recouped its staff losses; it had actually increased its full-time staff numbers by 19 per cent over the decade and had more than trebled the number of part-timers ⁽⁵⁾. Nevertheless, ranked by size, York's position relative to certain UK universities fell slightly over this period.

1.3 Science Base

Given the University's size and the balance which it seeks to maintain between the sciences, social sciences and arts, York's science base is inevitably less comprehensive than many of the universities participating in this study. For over a decade after its foundation, York had only four science departments: Biology, Chemistry, Mathematics and Physics. In the mid-1970s, however, the university opted to establish an Electronics Department and to convert its computer unit from a service activity into a teaching department. It also established a new Archaeology Department. Thus, each of the three broad subject areas is now represented by six departments. However, by the end of the 1980s the science departments had come to account for a relatively high proportion of the university's academic staff, with around 45 per cent of the posts funded by the UFC. This is a significantly larger proportion than at the beginning of the decade, when only 32 per cent of the UGC-funded staff were scientists ⁽⁶⁾.

Figure 6a showed us that in the 1986 research selectivity exercise, one subject area in the natural sciences, engineering and technology was rated as outstanding at York, two as above average and the remaining three as average ⁽⁷⁾. It was suggested at the time that if the ABRC's recommendations were ever implemented, York would be assigned to the "X" category of universities ⁽⁸⁾; accordingly, it would be able to offer teaching across a broad range of fields and substantial research activity in particular fields, in some cases in collaboration with others.

Figure 6b showed us that in the 1989 research selectivity exercise, no "units of assessment" in the natural sciences, engineering and technology were awarded a "5"; four were awarded a "4" and two a "3" ⁽⁹⁾. National league tables published in the press at the time ranked York's research effort as the eighth best in the country, after Oxford, Cambridge and three major London colleges ⁽¹⁰⁾.

1.4 Research Grant and Contract Income

As we can see from Figure 41a, in 1984/85, York ranked 27th in terms of £ earned in external research grants and contracts, but 10th in terms of the percentage of its total recurrent income which this external revenue represented ⁽¹¹⁾. The six science departments generated close to £2.3m, accounting for 59 per cent of the University's total income from research grants and contracts ⁽¹²⁾. Figure 41b reveals that by 1988/89, the science departments had increased their 1985 earnings by around 45 per cent, generating £3.3m; this accounted for 56 per cent of the University's total income from research grants and contracts ⁽¹³⁾.

As Figures 345-346 indicate, the pattern of sponsorship which York's science base attracted changed somewhat over this period. The proportion of funding received from the Research Councils and charities fell - not due to increased funding from industry/commerce, for the proportion of funding from this sector was virtually unchanged. Instead, York considerably increased the proportion of funding received from central government, local government and various overseas organisations.

2 HISTORY OF EXPLOITATION

2.1 Background

Unlike the other Yorkshire universities, York is situated in an area which has no industrial tradition and relatively few large companies ⁽¹⁴⁾. In part, at least, this is said to explain the university's long-standing disinterest in industrial liaison. Until the end of the 1970s this disinterest was apparently reinforced by the perception that its four science departments had little to offer in commercial terms ⁽¹⁵⁾. Moreover, if these departments were generating IP, for the first decade and a half after the university opened, the administration was certainly not aware of it. Given this situation, it is perhaps not surprising that the university failed to respond to the CVCP's recommendation that universities should amend their terms and conditions of appointment in the light of the 1977 Patent Act to incorporate their (joint) rights to employee inventions.

This situation began to change when the electronics department was established in 1979. York appointed a HoD from Southampton University, which had been pursuing commercial activities for a number of years. Moreover, unlike most of York's academic

staff, he had spent part of his career working in industry. In 1980 the new HoD obtained a grant of £60,000 from the Wolfson Foundation to set up a centre which would act as the commercial arm of the Department. This interest in things commercial found an echo in the new computer science department, particularly after it developed the Ada compiler ⁽¹⁶⁾. This led to a number of potential products being identified, many of which have subsequently been developed. In the view of one senior administrator, the activities of these two departments began to exert an influence on the other science departments:

"... Academics are terribly competitive and as soon as electronics and computer science started to do work that [brought] an income, the science departments in particular saw that there was a need for them to do something as well ..."

This was not a university-wide perception, however. In 1981, when the UGC announced a cut in York's recurrent exchequer grant, the university did not see greater contact with industry as the best way of making up some of its lost revenue. Following a meeting of the Court, at which a member of the academic staff suggested that the university should try to raise money from external sources, it was decided to appoint someone to organise an appeal, rather than appoint a dedicated industrial liaison officer. As a concession to those wanting greater contact with industry, it was agreed that the appointee could devote his spare time to industrial liaison, however. There was apparently no perception that these two activities required different skills, nor that making one person responsible for both could convey mixed messages.

2.2 Structures

Upto that point, the IP which began to emerge from the two new science Departments had been handled by the Finance Officer ⁽¹⁷⁾, if the individuals concerned approached the administration. He saw his role as facilitating rather than taking charge of exploitation. He was less concerned with getting the best financial deal than with exploiting the IP in a way which allowed the researchers to pursue their particular interests. If an academic wanted to cultivate a relationship with a particular firm and felt the IP would act as a sweetener, a deal would probably be struck with that firm, without too much emphasis on the financial return or, indeed, that company's ability to exploit the IP in question.

If the IP was not to be exploited by the BTG, the Finance Officer invariably assigned it to a company, rather than retain ownership, seek patent protection and license it. Having consulted the University's commercial solicitors and attended a number of seminars on patenting, he was deterred from this course of action by the cost implications. There was, in any case, no obligation for researchers to notify the Finance Officer if they had exploitable IP, so a central budget to cover patenting was never set up. Sometimes, the Department which generated the IP chose to retain ownership, patented the discovery on behalf of the University and negotiated license deals.

In 1982 the University appointed a Cambridge science graduate who had just retired from a career in a major British chemical company, ostensibly to co-ordinate the University's appeal and look after industrial liaison in his spare time. In view of his industrial experience, responsibility for IP passed from the Finance Officer to the new appointee but he was not given a formal patent budget. Nor was he given a formal remit:

"... The one person who might have done that, the Registrar at the time, [was taking] a year off in Oman ..."

Despite his considerable efforts ⁽¹⁹⁾, the appointment was not deemed to be a success. For the first half of his 3-year contract, experience and inclination led him to concentrate on industrial liaison, sowing a lot of seeds but generating little revenue. This irked the Departments which were more in favour of raising money via appeal. The Departments which were more in favour of raising money via industrial liaison were disgruntled that he was not devoting all his time to it. After 18 months the Vice-Chancellor, the Finance Officer and the Registrar decided he should drop all industrial liaison activities and work only on the appeal. In 1985, however, he chose not to renew his contract and the University did not replace him. Once again, the Finance Officer found himself handling IP matters.

By this time, the Jarratt Report (CVCP, 1985) had been published and a lay industrialist who sat on the Finance Committee saw the report's references to commercial spin-offs as an opportunity which York should grasp. Accordingly, in April 1985 the Finance Committee set up the Commercial Activities Sub-Committee. This ensured that academics - a number of whom subsequently came forward with entrepreneurial proposals - received encouragement and support from the administration. Prior to this, academics had received encouragement and support - albeit for less entrepreneurial ways in which to exploit their ideas - but very informally, with the Finance Officer playing the key role:

"... If I went [to the Vice-Chancellor] and said - I think Dr. X has a good idea, it would be worth putting a bit of money into it, [he would say] - if you think so, you go ahead and do it ..."

2.3 Regulations and Documentation

Handling IP was very much a part-time, sporadic activity for the Finance Officer, who advertised his responsibility by means of a dual listing in the internal telephone directory, and via very occasional items in the University's "News Sheet". There was no written documentation which spelt out for the academic community the DOs and DON'Ts of identifying, evaluating, protecting and exploiting IP: "*Academics have had to find their own way*". There were no University regulations relating to the exploitation of IP and the University did not amend its General Terms and Conditions of Service.

2.4 Incentives

When the new Professor of Electronics arrived at the end of the 1970s, he became concerned when he discovered that the University had no policy concerning the distribution of income from the exploitation of IP. This led to the University deciding that income of this ilk would be divided between the academic(s) concerned, their department and the centre, a policy which was eventually incorporated into the staff handbook. However, although the department's share was limited to a maximum of one-third for sums up to £1,000 - or the first £1,000 of larger sums, and although both the department's and the centre's share was limited to a maximum of one-third each where sums greater than £1,000 were concerned, it was not at all clear what proportion the academic(s) concerned could expect to receive or what criteria might be employed in negotiating the requisite proportion.

3 THE KINGMAN LETTER

When Sir John Kingman's letter arrived, it was passed to the Finance Officer in his capacity as secretary of the newly-formed Commercial Activities Sub-Committee. He circulated a copy of the letter to all HoDs, inviting comments. Those who were interested or had experience of IP - primarily members of the Electronics and Computer Science Departments - were invited to attend meetings of the Commercial Activities Sub-Committee, a small committee consisting of two lay members, a professor from the Department of Economics and Related Studies and the Finance Officer.

No thought was given to rejecting the Research Councils' offer. By this time it was recognised that the appeal had been less successful than expected and the offer was seen as a means of increasing the University's revenues. The University also felt that having the right to exploit IP might enable it to have a positive impact on the local community, perhaps creating jobs at a time of high local unemployment. The prospect of the University getting involved in commercial exploitation aroused no controversy in the academic community, except when it was proposed that if a science Department earned a lot from IP, the money could be used to appoint a lecturer in an arts or social sciences Department:

"... The reaction was - I'm happy to earn money to appoint a lecturer in my Department or a [related] Department, but I'm not going to earn money to put a lecturer in [the Department of] Language! ..."

The Commercial Activities Sub-Committee drew up a reply which was duly dispatched to the Exploitation Scrutiny Group. It was not accepted initially due to concern over how the University proposed to handle the division of royalty income. The Finance Officer contacted a number of industrial liaison officers from other universities, to see how the successful ones had handled this point. He and the Vice-Chancellor then redrafted York's reply:

"... It [was] done outside the [Sub-]Committee, because that's how you made progress to a large extent on this innovative stuff ..."

The second response was accepted by the Exploitation Scrutiny Group and York's letter of authorisation was sent on 16 October 1987, nearly a year after the majority of Britain's universities received theirs.

4 CURRENT POLICY AND STRUCTURES

4.1 Rationale

York's reply to the Exploitation Scrutiny Group was formulated without reference to other universities or to organisations like UDIL and IACHEI, with the minor exception of research into acceptable methods of sharing out royalty income. The University's reply reflected custom and practice which had evolved over the years from grassroots activity rather than from an initiative of the administration. This is a dynamic which has strong parallels in other areas of York's academic life ⁽⁴⁹⁾. In 1987, when it received its letter of authorisation from the Research Councils, the University had an attitude - a *laissez-faire* attitude - rather than a coherent policy.

Over the following years, the administration made moves to develop a coherent policy. By 1988 the Commercial Activities Sub-Committee had been disbanded ⁽²⁰⁾, so an informal working party was set up to advise on IP policy considerations ⁽²¹⁾. Reporting to the Joint Committee for Academic & Related Staff, in formulating the University's policy the working party drew freely on a recent report by UDIL ⁽²²⁾ and a talk given by a QC to the Conference of University Registrars & Secretaries ⁽²³⁾. The resulting policy defined IP in widest sense, as proposed by WIPO ⁽²⁴⁾. It asserted the University's rights to all such IP except copyright in books, articles, lectures *etc* - and copyright in computer software which is not widely applicable. It committed York to retaining ownership of all other IP, wherever possible, and to adjusting the costing of research contracts to take account of IP ownership. The working party concluded by drawing up a set of regulations, to which academic/academic-related staff should adhere. These incorporated a formula governing the distribution of revenue generated by IP.

The draft policy was first put to the Joint Committee for Academic & Related Staff in November 1989 ⁽²⁵⁾, but only the formula governing the distribution of revenue was agreed. The local AUT felt that the draft policy had been "*cobbled together*" from various documents. In their view, it displayed no cohesion and no evidence of having addressed certain issues, most notably the fact that the University proposed to leave it to co-researchers to determine how to apportion IP income between them. This was a problem which the Computer Science Department had already tried to address on its own initiative ⁽²⁶⁾. The local AUT was also unhappy about including all software in the IP over which the University proposed to assert ownership. The revised policy and accompanying regulations - encapsulated in a dedicated document - were accepted by the Joint Committee for Academic & Related Staff in April 1990. They were subsequently ratified by the Professorial Board, the General Academic Board (which, taken together, are roughly equivalent to the Senate in other universities) and by the Council in July 1990 without any amendments.

