Quantum Physics, Econometric Models and Property Rights to Information

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The problem of how one translates the capacities inherent in intellectual and other inventions into property rights upon which a return is claimed I find oppressively difficult.[1]

Information is a somewhat recalcitrant economic good.[2]

Introduction

It has been suggested that some of the western high-technology countries, having passed through agricultural and industrial revolutions, are now entering into a post-industrial state typified by information-based economies.[3] A landmark study in the United States demonstrated that as long ago as 1967 twenty-five *per cent* of the United States Gross National Product (GNP) originated with the production, processing and distribution of information and related goods and services. The purely informational requirements of planning, co-ordinating and managing the rest of the economy took another twenty-one *per cent* of the GNP. It is possible to verify the obvious inference that an information-based economy has arisen in that country by studies of the structure of the work force. Such studies duly revealed that these "informational" activities engaged forty-six *per cent*

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[1] David, *Proceedings of a Special Conference on Research and Development, Technological Education and Industrial Property: Policy Correlations for the 1970s* (1971-72) 15 IDEA The Journal of Law and Technology 477.

[2] G. Thompson, *Memo from Mercury: Information Technology is Different* (1979), 30.

[3] "In pre-industrial societies — still the condition of most of the world today... life is primarily a game against nature. [In] industrial societies... life is a game against fabricated nature... . A