4.2 Structures

Prior to this, the administration had recognised the need to institute some kind of structure to promote and monitor industrial development. When the UGC instructed Britain's universities in 1985 to plan for a 2 per cent cut in their recurrent grant over the next four years and to submit proposals to meet this reduced level of support, York indicated it intended to raise funds by developing five industrially-oriented research centres which would bring in "*considerable sums*" ⁽²⁷⁾. The administration's expectations *vis-a-vis* the academic community's potential for doing commercial work changed over the course of the 1980s, especially after the Biology Department set up a series of commercially-oriented, self-financing units to exploit its strengths in half a dozen areas. The success of these units was instrumental in the decision to construct a purpose-built Institute for Applied Biology ⁽²⁸⁾. Moreover, increasing numbers of York's academics were generating exploitable IP - and not only members of the Electronics and Computer Science Departments. The Biology Department developed a number of devices which were patentable and/or exploitable. The Chemistry Department won second prize in the 1988 Academic Enterprise Competition (section 2) for one of its inventions. The Language Department developed a device to help deaf people and the Music Department developed a computer-based musical instrument which was on the market in 1989/90. The Departments of Sociology and History had developed commercially exploitable products in the shape of archiving techniques and databases.

Until 1988, responsibility for IP stayed with the Finance Officer but his impending retirement acted as a trigger for new arrangements. Before it was wound up, the Commercial Activities Sub-Committee decided in favour of an internal appointment to handle industrial liaison and IP. Committee members reasoned that, unlike the man from industry, the person selected would at least be familiar with the University's structure and *modus operandi*. It was also felt that unless the University was prepared to pay a considerably enhanced salary, it would be impossible to attract a person of the right calibre from industry.

An entrepreneurial Professor in the Biology Department ⁽²⁹⁾ was invited to become Director of a new Industrial Development Unit (IDU) on a half-time basis, retaining as a certain number of academic commitments. He took up his post in October 1988 and reported to both the Vice-Chancellor and the Policy & Resources Committee. A full-time Assistant Director of Industrial Development was appointed soon afterwards. In 1989/90 the IDU was located in the new Institute for Applied Biology.

At the end of 1989, the IDU was very much in its infancy. It was also a relatively small-scale operation. This was seen as an inevitable consequence of the University's size:

"... The science base isn't going to lead to a £multi-million turnover to underwrite a large office ..."

4.3 Incentives

(i) Financial

In keeping with the terms of the 1977 Patent Act, academics at York are not rewarded - financially - or in any other way - simply for bringing potentially exploitable IP to the University's attention. They are rewarded only if the IP is successfully commercialised - but if they want to, they are likely to have a considerable say in how it is commercialised. The extent to which inventors are financially reward has changed considerably during the past few years.

At some point during the 1980s, the University introduced a formula to govern the distribution of income from IP. It was publicised in the Academic & Related Staff Handbook, which seems not to have kept upto date with events in preceding years. In the 1989 edition, for example, the section headed "Inventions" refers only to revenue-sharing in income from inventions patented through the BTG. Although the University had acquired the right to exploit IP arising out of Research Council-funded projects some two years earlier, the Handbook makes no reference to income which might be derived from other ways of exploiting IP. Moreover, it does not give a very clear message about the way any income would be divided:

"(i) In respect of income upto £1,000 or the first £1,000 of larger sums, the income should be divided between the inventor and his department in a ratio determined by the Vice-Chancellor after consulting the Head of Department concerned. The department should not receive a share exceeding one-third.

- (ii) *In respect of remaining income in excess of £1,000, the income should be divided between the inventor, his department and the University in ratios determined by the Vice-Chancellor after consulting the inventor and his Head of Department. Neither the department nor the University should receive a share exceeding one-third.*" ⁽³⁰⁾

In November 1989 the Joint Committee for Academic & Related Staff accepted the idea that an unambiguous sliding scale was more appropriate. Under the terms of the new formula, "*originators*" will receive 100 per cent of the first £1,000 net, 80 per cent of the next £5,000 net, 70 per cent of the next £24,000 net and 50 per cent of any income over £30,000. The introduction of the sliding scale was backdated to the start of the financial year (August 1989). It was York's intention to be extremely generous to inventors, indeed, the local AUT was under the impression that terms agreed at York were more generous than at any other UK university. However, although the IDU had to hand the relevant extract of the minutes, it was not immediately circulated to the academic community. This was finally done in summer 1990, once a comprehensive policy on IP had been agreed.

The residue of the income is split evenly between the Department and the University's central funds, yielding a minimum of 10 per cent and a maximum of 25 per cent each. This is seen as a very positive incentive to HoDs to encourage their staff to transfer technology:

"... £10,000 or £20,000 a year coming in non-earmarked would be tremendous ... For most Departments any new initiative is very difficult to fund, whether it's research or teaching. So that is probably one of the most exciting things you can hold out to a Department ..."

(ii) Career Progression

Promotions policies at York are decided by the Joint Committee for Academic & Related Staff. At present candidates for promotion are considered on the basis of competitive merit in:

- * teaching, course preparation and examining;
- * research and scholarship;
- * Departmental and other management or administrative responsibilities,

three areas which are of equal importance to the University. The Staff Handbook provides examples of areas of work which fall into the various categories. Under the second heading it mentions "*consultancies and the provision of professional service*"; under the third heading it lists "*industrial liaison*". No mention is made of patents, something which does not unduly concern the IDU:

"... [A patent] in itself has absolutely no merit, in the sense that [one] can write as many patents as [one] can whack in for £15 a time. Its [like] an unrefereed publication ..."

Neither involvement in the exploitation process - unless that comes under the heading of "*provision of professional service*", nor entrepreneurial activities are mentioned. It is emphasised, however, that the examples listed are not exhaustive. In the Registrar's view, there is no explicit reference because the value to be placed on such activities has not become the subject of debate at York in the way that it has elsewhere. As a result, some academics included their more entrepreneurial activities in their applications for promotion, some do not; some are promoted, some are not.

4.4 Regulations and Documentation

The IDU did not feel that the University's *laissez-faire* attitude necessarily worked entirely to its advantage where the identification, evaluation, protection and exploitation of IP was concerned. The Director welcomed the new regulations:

"... [We] have got to be more regulatory ...[but] we've got to show people that the regulations are for their own benefit. They've got to be protected from themselves ..."

York's policy is detailed in an 11-page document ⁽³¹⁾ which was circulated to all members of the academic/academic-related staff in the summer of 1990. The document explains that the policy has been formulated "*to provide a framework for the successful accomplishment of technology transfer*" and that it is intended "*to encourage researchers and other innovators to identify and to develop commercial projects*". It informs academics that the University has been recognised by the Research Councils as "*a competent body to arrange for the exploitation of Research Council-funded IP*". It gives the WIPO definition of IP, backs up its claim to ownership of inventions by reference to the 1977 Patent Act and clearly states the types of IP over which the University has no interest in asserting its rights. The document indicates that in all other cases, it is the University's policy to retain ownership of IP, wherever possible. It discusses different categories of research, with a view to ensuring that researchers do not inadvertently give away rights in IP. It also discusses the relationship between IP ownership and the costing of research grants/contracts.

It concludes by listing 14 regulations. These commit researchers (both staff and students) to informing their HoD and the IDU if they have invented something exploitable. They commit the IDU to keeping a central record of such inventions, together with the names of inventors and the date. They also commit the IDU to deciding within three months whether the University wishes to become involved in the exploitation process. If so, the regulations outline a range of possible actions. They commit the inventor(s) to retaining confidentiality, to providing "*reasonable assistance in the exploitation process*", *ie.* "*providing information promptly upon request, attending meetings with potential licensees and advising on further developments*". They commit the University to bearing, initially at least, the costs of protecting, developing and exploiting IP and to distributing any net revenue on the basis outlined above. They conclude by outlining arbitration procedures to be employed in the event of a disagreement over ownership of IP or the distribution of revenue which IP generates. If the University does not wish to become involved in the exploitation process, the regulations commit it to offering to waive/assign its rights in the IP to the inventor(s).

The document concludes with a comprehensive set of notes. These indicate that although the General Terms and Conditions of Service of existing academic staff members make no reference to IP, since 1977/78 they have imposed an obligation to undertake research; they describe the nature of university research as "*such that an invention may reasonably be expected to result from the carrying out of such duties, so that the invention ... will belong to the University by virtue of Section 39 of the 1977 Act*". They also outline the position of technicians. The notes draw academics' attention to the possibility of obtaining finance from the Innovation & Research Priming Fund in order to develop inventions to a first prototype stage. They stress the need to conduct talks with potential industrial partners under the seal of confidentiality agreements. They discuss copyright and how to assert it, how to register designs, trade marks and service marks and they describe the conditions which must be fulfilled in order for a patent to be granted. Finally, they indicate the various routes by which a patent might be exploited, including joint ventures and independent academic spin-off companies.

The Intellectual Property Regulations will be incorporated in full in the next edition of the Staff Handbook and reference to them will be explicitly made in the General Terms and Conditions of Service of future academic and technical staff. It is also proposed to draw students' attention to the new regulations.

4.5 Sanctions

Because explicit regulations have only just been introduced, the University feels it would previously have been difficult to impose any sanctions against academics who had decided to exploit their discoveries clandestinely, to their sole advantage. There is a school of thought which held that was by no means certain that the existence of explicit regulations and the amendment of future Terms and Conditions of Service would make any difference. Like the OECD, the CVCP and the AUT, the previous Finance Officer sought legal advice concerning the applicability of the 1977 Patent Act to academic staff. He was advised that the situation was not at all clear, since numerous examples could be cited in which universities were anomalous or exceptional in law.

Some members of the administration are not unduly concerned; as a university, York has a number of characteristics which make it unlikely that academics exploit their discoveries clandestinely, to their sole advantage. These include its size, the opportunity for networking - not to mention gossip - provided by college senior common rooms and the fact that a large proportion of the staff have been there almost since the University opened and know each other well. Moreover, the administration believes it enjoys an unusually good relationship with the academic community:

"... At York the administration and the academics get on very well together. I gather this is strange. I've spoken to academics from elsewhere and they find it very odd!"

Academics are said not to perceive the administration as "*out to get every penny it can from their endeavours*". This positive relationship has also encouraged an ethos of openness in the University.

Cynics in the administration are less convinced:

"... anybody who's got a good idea isn't going to [involve] a third party if he can go and sell it to someone direct ..."

However, given the advice it received, it is doubtful whether the University would seek legal redress:

"... the University would be reluctant to go to law unless they were certain that [the IP involved] was a money-spinner, and to be certain is almost impossible ..."

5 THE EXPLOITATION PROCESS

5.1 Interpretation of Government Statements

In principle, the administration at York was in sympathy with Sir Keith Joseph's statement to the effect that academics should become more actively involved with the exploitation of the IP they generated. More by default than by plan, perhaps, York had a long-standing tradition of allowing individual academics and Departments to protect their discoveries on the University's behalf and to have a say - often the say - in how their discoveries were exploited. The suggestion that exploitation might now be achieved via spin-off companies was completely in keeping with the line adopted by the Commercial Activities Sub-Committee only a month beforehand. This Committee did more than pay lip service to the idea: it was not long before the University put its advice into practice by giving financial support to campus companies and joint ventures which were "driven" by academics.

However, the administration also felt that the student:staff ratio at York was particularly poor ⁽³²⁾. In its view, there were not enough hours in the day for many members of staff to carry out their primary, academic commitments and get a commercial project off the ground. For this reason, it did not go out of its way to promote activities like academic entrepreneurship. Rather, it was supportive when individual academics showed they were willing to shoulder the burden.

5.2 Identification

In 1986 York made a brief reference in the University newsletter ⁽³³⁾ to the removal of the BTG's first right of refusal to exploit IP arising from Research Council-funded projects. At the same time, the academic community was reminded of the Commercial Activities Sub-Committee's interest in "*marketing bright ideas*". At the end of 1987, once the Exploitation Scrutiny Group had accepted York's submission and granted authority to the University, the administration sent a copy of the submission and the letter of authority to all HoDs, asking them to circulate copies to all members of staff. There seems to have been no written reminder after that until the summer of 1990, when mentioned obliquely in the first paragraph of the new policy document and reiterated in the discussion of different categories of research.

The policy document places the responsibility for flagging potentially exploitable research discoveries firmly on the researcher(s) concerned. However, York has experienced the difficulties entailed in trying to recoup what it can from situations where academics have unwittingly disclosed their discoveries ⁽³⁴⁾. As a result, it understands the need to be proactive. However, unlike many of its counterparts, the IDU's Director is not automatically informed when researchers have been successful in negotiating research

grants or contracts. The paperwork is handled by the Finance Office, which scrutinises proposals only to check their financial probity. The research grant and contract staff have no connection with the IDU, either geographically or organisationally. The IDU's Director does not believe that the solution necessarily lies in relocating the research grant and contract section within his office. He believes the IDU needs to set up its own, comprehensive information system. Copies of research grants/contracts form only a part of this:

"... In the long term one would want to have complete sets of documentation on every project, right back almost from the glimmer of an idea through to the reporting. That's the only way [one] can follow it through ..."

The IDU's wish to be involved at the "glimmer of an idea" stage is motivated by concern about the terms of research proposals - particularly those with industry. This is a sufficiently complex area that the IDU's Director himself feels he is still on a learning curve ⁽³⁵⁾. Academics are therefore encouraged to come and discuss their proposals at the stage when they are still formulating their research objectives and strategies. Encouragement is given both informally and formally. Because York is so small, the IDU's Director expects to be able to make personal contact with every major researcher in the University in the space of a year:

"... I reckon if I'm not lunching with somebody somewhere, then I'm not doing my job properly ..." ⁽³⁶⁾

More formally, the IDU has instituted a local early warning system. Rather than use the in-house research committees which some Departments had established, at the end of 1988 the IDU's Director asked every HoD to nominate a Departmental ILO who would act as a gatekeeper. He preferred to institute a mechanism which would make commercial activities its priority, rather than a subsidiary interest. In the science Departments, these gatekeepers have tended to be relatively senior people with a good knowledge of their Departments; in the arts Departments, this is less often the case. The decision to appoint gatekeepers in every Department was taken advisedly:

"... it would be an enormous mistake in this small a University to be seen to be divisive. It would be very much easier to say - these are the clear commercial areas, forget the rest, concentrate on these. We are a University [though], and ... we have to carry the whole University with us ..."

The requirement that researchers should flag potentially exploitable IP before disclosing it is outlined in the new policy document. The IDU tries to reinforce its message by means of a 4-page commercial bulletin ⁽³⁷⁾. During 1989/90 the bulletin appeared four or five times. In due course it is intended to publish it every month, however, not only reminding staff but giving feedback on what has been achieved commercially. In addition, the IDU periodically arranges seminars to explain the workings of the patent system to the academic community, but:

"... [Attendance] isn't mandatory, and even if it was, how they behave is something else ..."

This wry comment was occasioned by a "maverick" who "*went off like a firework, doing daft things*", and no matter how tight a system he devises, the IDU's Director sees no way of preventing that. Because of this, the IDU feels it needs to routinely acquire and scrutinise copies of all research proposals and all successful grants/contracts. It should also see all reports, before they are sent to sponsors, and it should vet scientific thesis titles before they are finalised. The IDU draws the line at asking academics to submit drafts of papers for scrutiny before sending them off for publication, however:

"... If you made a general edict, numerically you'd probably be creating ... a 100 per cent system to catch 5 per cent of the people ..."

Moreover, most academics are "*pretty jealous about ... anybody interfering with his or her academic prerogative*".

New members of staff learn about the University's policy *vis-a-vis* IP from their General Terms and Conditions of Service and the document containing the regulations - *ie.* in writing. Although York runs an induction course for new members of staff, the IDU does not see that as a useful forum. Firstly, it is voluntary, not mandatory, and secondly, because of the size of the University, the induction course deals with matters which apply to all members of staff, not just academic members. The IDU recognises that it may need to organise a one-to-one talk with new academics about IP and commercial activities.

The University has chosen to rely primarily on in-house mechanisms for identifying IP. It is "*constantly pestered by consultants such as Ceres*" wanting to conduct a technical audit of the University. However, since the first ILO carried out a thorough audit in 1982-85 and a firm of management consultants was recently invited to do a follow-up audit, the IDU has not taken up such offers.

5.3 Evaluation

Once potentially exploitable IP has been identified, the IDU's Director asks researchers to write a "*mini-mini business plan*", with particular emphasis on the scientific value of their discovery. This is used to solicit peer review from within the Department and from outside the University.

The scientific merit is fairly easy to evaluate, but the IDU's Director feels it is almost impossible to obtain an independent market evaluation. Since York is not deemed to be part of the "North East" ⁽³⁸⁾, it gets no public sector grant aid. There are no local public sector agencies which could provide an independent market evaluation. Nor can the IDU readily employ private sector consultants to do it. That requires "*significant money*" and the IDU's budget headings do not include market research. Increasing the budget to allow for the costs of market research is no easy matter. The IDU has to compete for additional funds against 18 Departments and a number of institutes and centres, in a University which feels its traditional activities have been underfunded for decades. Unless it can demonstrate a return from market research, preference is likely to be given to funding new teaching posts rather than "*the peripheral side*" of the University's activities - a "Catch 22" situation. This means that the IDU often has to rely on the BTG - or on industry, which may provide an evaluation which is neither as objective nor as comprehensive as it might be.

Unless researchers have particularly intimate market knowledge, they are unlikely to contribute a great deal to the process of evaluating their discovery. Unless they wish to exploit the discovery via their own spin-off company or a joint venture with the University, their contribution is likely to be limited to suggesting companies to approach.

5.4 Protection

(i) Philosophy

It is York's explicit policy to try to retain ownership of IP generated by the academic community, irrespective of whether the discovery was funded by the Research Councils, government or industry. In practice, the IDU finds this policy difficult to implement. One difficulty stems from the fact that until the early 1980s, like many of Britain's universities, York's inventors and industrial partners were used to the University not asserting ownership of IP generated by academics. This created a climate at York in which failing to assert ownership in the first place or assigning it is seen by many as the norm. This is compounded by the fact that even though the BTG's first right of refusal was removed in 1985, if the University elects to offer IP to the BTG to exploit, the BTG still insists on being assigned ownership. This does not create a good role model for the IDU when it comes to negotiating IP ownership in industrial contracts:

"... From the researcher's point of view ... BTG is not all that different from an award-giving body like the SERC. They say - if this is what I have to give to get the money, then I'm going to have to give it. End of story.

"When ICI or Unilever comes along and makes the same demand, I say to [the researcher] - you are going to have to fight that. Then the company says - tough cookie, and I've lost him his research money. Its a very delicate situation ..."

In this situation, the IDU has sometimes elected to assign rather than retain ownership. Assigning has the advantage of removing worries about patent litigation, too:

"... In a large majority of cases, sooner or later [ownership] is going to be assigned to an external organisation with the clout to defend it ..."

The IDU is also prepared to protect IP by treating it as secret know-how. This is perhaps surprising in a University which allows only a one-year embargo on PhD theses and is unhappy about academics delaying publication for more than six months. The IDU plans to grasp this nettle when it gets around to publishing a loose-leaf "Enterprise Manual":

"... In the absence of a strong management-based directive on this, the way we've got to go is to produce papers in the Enterprise Manual which will actually [function as] discussion documents.

"We'll put them in, saying - this is what is going to be done - and wait to see the reaction. That's the only way we're going to go forward. We can't keep discussing this sort of thing [at] every academic board in the University ..."

It remains to be seen whether retaining ownership of IP arising out of projects funded by the Research Councils or charities will become easier, as long as it is not offered to the BTG. The new regulations obliging academics to notify the IDU if they had potentially exploitable IP may start to counteract the old ethos, in which the Department which generated the IP often protected and exploited the IP in whichever way it saw fit ⁽³⁹⁾. However, the IDU is operating at a financial disadvantage which could leave the decision to retain ownership of the IP, indeed, whether to protect it at all, to the Department which generated it.

(ii) Finance

York still has no patent budget. If the Department concerned was unwilling to bear at least the initial registration costs, the IDU would try to find the money from other budget headings - in a budget which is already *"modest for the size of University"*:

"... When the first person came, I would try to find the money. When the second person came, I'd be scratching a bit and when the third person came, I'd say - isn't this super? What a nice problem I've got to deal with now ..."

So far, the IDU has managed to avoid robbing Peter to pay Paul. In some cases, the commercially-oriented institutes/centres have covered the costs. In the longer term, it believes a central patenting fund is essential, but getting the administration to set up a fund may not be easy, for the same sort of "catch 22" reasons that a market research budget would be difficult to procure:

"... Coming from industry, [the Finance Officer's] attitude is very much going to be - show me what you can achieve and I will put in the support you need ..."

As things stand, it will not be easy for the IDU to demonstrate even the direct financial benefits of retaining ownership, patenting where possible and licensing IP. Firstly, there is no central record of patents acquired by Departments/institutes/ centres, the manner of their exploitation and the return, if any, which they have brought. Secondly, many patents are believed to have been filed via the "do-it-yourself" route, whereby academics write the patent specification themselves. The IDU is:

"... extremely nervous about that. A patent agent would say - well, obviously anybody can drive a coach and horses through that. Its not really going to be much use to you ..."

It would be hard at the best of times to establish whether such patents might have attracted more licensees or better license deals if they had been stronger. However, in the absence of a central record of patents, it is impossible even to compare the performance of "do-it-yourself" patents with patents filed by a patent agent.

(iii) Practicalities

The IDU would like the University to bring in a patent agent as a matter of policy ⁽⁴⁰⁾, at least to draft the final specification. It tries to persuade Departments to do likewise, if they are paying the costs in the first instance. However, until a formal patent budget is established, or central funds are routinely made available, some academics may find themselves being asked to draft a patent specification.

The new policy document indicates that if the University is interested in having the IP in question exploited, discussions between "*interested parties*" ⁽⁴¹⁾ will determine the appropriate action to be taken. This might include:

"... retention of confidentiality and strict avoidance of prior disclosure (though the University will as a general rule preserve the rights of individuals to publish material arising from their research and scholarship as they think fit) ..."

Despite the fact that the University has asserted its ownership over the IPR, the IDU believes that in practice, academics themselves have the final right of decision about whether to delay disclosure in the interests of protection. The IDU feels it can only advise, not insist, given the terms of the new policy document. Certainly, the arbitration procedures outlined in the notes attached to the new policy document make no reference to disputes over publishing versus protecting IP.

(iv) Ownership of Patents

In the past, York has not had a policy concerning the names in which patents relating to IP generated by academics should be vested. As a result, some have been vested in the University or the Department ⁽⁴²⁾ alone, some in the names of the inventor(s) alone - after which they were generally assigned to the University, and some have been vested jointly in two or more of these parties. However, the new policy document states explicitly that in future patents will be vested in the name of the University alone, with the originator as named inventor.

The new policy document commits the University to deciding within three months ⁽⁴³⁾ of a researcher notifying the IDU of a discovery whether it wishes to become involved in the exploitation process. If not, rights in the IP "*shall promptly be assigned to the originator, if the originator so wishes*". The IDU itself wanted six months to make this decision, but the local AUT negotiated the period down to half that time. The policy document does not indicate whether the University would give up all its interest in the IP or would retain some interest and the IDU has not yet had to consider this.

5.5 Commercialisation

Where the University retains its rights to the IP, it has no principled objection to it being exploited via licensing to a third party, a wholly-owned University company, a joint venture ⁽⁴⁴⁾ or an independent spin-off company. IP can also be exploited by a centre/institute which acts as the commercial arm of a Department; so far York has not restricted its commercially-oriented centres/institutes to exploiting expertise or running courses. The new policy document explicitly lists company start-up together with identifying licensees and assigning IP to the BTG/the Research Corporation as a possible way of exploiting IP. In practice, this is a route which has been pursued with considerable success. The activities of such companies have been publicised through detailed articles in various editions of the University newsletter.

(i) University Companies

York has had two University companies to date, both of which the University has successfully sold on in under five years, giving a handsome return on its investment ⁽⁴⁵⁾. Both grew out of diverse activities of the Biology Department. One was registered as a

campus-based company from the outset, since the research group concerned was alert to its commercial potential. The other started life as a small-scale in-house contract research unit which was created to exploit basic research discoveries into causes of cancer. The unit generated a large surplus income. Due to concern about liability, it was then turned into a wholly-owned University company limited by guarantee and subsequently, when additional funding was required, a joint venture.

(ii) Joint Ventures

By the end of 1989, York had participated in two joint ventures, one with members of the academic staff alone and one involving academics, company employees and the private sector. In each case, the academics themselves took the initiative for the joint venture to be formed.

(iii) Academic Spin-Off Companies

York's academics have founded a number of independent spin-off companies over the years, starting in the 1970s with a group of physicists. These have tended to be "soft" companies exploiting expertise rather than "hard" manufacturing companies but it is not unknown for such companies to start making the transition. As yet, the University is not aware of any which are exploiting patented IP. However, one company is known to have exploited computer software written by an academic after leaving the University to set up in business.

(iv) Licensing

The IDU has an ambivalent attitude to academics becoming actively involved in the process of commercialising their discoveries. Academics who seek to do this via involvement in University-owned companies or joint ventures are seen as occupying themselves with a legitimate University activity. This is not the case where academics try to become involved in the search for an industrial partner who will fund development work and/or become a licensee. In the IDU Director's view, academics are welcome to provide a list of companies which might be approached, but the contact should be made by the IDU:

"... The academic resource is an enormously valuable one and we should do everything to let the academic get on with his academic work. Contacting companies to see whether we can exploit something should be something that we do ..."

Given its budgetary restrictions, the IDU relies principally on self-help of one sort or another to identify industrial partners. It is unable to pay for private sector brokers and there is a conspicuous dearth of public sector brokers in North Yorkshire. When it set about forming the University's Enterprise Club, it constructed its own database of industrial contacts. It also finds "Innovation" a useful way of attracting enquiries⁽⁴⁶⁾, though this has not yet led to any license deals. The IDU's commercial bulletin will also carry details of technology awaiting transfer, when needed; the bulletin is circulated to Enterprise Club members and a number of other people outside the University. The IDU also sends out its own press releases to the media.

Once a promising contact has been established, the IDU arranges a meeting between the researcher and company representatives. If the decision is made to license, the researcher is free to negotiate the terms of the deal. The IDU does not insist on being present, though it would expect the researcher to report on how negotiations were proceeding. In due course, this will change: deals will be negotiated by the IDU. At the moment, neither of the IDU's staff have the requisite skills, but contact has been made with the local Licensing Executives Society, partly with a view to acquiring those skills ⁽⁴⁷⁾.

Once a license deal has been negotiated, the researcher is unlikely to make a further contribution to the commercialisation process, beyond a scientific/technical input on a consultancy basis or further contract research.

6 ACADEMIC ENTREPRENEURSHIP

6.1 Policy and Practice

Academic entrepreneurship has manifested itself in many different ways at York. Since the late 1970s, academics have been instrumental in setting up units/centres/institutes which function as a commercial arm of their Department. These academics chose to be entrepreneurial within the University system, though several have since been asked to convert the organisations they created into independent companies. Others have chosen to pursue their entrepreneurial activities outside the conventional framework of the University, but within companies wholly-owned by the University or in joint ventures with the University. Since the 1970s, there have also been individuals who have chosen to go it alone, founding completely independent spin-off companies. It would be stretching a point, however, to suggest that York had a coherent policy *vis-a-vis* academic entrepreneurs. At best, it is a custom and practice situation, which has evolved as a result of the University turning a blind eye to or granting permission to individual academics ⁽⁴⁸⁾ or, indeed, practically supporting individual academics, on an *ad hoc* basis.

The fact that York has not formulated a specific policy with regard to academic entrepreneurship is not surprising, given how recently the University formulated its policy on IP. However, inertia may not entirely account for it. The IDU does not regard academic entrepreneurship as a black and white issue which can easily be made the subject of a policy statement. For the IDU, there are too many grey areas: if an academic uses his expertise to invent an exploitable device, whether or not he has used University resources, the University claims ownership of his IP and pays him a royalty. If he uses his expertise to obtain consultancy work, he keeps the proceeds but pays for the University resources used. If he uses his expertise to write a book on, say, electron microscopy, he has probably gained that expertise as a result of using the University's electron microscope; he may include in his book pictures obtained in the course of his work for the University, and he may well have written his book on a microcomputer provided by the University. In this instance, however, the University does not assert its rights in the IP, nor does it expect a financial return.

Academics who have chosen to pursue entrepreneurial activities have inevitably had the administration's explicit or tacit blessing. The administration has been pushed and pulled into embracing academic entrepreneurship in its various manifestations. The opportunity to generate additional revenue, the symbiosis which high-tech spin-off companies encourage and the contribution which they should make to the local community are all pull factors.

The primary push factor is the hope that academic entrepreneurship will act as a mechanism for keeping staff who might otherwise be attracted to the "*rich pickings of industry*"; having been founded only 25 years earlier, York has large numbers of staff at the top of the various scales who are frustrated by the poor chance of promotion which this situation engenders ⁽⁴⁹⁾.

However, the activities of some entrepreneurial academics have not been universally welcomed by their colleagues. It is difficult to gauge whether the dissenters object to academic entrepreneurship *per se*, or to academic entrepreneurship as practised by the particular individuals involved. It may be more a question of personalities than of fundamental disagreement, since it is generally felt that some of the entrepreneurs have had particularly abrasive personalities. It is also possible that negative reactions have been engendered by jealousy. In one Department, when two academic entrepreneurs acquired company cars, their colleagues felt they were being "*overtaken by two people who weren't even University-financed*". Since there was no forum for critics to air their views, feelings festered. Eventually the Vice-Chancellor suggested to the academics concerned that they should consider a part-time contract of employment with the University. This was duly arranged.

6.2 Making Time

If would-be academic entrepreneurs decide to try and set up their company while still employed full-time, in the absence of a central policy the amount of time they are allowed to dedicate to it will depend very much on the attitude and circumstances of their Department. The Department of Computer Science has taken the trouble to draft a set of guidelines to cover such eventualities ⁽⁵⁰⁾. In the other Departments, the situation is less clear-cut. In theory, researchers can utilise the time they might otherwise be devoting to consultancy activities. However, there is no formal entitlement to consultancy time at York and therefore no stated limit. Permission to do outside work of any sort is not normally withheld, "*provided the member of staff has consulted properly with those to whom responsibility is owed and that proper arrangements have been made for the discharge of his/her duties*" ⁽⁵¹⁾. If academics want to devote more time to company start-up than they can take without impinging on their primary academic responsibilities, they would have to ask their HoD if it was possible to reschedule or reduce their workload. The decision would be made by the Departmental Board of Studies. In other words, every full-time member of the Department's teaching staff would have the right to be consulted about it, and possibly a number of outsiders ⁽⁵²⁾. The Board's decision could well be a function of the staff:student ratio in the Department concerned at that particular time and/or the availability of surplus funds. It may also depend on whether the academic concerned is setting up an independent spin-off company, a joint venture or an in-house commercial unit. The staff of the Biology Department, for instance, felt they were prepared bear the cost of giving one of their members time to set up and run the new, commercially-oriented Institute for Applied Biology, an in-house venture.

There is no central policy on the manner in which sabbaticals ("research terms") should be spent; this is, at present, a matter for individual HoDs to decide. If academics with entrepreneurial leanings wanted to create a short period of free time in this manner, it would be very much a local decision. Alternatively, would-be academic entrepreneurs could try and arrange to work part-time or request leave of absence. Part-time work is viewed as partly-paid leave of absence at York and comes under the aegis of the Advisory Committee on Leave of Absence ⁽⁵³⁾. First, however, the HoD and the Board of Studies

have to approve the proposed arrangement. Their agreement signifies that the Department is prepared to forego any entitlement to a replacement appointment or funding. The Advisory Committee generally grants only a year's partly-paid absence⁽⁵⁴⁾, but this might be extended in exceptional circumstances. It also gives priority to staff at the top of the Lecturer scale. Partly-paid leave of absence was granted to two of the academics who were instrumental in setting up the University's first wholly-owned company, who were then able to devote one third of their time to the company. However, in this case the suggestion was made by the Vice-Chancellor as a means of solving what was perceived as a local, departmental problem.

Where complete leave of absence is concerned, there is provision for both unpaid and paid leave, over and above the one term which would be allowed for a sabbatical. Applications for leave of absence the following session have to be submitted by the end of the preceding spring term and include "*a definite statement about the period of leave requested*". In making its decision, the Advisory Committee takes into account whether the person concerned has had leave of any sort before, their length of service, how the leave would be used and "*the likely value to himself/herself and, in the long term, to the University*"⁽⁵⁵⁾. In other words, the would-be academic entrepreneur could find his request turned down. To date, only one academic has knowingly been granted leave of absence to set up a business - and he did not come back. The administration was not particularly concerned when it learned this, since it had assumed that there was always a possibility this might happen.

If academics feel they need to extend a previously agreed leave of absence, York generally tries to be as flexible as possible in accommodating their request; academic entrepreneurs, would probably benefit from this desire to be flexible, too, although the situation has never arisen.

6.3 Other Resources

(i) Equipment/Instrumentation, Support Staff, Communications

The University is keen in principle that academics who are trying to exploit promising IP should have access to University resources, where demand permits it. In practice, it expects a return on the use of its resources. This applies equally to academics trying to set up independent spin-off companies and those involved in joint ventures with the University. The University does not necessarily look for an immediate return; it might agree to a *quid pro quo* at some time in the future. Where equipment and instrumentation are concerned, researchers could find themselves paying the full market rate or a marginal rate: this is negotiable and depends on the circumstances. Alternatively, the University might be happy to charge a peppercorn rent initially if researchers are prepared to give the University a higher return later on.

There is likely to be less flexibility about the use of technical or secretarial support staff and use of the telephone. Support staff are allocated to Departments on a ratio basis which is kept under monthly review. Those who leave are not necessarily replaced and this has led to considerable pressure on those who remain. Since the installation of the University's new telephone system in July 1988, attitudes towards using the telephone for private calls have changed. Departments are now allocated an annual telephone budget and if they exceed it, the deficit has to be covered by Departmental funds. This is likely to encourage many HoDs to charge would-be academic entrepreneurs at least the cost of the

calls relating to their business start-up activities - and the University has the technology to identify them.

(ii) Accommodation

Despite pressure on accommodation, York tends to take a more relaxed attitude to would-be academic entrepreneurs using University accommodation. If researchers were found to be working towards company start-up in their own offices, the administration feels that most HoDs would:

"... turn a blind eye to start with, just to get the thing going. By the time you've got the seeds of an idea and you've worked through it, you've probably been using your desk for six months or so anyway, unwittingly.

"After, say, one to two years, they might see it differently ..."

If the researcher wanted formal use of existing Departmental space over and above his own office, the decision would rest with the HoD, but the administration believes that *"the goodwill is there if the facilities are available"*. Use of additional accommodation, over and above the Department's allocation, would be decided by the Policy & Resources Committee. In practice, Departments have not only allowed would-be academic entrepreneurs to work towards company start-up. They have found the space for established companies to operate within or attached to the Department which incubated them, whether or not they are joint ventures with the University ⁽⁵⁶⁾. The rent has usually been negotiable.

The University's flexibility regarding accommodation stems from its belief that there is a great deal to be gained from high-tech R&D companies rubbing shoulders with the academic community, both for its own benefit and the benefit of the surrounding community. For some 10 years, it has been trying to establish a science park on 21 acres of spare land. In 1989/90 the project was scheduled to be completed by the end of 1991 ⁽⁵⁷⁾, at which point the University's entrepreneurs may be encouraged to move to one of the purpose-built incubator units. Although the local council and private developers have built a number of business villages and industrial parks in recent years, there has been a dearth of suitable incubator units ⁽⁵⁸⁾ to which they could otherwise go. The new science park will be run according to the one (albeit unwritten) policy which the University has regarding spin-off companies: there will be no large-scale manufacturing of widgets on campus. The administration appears to be happy to endorse what amounts to a consensus among the academic community.

(iii) Financial Support

York has an innovation fund, but in this context, "innovation" is given a considerably wider interpretation. The Innovation and Research Priming Fund aims to support work which is:

"... of academic merit and will bring benefit to the University in terms of additional funds, students or prestige ..." ⁽⁵⁹⁾

Areas of work considered suitable for support range from pilot studies prior to seeking Research Council for funding for a full-scale study to the development of innovatory teaching methods and the launching of new academic courses. The "*promotion or development of patentable devices or systems*" may also be supported. Although around 80 per cent of applications are granted, there is no guarantee that applications related to IP will be assessed by the Committee as more meritworthy than those in any other area. However, during the 1980s the Committee has supported several applications for help in developing devices and techniques. At least two have been successfully commercialised. The Committee has also funded research which has led to the identification of IP which could be exploitable ⁽⁶⁰⁾.

York does not have a dedicated commercial fund. However, on the recommendation of the Commercial Activities Sub-Committee - or, in practice, the former Finance Officer, the University provided the initial capitalisation for its two wholly-owned companies and for the equity stake which it bought in two joint ventures. The sums involved in the two joint ventures varied from £25,000 to £25. The capital concerned was diverted from the University's general funds in a fairly informal way.

6.4 Business Start-Up Advice

The spin-off companies set up at the initiative of academics at York appear without exception to have been successful, and in some cases, highly successful. The University itself appears to have contributed very little to their success, beyond a capital injection and some helpful advice from the former Finance Officer. There is little or no in-house expertise on which entrepreneurially-inclined academics might draw: accountancy, law, business/management studies and marketing are not taught at York. Nonetheless, most of York's entrepreneurial academics have managed to combine their academic career with a business career, often retaining for themselves the position of managing director ⁽⁶¹⁾. Given that none of York's spin-off companies has yet completed the transition from a "soft" to a "hard" company, this may partly explain their success.

The IDU's remit does not include giving business start-up advice to members of the academic community. However, the Assistant Director has considerable experience of advising small businesses. If academics were involved in setting up a University company or a joint venture, she would see it as a legitimate use of her time and skills to give business start-up advice. Those attempting to set up independent spin-off companies she would refer to the local enterprise agency ⁽⁶²⁾.

7 SCRUTINY GROUP ASSESSMENT

In September 1992 York was still waiting to learn the Exploitation Scrutiny Group's view of its arrangements with regard to the exploitation of IP. As a result its initial 3-year authorisation from the Research Councils had not yet been formally extended, though in practice the University was behaving as though it had.

8 POLICY AND PRACTICE AS PERCEIVED BY HEADS OF DEPARTMENT

8.1 **Removal of the BTG's Monopoly and Response to the Kingman Letter**

(i) Awareness of the Removal of the BTG's Monopoly and the Research Councils' Offer

Two of the four HoDs interviewed at York ^(A, D) reported that they had been aware of the removal of the BTG's monopoly in 1985 - indeed, one ^(A) volunteered the information that he remembered the Prime Minister's advance announcement at Lancaster House in 1983. However, both indicated that they had gleaned this information from the media; none of the four had any recollection of the University circulating information about the removal of the BTG's monopoly or the offer made by the Research Councils, as detailed in Sir John Kingman's letter. On the other hand, all four commented spontaneously on the excellent communication between the administration and HoDs. As one ^(A) put it:

"... We've no wretched faculty structure here, all cluttered up with bureaucrats. It's just ourselves at the top. If the V-C wants to talk to me, he just picks up the telephone and rings me up - and I stand up and talk to him ...!"

Accordingly, three attributed their inability to recall information being circulated by the University to a failure of memory; all three were quite sure that the administration would have circulated the relevant information to HoDs within a day or two of its arrival. The fourth ^(C), who was not HoD at the time, was quite sure that, in turn, his HoD would have circulated any information received to members of the department.

(ii) Attitudes to the Removal of the BTG's Monopoly and the Research Councils' Offer

Questioned about their attitude at the time to the removal of the BTG's monopoly and the Research Councils' offer, two HoDs ^(A, D) reported that they had been very much in favour of the idea that universities should acquire rights to and responsibility for the exploitation of IP, whereas the third ^(B) described his attitude as "neutral". One of those in favour ^(D) indicated he had a very positive experience of the BTG's exploitation skills; however, he felt that the University could only benefit from the fact that BTG would now be obliged to compete for business, and that the University would be free to direct its business to other technology transfer agents. The other ^(A) commented that the loss of ownership of and royalties from penicillin had played a key role in the government's decision to establish the NRDC, but added that his department tended to generate software rather than "widgets". He expressed considerable dissatisfaction with the BTG's ability to exploit software; it was his opinion that the academics who generated the software understood the commodity better and thus were certain to exploit it more effectively. The third HoD ^(B) explained his neutrality in terms of the 'fact' that IP did not loom large in his subject area, since he and his colleagues were "not in the business of making things that can be exploited". Nonetheless, he felt that the University was right to have accepted the Research Councils' offer:

"... it has become clear that universities are [expected to be] much more masters of their own fate, [so] they'd better become masters of their own fate and try to do things themselves, rather than employing a crutch, or whatever ...".

The fourth ^(c) said he had no opinion on whether or not the University should have accepted the Research Councils' offer because he had no knowledge of "*the small print*"; he was not HoD at the time, and has not seen the relevant documentation since becoming HoD.

(iii) Perceptions of the University's Motivation in Accepting the Research Councils' Offer

There was no consensus where perceptions of the University's motivation in accepting the Research Councils' offer were concerned. One HoD ^(b) had no idea what the University's motivation was; another ^(b) refuted the idea that "*the University*" could be said to have a coherent motivation, since it was composed of individuals - "*you, me, the Finance Officer and the academics*". The next suggested that, considering the parties involved (the Research Councils who funded the research, the academic(s) who generated the IP and the university in which both activities took place), making universities responsible had probably seemed to the University like a reasonable solution to the problem. The last felt that the University had been motivated by the desire to generate additional revenue - to the extent that determining the response to the Research Councils' offer had been ...

"... muddled up with a lot of general waffle-waffle ... about all sorts of issues like royalty stakes and so forth, and ownership of IP and all that sort of thing, which [it] could probably have come to later ..."

(iv) Awareness of and Views on the Process of Determining the University's Response to the Research Councils' Offer

All four HoDs felt that consulting HoDs was the right way to begin the process of determining the University's response to the Research Councils. However, one could not recall having been consulted, even though he was HoD at the time; two recalled being intermittently co-opted onto the Commercial Activities Sub-Committee; the fourth had no involvement, since he was not HoD at the time. Views differed on the way in which the decision-making process should have proceeded, once the views of HoDs had been established. The two who were co-opted onto the Commercial Activities Sub-Committee were basically happy with this *modus operandi*, seeing it as an issue to be decided by those with insights into the resource implications and those with a particular interest in or previous experience of exploiting IP. The respondent who was not HoD at the time felt that there were issues of principle involved, as well as issues of resource; in his view, the matter should therefore have been debated by the Professorial Board. He felt that academics in the larger civic universities were probably more successful in lobbying for this kind of principled debate than a small university like York.

8.2 Identifying Intellectual Property Created by Academics

(i) Views on the Likelihood of Different Disciplines Generating Exploitable IP

Asked whether they thought the particular spread of science and technology disciplines in a university had an influence on the amount of exploitable IP which might be identified, all four HoDs felt that some disciplines were currently more likely to generate exploitable IP than others. All four mentioned engineering disciplines (particularly electrical,

electronic and biomedical engineering); three mentioned computer science and information technology; one added biotechnology, and agricultural and food science to the list. Physics, chemistry and other fields within the biological sciences were felt to be a little less likely to generate exploitable IP at this time, though considerably more likely than mathematics.

Where York itself was concerned, one HoD ^(A) felt that the research bias of his own department was likely to generate more exploitable IP than similar departments in other universities. He attributed this to the fact that he had deliberately recruited staff with industrial experience or contacts, staff capable of bringing in contract research funded by industry. Another ^(B) felt that the research bias of his department was likely to generate less exploitable IP than similar departments in other universities, given the particular fields in which his staff specialised. The other two felt their departments were neither more nor less likely to generate exploitable IP than similar departments elsewhere.

(ii) Awareness of the University's Wish to Identify IP

Asked how aware they thought staff in their department were about the University's wish to identify potentially exploitable IP, the four HoDs responded quite differently. One ^(B) felt that very few of his staff were aware - in fact, only those who were "*entrepreneurial*" by nature or who had participated in the local AUT's working party on IP issues. He attributed this to the fact that his was a very "*pure*" department which had continued to receive almost all its funding from traditional sources (*ie.* research councils and charities). Another ^(C) felt that there was probably a fair degree of ignorance among staff in his department, but that those who needed to know were reasonably aware. The other two HoDs claimed that their staff were very aware of the need to identify IP. However, one ^(A) felt his staff were currently less aware than they had been a few years earlier; in his view, their initial enthusiasm had been undermined by participation in programmes like Alvey, which allowed the industrial partners to claim ownership of IP generated by academics - which usually meant that it was never exploited. The other ^(D) qualified his answer, suggesting that his staff were aware of the department's wish to identify potentially exploitable IP, rather than the University's; in his view, the average academic has a better concept of what a corporation is than what a university is - with the result that he/she has little or no awareness of the wishes of "*the University*".

(iii) Responsibility for Identifying IP

None of the HoDs questioned felt that members of their department would take a negative view of being asked to "flag" potentially exploitable research results - or certainly no more than the odd "*maverick*". However, only one stated unequivocally that his staff would take a positive view. This particular HoD ^(D) indicated that his staff would undoubtedly notify the HoD or the manager of the department's commercial arm in preference to notifying the ILO or any other representative of the University administration. He indicated that he felt this was the correct response, given that his staff sat in their offices while the ILO sat in his office and there was little or no interaction between the two. Moreover, he saw no reason to encourage interaction, since the department's commercial arm was allowed to exploit "hard" IP as well as "soft". Given that the department's commercial arm was larger than the IL office, it had been operating longer and therefore had a track record - and given that it probably had more resources at its disposal than the entire IL office, he saw no reason for the HoD in turn to communicate to the ILO IP opportunities notified to the HoD or the manager.

This contrasted strongly with the views of the other three HoDs interviewed, who felt that responsibility for identifying IP should rest equally - if not principally - with the ILO; all three felt that the ILO should adopt a proactive rather than a reactive approach to the task. Moreover, two ^(A, C) perceived the recently-appointed ILO to be fairly proactive. One ^(A) said:

"... There's no question about that. He is being a bloody nuisance now and again ... but constructively. I don't mean that in a disparaging way. He's being a mild irritant from time to time in a constructive way ..."

"... He is a sort of constructive irritant to the activities of this University, which is not to say that I might not actually resent some phone calls occasionally, but he is doing a good job, he's doing a proper job ..."

(iv) Strategies for Identifying IP

None of the HoDs interviewed seemed to regard scrutinising research proposals for potentially exploitable IP as a worthwhile activity. One ^(A) commented that for years the BTG had sent a representative to sit on the grant-awarding committees of the Research Councils; this had been a complete waste of time - as far as he could determine. Three of the HoDs interviewed felt that scrutinising interim and/or final reports might be worthwhile, though one ^(B) added the caveat that the scrutineer would need to accept that there was only about a 5 per cent chance of discovering anything of any conceivable use - and 4.5 per cent would probably be aware already of any potential for exploitation. The fourth HoD ^(D) responded rather defensively to the suggestion, saying:

"... if you are suggesting or you are asking if there is some gap in our management here, that we don't give a second thought to this, then that is ...!"

Three HoDs responded very negatively to the idea of scrutinising drafts of papers before submitting them to journals, describing this variously as "*a bureaucratic nightmare*", "*a bureaucratic impediment*" and voting it "*a large raspberry*" on the grounds that it would act as yet another obstacle to getting papers published. The fourth ^(D) felt that in any case this would be a superfluous strategy in the context of his department, where he would expect members of staff to draw potentially exploitable IP to the attention of their research group leader or HoD before submitting papers to journals.

8.3 Ownership of IP Created by Academics

Asked whether they thought it was more appropriate for IP to belong to the University or the academic(s) who created it, two HoDs ^(A, D) said they felt it was right that the University should own patentable IP and software. One ^(D) explained this view in terms of the fact that the University created the environment and provided the resources which enabled academics to generate potentially exploitable IP. The other justified his view in three different ways - firstly that it would undoubtedly cost a great deal of money to ensure that these types of IP were protected and exploited - and most academics could not afford it; secondly, that the income from exploiting these types of IP could be considerable; and thirdly, that these types of IP did not necessarily contribute to the reputations of the academics who generated it. This particular HoD felt that though it could doubtless be argued that the University should own the copyright in written material, there were a number of reasons why it should not. Firstly, it cost the University

nothing to protect and exploit this written material; secondly, it generated very little income; and thirdly, the University benefitted from it in non-financial ways - *ie.* by bathing in the reflected glory of members of staff who write well-received books.

Initially, a third HoD ^(B) also felt it was more appropriate for patentable IP and software to belong to the University, since it was created in "*company time*". Upon further reflection, he decided that the view of UK universities that "*company time*" extends to 365 days a year, 24 hours a day was not justifiable. He added that he might well change his mind about the ownership of these types of IP if the University ever tried to assert ownership of copyright in books, journal articles *etc.*, even though these were also created in "*company time*". In the end he concluded that it did not matter whether the University or the academic(s) concerned owned the IP, provided both got "*a share of the action*" if it generated a reasonable income.

The fourth ^(C) felt that there was a distinction between the way that academics worked and the way employees in industry work - a distinction based on the locus of initiative for pursuing certain research topics/angles and the locus of direction of the resulting research projects. He thought, therefore, that it might be more appropriate for academics, rather than the University, to own any IP they create. He acknowledged, however, that very often it is the University which makes it possible for that creativity to flourish, and that this might be an argument for the University to have joint ownership. He did not feel that the University's role in helping to protect and exploit IP should influence this question, since very often academics themselves have greater insights and knowledge than the University can bring to bear on this process.

8.4 Protecting Intellectual Property Created by Academics

(i) Attitude to Protecting IP Created by Academics

Two HoDs ^(A, D) agreed in principle with the concept of protecting IP generated by academic research. Both explained this in terms of the opportunity which this might provide for the IP to make money for the individual(s) concerned, the University - and, as one said, the country. One ^(A) felt that this kind of benefit should not be a fortunate by-product of academic research, but the product of a conscious strategy:

"... If I invent something which I think is going to make a lot of money for me, the University and the country, you know, I would jolly well ensure that I engineered a situation which meant that came about, rather than giving it away ..."

The other ^(D) pointed out that there is an additional benefit for academics who adopt this approach - namely the possibility of pursuing their research further than might be possible if they relied solely on more traditional sources of funding.

Another HoD ^(B) agreed in principle with the concept of protecting IP generated by academic research - provided this would not impinge for more than a year or so on intellectually exploiting it; if it did, he felt that each case should be decided on an *ad hoc* basis - on its merits. The fourth ^(C) demonstrated that he had a clear understanding of the issues surrounding this question, but did not commit himself.

When asked to consider the fact that universities are not legally obliged to patent patentable IP, that they have the right to protect it by treating it as secret know-how

instead, two HoDs ^(A, D) felt that this was acceptable, provided it did not entail an indefinite ban on publishing the results in question. One ^(A) argued that research results should not be kept secret for more than six months - on the model of thesis embargo rules; the other ^(D) felt that it was acceptable to keep research results secret for a year or so, and that no rigid rule was required to regulate this. The other two HoDs felt it was difficult to give an in-principle response to this question, since the situation probably differed from one discipline to the next. One ^(B) said:

"... I think one begins to get slightly impure about it (laughs) when others do it. Let them do it over in electronics. That's what they are there for, anyhow. They are only jumped-up technicians. That's the kind of attitude one can take ..."

The other ^(C) felt that certain disciplines might generate the kind of IP which conveys a benefit only in certain, highly specific contexts, rather than a more general intellectual or commercial benefit. In cases like this - which he regarded as the rule rather than the exception, he felt it was probably acceptable to protect the IP in question by treating it as secret know-how - provided there were safeguards in relation to IP arising out of student dissertations.

Three HoDs concluded that if there was a choice, patenting IP was preferable to treating it as secret know-how - though one recognised that cost would probably play a part in the ultimate decision. All three explained their preference in terms of the fact that a patent is, after all, a publication of sorts; one added that it made the research results readily accessible to a huge network of potential users. The fourth ^(A) expressed no preference, pointing out that 99.9 per cent of what a university does is not exploitable and that little damage would be done if a university behaved just like industry for the 0.1 per cent which was exploitable.

(ii) Who Decides Whether and How to Protect IP Created by Academics?

Three of the HoDs interviewed believed (correctly) that the University had no policy on who should make the final decision about whether and how to protect IP created by academics; characteristically, the fourth ^(D) did not see how the University could have a policy on an issue like this, seeing it as a departmental matter.

Two of the four HoDs felt that the academic(s) concerned should have the final say when it came to deciding whether and how to protect the IP they had generated. One ^(C) saw this as a matter of principle. The other ^(B) felt it would be impossible to police any other approach, since academics could always find a way around a ruling that they should delay publishing or not publish at all; equally, they could not be forced to publish. The other two HoDs agreed that in the final analysis it should probably be the academic(s) concerned who made these decisions. However, both felt that they should take into account the views of fellow members of their research group, their HoD and even, should the ILO deem it appropriate, the views of the Vice-Chancellor.

(iii) Attitude to the Logistics of Protecting IP By Patent

Two of the HoDs interviewed ^(B, C) did not question the University's policy that academic(s) who create IP should produce at least the first draft of a patent application, where appropriate. A third ^(A) felt that academics did not have the requisite skills and the University should bring in a patent agent from the very beginning. The fourth ^(D) indicated

that University policy did not apply in his department, since the department's commercial arm would fund the cost of a patent agent, if the academic(s) concerned felt it was necessary on grounds of skill or time.

The other three HoDs had widely differing views on how they would respond to a member of staff who asked for a temporary adjustment to his/her workload in order to draft a patent specification. One ^(A) felt it would be impossible to formally reduce someone's workload, even for a short period - partly because the teaching schedules are established each May-June for the coming session, and partly because apportioning the departmental workload is such a "hot potato" in any case. However, if the individual(s) concerned were able to come to some informal arrangement with their colleagues - in the same way that they might in order to go to a conference overseas, this would be acceptable. Another ^(B) felt that he would be fairly cynical about a request to formally reduce someone's workload on a temporary basis, but that he would be prepared to consider the merits of the case and make an *ad hoc* decision. He indicated that assisting inventors in this way would be sure to cause "a heap of resentment" in the department. In contrast, the last ^(C) responded very positively, suggesting that if it was important to submit a strong patent application fairly quickly, he would try to arrange a sabbatical for the member of staff concerned. He considered this to be comparable to the sabbatical he had arranged for a member of the department who was developing a revolutionary instrument based on the work of two Nobel prizewinners. He conceded that this might provoke "mild grouses" in the department, but made it clear that dealing with grouses was all part of a day's work for a HoD.

8.5 Entrepreneurially Exploiting Intellectual Property Created by Academics

(i) Exploiting "Hard" Intellectual Property

Asked to give their views on the idea of exploiting "hard" IP entrepreneurially, instead of automatically licensing it to an existing company, all four HoDs signified their approval-in-principle. One ^(A) spoke eloquently about the importance of the University incubating spin-off companies, since it was located in an area virtually bereft of an industrial base. He believed that if the University could help create a local industrial base - particularly on a neighbouring science park, it would facilitate technology transfer and increase the income the University received from external sources. He also spoke of the potential benefit of this kind of entrepreneurial activity to the country as a whole:

"... I mean, one thing this country is very deficient in by comparison with the United States is generating successful entrepreneurial spin-off companies from institutions like this. Large IT companies in the States - like DEC, Hewlett Packard and Sun - by and large they have all been spun-off from departments like this. We have no track record in this country of doing it ..."

Another ^(D) talked in more general terms about spin-off companies from other universities - both in the UK and abroad - which had created challenging work for their employees, as well as wealth for the universities which incubated them. One HoD ^(C) qualified his approval-in-principle, saying that spin-off companies should only be considered where there appeared to be a sensible niche market; he was against the idea of trying to compete against existing companies by founding a company to market a modification to a well-established product or some add-on component. He also felt that a

strong grip should be maintained on the proliferation of spin-off companies within the University:

"... I think that the odd satellite company that emerges ... I think that's a perturbation on the main thrust of the University. As long as you don't have more than a modest fraction of the lecturers in any one department having an involvement in such an activity, I think it is containable ..."

One HoD ^(A) viewed some types of spin-off company as more appropriate than others - because they offered the University a greater chance to maximise the return it received from the exploitation of its IP. In his opinion, exploiting IP via a joint venture between members of the academic staff and the University would be preferable in principle to an independent academic spin-off company, because the University might get dividends and ultimately a profit on its equity share, as well as royalties. He recognised that in practice, though, the relative benefit to the University would depend on the terms of individual licences, and that the University might prefer sizeable royalties in the short-term to lower royalties initially, complemented by longer-term equity growth. This particular HoD was not in favour of the University maximising its return on "hard" IP to the extent of exploiting it via a wholly-owned university company, however; he felt that universities lack the requisite expertise, time and procedural capability to make such a company work properly. For the same reason, he advocated that the University should not hold a controlling stake in a joint venture.

Another HoD ^(C) saw this quite differently; he felt that in a joint venture the University would be "*getting behind the person and the idea*", with the result that the company was more likely to get off the ground than an independent academic spin-off company. He, too, was less positive about the idea of a wholly-owned university company, however, commenting that the academics associated with it would find it difficult to partition their roles, since both could be viewed as a legitimate university activity.

Despite their approval-in-principle of the concept of exploiting "hard" IP via spin-off companies, three of the HoDs interviewed spoke about the difficulties which they felt all spin-off companies pose in practice for departments. One was speaking hypothetically, since he felt he had no experience of spin-off companies; the other two made it clear that their perceptions were coloured by "*knowledge*" of one particular spin-off company incubated by the University. All three questioned whether academics involved in spin-off companies would apportion their time fairly between departmental and company activities. The HoD who claimed no experience of spin-off companies ^(D) suggested that full-time academics should not take on line management responsibilities, since they could not possibly give adequate attention to these and their academic commitments. One of the HoDs who claimed "*knowledge*" of one particular spin-off company remarked that part-time contracts did not solve this problem, since running a business exploiting "hard" IP was undoubtedly a full-time activity; as a result, academics' business interests were certain to lead to other members of the department having to shoulder more than their fair share of the workload. He conceded that this might depend on the personality of the entrepreneurial academics; one of the academics he had in mind had a particularly abrasive personality, which had not helped matters.

Two HoDs ^(B, C) spoke about the jealousies engendered by academics involved in spin-off companies - both at a personal and a departmental level. Both mentioned that the only new BMWs on campus belonged to the two academics involved in one particular spin-off

company and that their colleagues had not responded well to this conspicuous sign of their considerably greater earnings. One assumed that the company in question was still competing for the use of scarce departmental resources and suggested that the HoD should try to defuse the anger this engendered by keeping and publishing an account of the costs and financial and non-financial benefits of the relationship between the department and the spin-off company.

(ii) Exploiting "Soft" Intellectual Property

The four HoDs were asked for their views on three mechanisms by which academics could exploit "soft" IP: personal consultancy and commercial arms of departments, as well as various types of spin-off company.

As we have seen, York specifies no limit on the amount of time which academics spend on personal consultancy, provided they satisfactorily fulfil their academic and administrative commitments. Two HoDs ^(B, D) felt this was the right approach, because it encouraged openness on the part of academics about what they were doing. One ^(C) felt it might be a good idea for the University to provide guidelines, but acknowledged that it would be difficult to reach a consensus in view of widely differing views about the purpose and value of consultancy. The fourth ^(A) not only felt that there should be a limit, but he had specified a local limit of twenty days per year within his department. This particular HoD felt that one or two of his staff had devoted rather more time than was appropriate to personal consultancy, a sentiment which was echoed by another HoD ^(B) about one particular individual; the other two HoDs had not experienced this problem. Asked what proportion of their staff actually did personal consultancy work, one HoD ^(B) had no idea; one ^(A) estimated that probably around 15 per cent of all his staff (*ie.* academics, researchers, scientific officers and laboratory technicians) had done so and another ^(C) suggested it was probably about 20 per cent of his academic staff. The fourth ^(D) made a distinction between personal consultancy - undertaken by some 16 per cent or so of his staff - and in-house consultancy, undertaken by about 50 per cent of his staff on behalf of/via the commercial arm of the department.

Most of the HoDs interviewed felt that there were advantages and disadvantages to their staff doing consultancy. For instance, one ^(C) saw consultancy as the transfer of existing technology, which conflicted with an academic's remit of creating new technology; on the other hand, he felt that consultancy gave his staff access to expensive, state-of-the-art instrumentation which the University could not afford. Two ^(A, B) felt that consultancy could impinge negatively on an academic's primary commitments, leading to a poorer publication rate than they might otherwise have, or inadequate supervision of postgraduate students - or simply not being around at coffee time when unforeseen extra tasks are shared out. However, one ^(A) added that allowing staff to do consultancy made it easier to recruit to a discipline fraught with recruitment difficulties; it also allowed them to develop industrial contacts which were useful to the department - contacts who sometimes commissioned interesting and lucrative contract research from the department. Moreover, he felt that if consultancy encouraged academics to be entrepreneurial, this could only be a good thing. The fourth ^(D) saw consultancy as an absolutely essential activity in his particular discipline, to encourage staff to concentrate on real-world problem-solving as well as basic research.

Views on the value of commercial arms to departments varied considerably. One HoD ^(D) saw the commercial arm of his department as an essential and integral part of the

department's activities and actively encouraged staff to exploit "soft" IP via this mechanism. Another ^(B) talked at length about an unofficial semi-commercial arm established in his department some years earlier by a "*consortium of academics*". He expressed concern about the blurring he had perceived between the *bona fide* activities of what had essentially been an academic research group and its more commercial activities. At least part of his concern was occasioned by contractual difficulties created by the semi-commercial arm, which employed short-term researchers on contracts issued by the University; when the market was not buoyant, the academics in question put pressure on the University to pay the salaries of these researchers until new clients could be found. This particular HoD was ambivalent about the department's new, official commercial arm, despite the fact that the University's and the department's position with regard to short-term contract research staff had been clarified from the outset. It was clear that he was weighing the resentment it had provoked among some members of staff and the financial risk it entailed against its potential to exploit "soft" IP and generate revenue for the department.

Two of the HoDs interviewed had no commercial arm to their department. Neither felt it would be advantageous to create one, since their staff had no difficulty in marketing their expertise - expertise which was often highly individual. One ^(A) added that as far as he could tell, he doubted whether the distinction was drawn clearly enough between the remit of a department and the remit of its commercial arm. Moreover, it seemed to him that insufficient attention was paid at the outset to reconciling the rewards which the individuals concerned, the department and the University expected to get from the activities of a commercial arm.

Asked what they felt about the idea that academics who do a lot of consultancy tend eventually to set up their own business, all four said that they viewed this as a positive side effect. One ^(D) added that he saw it this way

"... because it means that the academic isn't just concentrating on his basic research. He is actually more in touch with industrial problems and if he is more in touch, he is more likely perhaps to become excited about some possibility and realise it can be exploited and want to do it himself and not just leave it to [the manager of the department's commercial arm] ..."

None of the HoDs interviewed had markedly different views on exploiting "soft" IP via spin-off companies to those they expressed in relation to the exploitation of "hard" IP. Only one ^(B) indicated that he regarded this as a more acceptable exploitation mechanism for "soft" IP - on the grounds that it did not entail the establishment of companies manufacturing "*widgits*" on-campus.

8.6 Support for Entrepreneurial Academics

(i) Time

Where support in the form of time was concerned, all four HoDs agreed with the University's view that decisions about whether or not to help academics trying to exploit their IP entrepreneurially should be made at a departmental level rather than centrally. One HoD ^(A) felt that his staff could certainly use the 20 days per year consultancy time he allowed them, but that formally reducing someone's normal workload for a period while continuing to pay their full salary - to allow them to get a company up and running - was

out of the question unless the University was prepared to come to a special arrangement, preferably an explicit arrangement. In his view, the University should not do this unless there was a definite *quid pro quo* of some sort. Another HoD ^(D) felt that it might be possible to give someone a light teaching load for a year or so, on the explicit understanding that they made up for it in another year. If any further reduction in the would-be academic entrepreneur's workload was required, he felt that the department should not only make this decision, but it should also benefit from a *quid pro quo* of some sort, rather than the University. These two HoDs agreed that a share in the enterprise would be an appropriate *quid pro quo*. One ^(A) was in favour of a formal equity stake, while the other felt that the department could have some kind of informal share; alternatively, the academic's company could buy out the time he/she required, with the money going to the department rather than the centre, so that the department had the means to appoint someone to provide the requisite cover.

The third HoD ^(C) felt that an academic wishing to devote time to trying to exploit IP entrepreneurially was no different from an academic who concentrated for a period on, say, developing a particular instrument or overcoming a crisis-point in their research. In his view, these problems should be treated the same way - *ie.* the department as a whole should respond flexibly to accommodate the individual's need, as it already did in the case of colleagues going to overseas conferences or on sabbatical. He foresaw no great difficulty in persuading other members of staff to take on parts of the would-be academic entrepreneur's workload - provided it was clear what the benefit to the department might be and how the individuals taking on the extra work would benefit, in particular. It was clear that "*benefit*" could be interpreted fairly liberally, rather than in a strictly financial sense. This particular HoD suggested that he could make this kind of decision very quickly - and implement it quickly.

The question of a *quid pro quo* did not seem to occur to the fourth HoD ^(B), who felt that he would only consider reducing a member of staff's workload if two conditions were fulfilled. Firstly, he would need to believe that entrepreneurially exploiting the IP in question was a worthwhile exercise. Secondly, and more importantly, he would have to be able to "*carry the department*" with him; there would have to be a consensus in favour of the academic concerned.

Only one HoD ^(D) indicated that switching would-be academic entrepreneurs to a part-time contract for a period was preferable to temporarily reducing their workload but continuing to pay them on a full-time basis. Two ^(B, C) remarked that York's resource allocation model meant that they would not be able to keep the salary savings made and use them to provide part-time cover - so members of the department would have to absorb all the extra work. The first ^(D) had no sympathy with this view, saying that it was wrong to expect the University to provide part-time cover; in his view, this was a problem for the department to solve - and there must be a way around it. Another ^(A) added that in his particular discipline, it is hard enough to recruit full-time academics, let alone part-timers, and for this reason, too, he did not necessarily see part-time contracts as the solution.

The suggestion that would-be academic entrepreneurs be granted temporary leave of absence provoked much the same response, except that one HoD ^(C) felt that he was more likely to be given the money to find a replacement for someone who was absent altogether. This particular HoD commented that the University's approach to extending previously agreed periods of leave of absence was now much more flexible: where previously it had washed its hands of people who were absent for more than two years, it

was now prepared to "keep the door open" for five years and more. He felt this was right where people were spending their leave of absence in a internationally recognised research facility, but he would not recommend this approach for academics who devoted their leave of absence to company start-up. The other HoDs responded more pragmatically to the question of extending leave of absence granted to entrepreneurial academics: it was simply a question of whether they were allowed by the University to use the salary saved to recruit a replacement - and what their chances were of recruiting one. One ^(D) indicated that he would be prepared to go and argue with the P&R committee, if necessary, in order to help the academic entrepreneur bring the company to the point where he could return to the department.

(ii) Equipment/Instrumentation, Support Staff, Communications, Accommodation

Two HoDs ^(A, C) were aware of the University's willingness to let entrepreneurial academics have access to most - at a pinch, - all of these facilities, whereas the fourth ^(D) remarked characteristically that he knew only his own department's approach to this question, not the University's. In principle, the first three HoDs ^(A, B, C) agreed with the University's approach, recognising that in practice, it was upto the HoD to grant or withhold access to such facilities. The fourth ^(D) felt it was entirely upto the HoD to determine both policy and practice with regard to the use and cost of such facilities; in his view, the University could not have a policy on this. His own policy was not at odds with the University's; he indicated that he, too, would probably try to help academics who wished to entrepreneurially exploit their IP.

Two HoDs ^(A, C) indicated that in practice they would find it difficult to provide certain forms of support in their particular department. Neither felt that the use of equipment/instrumentation was likely to present a problem, but both commented that technical and secretarial support staff were already under considerable pressure as a result of traditional departmental activities. Both added that it might be feasible to permit the use of technical or secretarial support staff for a short period in the start-up phase, but not for an extended period, once the company in question had begun to establish itself; at that point, members of the department would have to provide their own technical and secretarial support. Two HoDs ^(A, C) felt that they were so short of accommodation, they would be unable to provide dedicated accommodation for would-be academic entrepreneurs. However, both said that it was appropriate to let academics use their office and their existing corner of the laboratory for entrepreneurial purposes without making a charge until they reached the stage where they started to realise their ideas. One ^(C) added that he would support any member of staff who approached the centre with a view to getting the use of additional accommodation in which to pursue his business activities. There was no indication that the fourth HoD ^(D) would find it particularly difficult to provide any of these facilities for entrepreneurial members of his department.

Three HoDs ^(A, B, C) agreed with the University's flexible approach to payment for facilities used by would-be academic entrepreneurs, though one ^(A) felt that it was important to define very carefully exactly which facilities were being offered, for how long and for what cost - down to details about the cost of pages printed on a University printer. In his view, this should be encapsulated in a formal, written document. One HoD ^(B) remarked that the method of payment had implications for the department, since some arrangements might benefit the centre exclusively, whereas others might benefit the centre and the department - or even the department alone. He added that in his department, everything

possible was put into surplus rather than overheads, because the centre did not levy a percentage charge on departmental surpluses. The fourth HoD ^(D) made it clear that if the department was getting neither financial benefit nor kudos from the activities of would-be academic entrepreneurs, they would have to pay the full, market rate for the facilities used - from the point that they began to turn an idea on the back of an envelope into reality. He would expect them to start paying not just for additional accommodation provided by the University centrally or from within the department's own allocation, but even for use of a portion of their office or their existing laboratory space. He felt that the district valuer should recommend the charge to be made by the department. However, he was not averse to an alternative arrangement, with some kind of *quid pro quo*, but he felt that the department should determine whether the *quid pro quo* was acceptable or not - and the department should benefit from the *quid pro quo*, not the University centrally.

(iii) Financial Support

Three of the HoDs interviewed were aware that, in principle, York was prepared to provide financial support for entrepreneurial academics in the form of a grant from the innovation fund or equity; only one ^(D) was unaware of this. In principle, all four HoDs were in favour of the University's approach. One ^(B) commented that it was appropriate for a university's investment portfolio to contain some speculative investments, while another ^(A) approvingly described the new Finance Officer as more prepared to be speculative than his predecessor.

However, all four added the same caveat: in practice the University should base its decision on whether or not to acquire equity in an academic spin-off company on the same objective criteria employed with regard to its conventional investment activities. None of the HoDs felt that the University should take equity in academic spin-off companies for sentimental reasons, or even because it perceived it to be "*a good thing*" to assist the technology transfer process in this way. One ^(D) hoped that the University made good use of lay members of Council and was prepared to employ well-qualified consultants, where appropriate, to avoid "*the blind leading the blind*". Another ^(C) added that this kind of financial support should be limited in scope, that it should amount to no more than "*a mild perturbation on the University's main activities*".

8.7 Incentives and Disincentives

(i) Exploitation of "Soft" IP

All four HoDs interviewed were aware that York imposed no earnings limit on academics who choose to exploit their expertise via personal consultancy - and all four felt that this was the right approach, but for different reasons. One ^(B) was not in favour of limits, as a matter of principle, whereas two ^(A, D) were motivated by pragmatism: the first ^(A) remarked that different people command different fees, whereas the second ^(D) suggested that it would make people reticent about their activities, which would be counter-productive. Similarly, all four knew that York did not levy a "tax" on academics' earnings from personal consultancy. All four agreed with this, given that academics were supposed to pay for the resources they used in the process of doing personal consultancy. However, one HoD ^(A) admitted he could see both sides of the argument. He felt that in an ideal world, the University should get a percentage of academics' earnings from personal consultancy; in reality, though, he acknowledged that this would act as a disincentive to doing personal consultancy and that it could even affect the recruitment of staff. One ^(D)

suggested that "taxing" academics' income from personal consultancy would have the same affect as imposing earnings limits: it would encourage secrecy.

There was less of a concensus over the University's policy that consultancy should be a criterion for promotion. Two HoDs ^(A, B) said that irrespective of the policy, in practice consultancy was not taken into account by the Promotions Committee. The second ^(B) felt that this was as it should be, since academics had to make a choice between mammon and academic excellence, while the first ^(A) saw this as an unfortunate "catch 22" situation: academics tended not to detail consultancy when applying for promotion - with the result that the Promotions Committee never considered whether to take it into account. The other two HoDs ^(C, D) agreed with the University's policy, though one ^(C) said that in practice, taking account of consultancy posed a number of difficulties: consultancy reports could not always be freely published, and even if an individual managed to submit them to the Promotions Committee, it was impossible to use objective measures such as a citation count to assess their relative worth. The other ^(D) admitted to no such difficulties, emphasising that in his discipline, it was essential for consultancy reports to be taken into account when considering applications for promotion; he was confident that the force of his argument would sway the Promotions Committee.

(ii) Exploitation of "Hard" IP

All four HoDs were aware that the University had instituted positive financial incentives to encourage members of staff to "flag" potentially exploitable IP, though two ^(B, C) were vague about the terms of these incentives, whereas the other two ^(A, D) were able to quote the percentage split more or less verbatim and knew that it had recently been amended in favour of inventive academics. However, it later emerged from discussion with the manager of the department's commercial arm that one of these HoDs ^(D) was unwittingly operating a totally different reward system. Academics who entrust the exploitation of their "hard" IP to the department's commercial arm do not share in the income generated by their IP in the same manner as their colleagues in other departments: rather than reward them financially in proportion to the royalties earned, as outlined in the University's policy statement, the department's commercial arm simply pays them a consultancy fee which bore no relation to the income.

However, all four HoDs appeared to approve of the University's policy; one ^(A) remarked that the University should be generous about rewarding academics who flagged potentially exploitable IP. There were differing opinions about how members of staff in each department would treat their personal share of the revenue from IP which had been successfully exploited. Two ^(A, D) felt that their staff in would probably be happy to keep their personal share of the revenue, whereas one ^(B) suggested that some people in his department would say "*oh, goody!*", while others would "*take a very pure attitude about the whole thing*". The fourth ^(C) said:

"... Scientists are extraordinarily unmercenary people, really, when it comes down to it. Compared to lawyers, I mean, they are quite fantastic. I don't think on the whole that people regard [money] as of number one importance ..."

In his view, members of his department would follow the example of an older member of staff and plough the gain they made personally from the exploitation of their IP back into their work - perhaps by buying a computer or funding a research student, rather than spend it on the ubiquitous BMW. He conceded, though, that if university pay levels

continued to decline, this was a tradition which might die out.

Three HoDs were aware that York's promotions criteria make no reference to "hard" IP which was successfully identified and exploited; only one ^(D) believed (wrongly) that the documentation circulated to HoDs each year listed manifestations of this, such as patents. Of the three HoDs, one ^(A) felt that patents should certainly be equated with publications when assessing applications for promotion; he remarked that he would "*bang the table*" if the Promotions Committee showed signs of not treating them this way. In his view, though, the issue of rewarding people in terms of promotion for generating IP which was successfully exploited had "*dropped off the table*", due to concern over the assessment of teaching - which affected far more people. Another ^(B) was against the idea of successfully exploited IP being taken into account by the Promotions Committee. In his view, promotion should be conferred on those who could demonstrate ability and effort in relation to research, scholarship, teaching and administration, not for making money for the University; he saw the two as mutually incompatible, since the effort entailed in making money would inevitably mean that the people concerned devoted less time to research *etc.* He also felt that most academics had no possibility of earning significant sums of money for the University in this way, and that rewarding the few who could was liable to cause resentment. He conceded that people might see it differently by the end of the 1990s.

Only two HoDs ^(A, D) were aware that York did not levy a "tax" on the income which academics made personally from exploiting their IP entrepreneurially. However, all four felt that this was the right approach - but for different reasons. One ^(A) saw this as an exact parallel with income earned from personal consultancy, while another ^(D) was motivated by pragmatic considerations: it would not be easy or practical to try to levy a "tax" of this kind. The third ^(C) was more concerned with principle: as long as academics did a full week's work and contributed fully to the life of the department, he saw no justification for levying a "tax" on any income which academics made personally from exploiting their IP entrepreneurially.

Only one of the HoDs interviewed ^(B) made a categorical response when asked whether successfully exploiting IP entrepreneurially would be taken into account when considering applications for promotion: in his view, it was not a criterion for promotion. Another HoD ^(C) said that this kind of activity should be included in the promotion criteria, as should a number of other activities to which the University paid no more than lip service (*eg.* continuing education); however, entrepreneurial activities should not entirely displace the emphasis placed on research, and applicants should still be able to demonstrate ability in teaching and administration, too. A third ^(B) suggested that activities which were "*good for the University*" should be taken into account, and that there was a need to develop different "*paths of rewards*". In his view, this was already happening to a limited extent: promotion to Readerships or personal Chairs was given in recognition of excellence in research or scholarship, whereas promotion to established Chairs took more diverse criteria into account. The fourth ^(D) felt that in his particular discipline, it was appropriate to take into account entrepreneurial efforts to exploit IP - because its *raison d'être* was to do things which would be successful industrially; however, he counselled against placing too much emphasis on this.

APPENDIX G

List of Contents

**Hull University's Formulae for the Distribution
of Income from the Exploitation
of Intellectual Property**

APPENDIX G.
FORMULAE FOR DIVISION OF ROYALTIES

Case (a): where an external sponsor meets patent costs as specified in its contract with the University:

Sponsor x
University $(1 - x) x y$
Inventor $(1 - x) x z$

Where $x = 2/3$ for Ministry of Defence contracts
 $x = 1/2$ for British Technology Group contracts
 $x =$ is negotiable for other contracts and
 y and z are determined as follows:

Where there are 1-3 inventors named on the patent application

y	z	
0.25	0.75	<i>The first £40,000 of net annual royalty income patent</i>
0.50	0.50	<i>Any additional income over £40,000</i>

Where there are 4 or more inventors named on the patent application

y	z	
0.25	0.75	<i>The first £80,000 of net annual royalty income patent</i>
0.50	0.50	<i>Any additional income over £80,000</i>

Case (b): where the invention is referred to the British Technology Group which subsequently decides to exploit it as required for work carried out on SERC grants and by SERC students, research assistants and fellows:

as in case (a)

Case (c): where the University is free to, and chooses to, exploit the invention and pays all the costs involved:

University $(1-a)/2$
Inventor $(1-a)/2$

where 'a' equals the external costs (e.g. patent agent, Patent Office and legal fees) incurred by the University in patenting the invention.

Case (d): where the University does not commit itself financially but gives official support to and makes a substantial administrative input into, negotiations for the commercial exploitation of an invention:

University 0.4
Inventor 0.6

A P P E N D I X H

APPENDIX H

INTELLECTUAL PROPERTY LAW: DIFFERENT FORMS OF PROTECTION

1 Copyright

Copyright protects original literary, dramatic, musical and artistic works, published editions of works, sound recordings, films (including videograms) and broadcasts (including cable and satellite broadcasts); in this context, computer software is deemed to be a literary work. Copyright in literary, dramatic, musical or artistic work - including computer software - lasts until 50 years after the death of the author; films, sound recordings and broadcasts are protected for 50 years. Copyright confers upon its owners a rental right in sound recordings, films and computer programmes; this rental right is given in the form of a licence.

Copyright is a simple process which involves little or no cost. To conform with the demands of other countries, copyright is most securely asserted by attaching the copyright symbol and the name of the person/organisation asserting copyright, although this is not necessary in the UK. In the case of computer software, there is the option of registering the copyright on a central database.

2 Registering a Trade Mark or Service Mark

This is a process which usually takes about two years from the initial application. Application is made to the Trade Marks Registry, accompanied by an application fee of £68. The trade mark/service mark is then examined to ensure that it is distinctive, not deceptive and does not conflict with existing registered trade marks/service marks. If it is accepted, a further fee of £95 must be paid. Initial registration lasts for 7 years and renewal fees are payable for each subsequent period of 14 years; the renewal fee is currently £125.

3 Registering a Design

This is a process which usually takes six months, although a total of twelve months, extendable to fifteen, is allowed for an application to be put in order. Application is made to the Design Registry, accompanied by an application fee. The design is then examined to ensure that it is new. If it is accepted, a further fee must be paid. Renewal fees, payable for each subsequent period of 5 years.

4 Acquiring Patent Protection

The process of obtaining a UK patent incorporates the following steps and costs:

1 The first step is to file an initial registration, which gives the applicant his priority date. This costs £15 and gives the applicant twelve months to consider his next move.

2 If the applicants decides, after making the initial registration, that he wants to add technical information or delay the schedule, he has the option of aborting the initial registration and re-filing, hoping that nobody else has filed something equivalent in the meantime.

3 If, however, he decides to acquire full patent protection, on payment of £105 the Patent Office will initiate a search for previous registrations which might reveal prior art.

4 If no prior art is found, details of the initial registration are published 18 months after the priority date. This is called the "A" publication; from this point, the applicant cannot add technical information, though existing information may be amended. From this point, the applicant may sue infringers.

5 In order to be granted a full patent, the applicant must pay a fee of £120 so that a full examination may be made.

6 If the patent is granted, it is published in what is called the "B" publication, which may contain amendments. The monopoly runs from this publication date.

7 The total cost of £240 does not cover the Patent Office's costs; therefore, every year from the 5th year onwards, upto and including year 20, to prevent the patent from lapsing, the patent holder must pay renewal fees. These start low (currently £90) and increase each year (currently upto £350).

These are the fees charged by the Patent Office; if the services of a chartered patent agent are used, there will be additional fees amounting to several hundred pounds.

A P P E N D I X I

GLOSSARY

ABRC	Advisory Board for the Research Councils
ACARD	Advisory Council for Applied Research & Development
ACI	Advisory Committee on Industry (part of the CVCP)
AFRC	Agriculture & Food Research Council
AILO	Association of Industrial Liaison Officers/Scottish Central Institutions and Polytechnics
AUT	Association of University Teachers
BEELAB	Bristol Earthquake & Engineering Laboratory Ltd
BEST	British Expertise in Science & Technology Index (database)
BTG	British Technology Group
BVG	Business Ventures Group (Strathclyde University)
CEO	Chief Executive Officer
ex-CAT	former College of Advanced Technology
CBI	Confederation of British Industry
CIHE	Council for Industry in Higher Education
CII	Centre for Industrial Innovation (Strathclyde University)
CRS	Conference of Registrars & Secretaries
CTL	City Technology Ltd (City University)
CUA	Conference of University Administrators
CUBIE	City University Bureau of Industrial Enterprise
CVCP	Committee of Vice-Chancellors and Principals
DES	Department of Education & Science
DoI	Department of Industry
DTE	Defence Technology Exploitation
DTI	Department for Trade & Industry
EC	European Community
EPC	European Patent Convention
ESG	Exploitation Scrutiny Group
ESRC	Economic & Social Research Council
FTE	Full-time equivalent
GATT	General Agreement on Trade & Tariffs
HEI	Higher Education Institution
HoD	Head of Department
ICDA	Industrial & Commercial Development Agency (Hull University)
ICDS	Industrial & Commercial Development Service (Glasgow University)
ICPB	Industrial & Commercial Policy Board (Kent University)
IDU	Industrial Development Unit (York University)
IECS	Institute of Estuarine & Coastal Studies (Hull University)
IFAB	Institute for Applied Biology (York University)
ILO	industrial liaison officer/office
ILO	Industrial Liaison Office (Bristol University)
IP	intellectual property
IPR	intellectual property rights
IRC	inter-disciplinary research centre
IVF	in-vitro fertilisation
KSIP	Kent Scientific & Industrial Projects Ltd (Kent University)
LENTA	London Enterprise Agency
LES	Licensing Executives Society (UK) Ltd
MRC	Medical Research Council
MIC	Merseyside Innovation Centre

MIT	Massachusetts Institute of Technology
MoD	Ministry of Defence
NAO	National Audit Office
NASA	National Aeronautics & Space Agency
NEB	National Enterprise Board
NERC	Natural Environment Research Council
NIH	National Institutes of Health, Bethesda
NIMTECH	Regional Technology Centre for the North West of England
NRDC	National Research & Development Corporation
NSF	National Science Foundation (USA)
NTBF	new technology-based firm
OECD	Organisation for Economic Co-operation and Development
ORSIL	Office of Research Services and Industrial Liaison (Liverpool University)
OTA	Office of Technology Assessment
OTEC	Ocean Technology (UK) Ltd (City University)
PCT	Patent Co-operation Treaty
PRCS	Premature Retirement Compensation Scheme
R&D	research and development
RDAS	Research Development Advisory Service (Liverpool University)
RDS	Research and Development Services (Strathclyde University)
SCDI	Scottish Council Development & Industry
SDA	Scottish Development Agency
SERC	Science and Engineering Research Council
SMART	Small Firms Merit Award for Research into Technology
SME	Small and medium-sized enterprise
SRC	Science Research Council (forerunner of SERC)
STT	Strathclyde Technology Transfer Ltd (Strathclyde University)
SUILEX	Scottish University Industrial Liaison Executives
UDIL	University Directors of Industrial Liaison
UDIRL	University of Durham Industrial Research Laboratories
UFC	Universities Funding Council
UGC	University Grants Committee (forerunner of UFC)
UKSPA	UK Science Park Association
ULEC	University of Liverpool Energy Co.
ULTRA	University of Liverpool Technological & Research Applications Ltd
UMIST	University of Manchester Institute of Science and Technol
USR	Universities Statistical Record, Cheltenham
WARF	Wisconsin Alumnae Research Foundation
WIPO	World Intellectual Property Organisation, Geneva

APPENDIX J

APPx J.

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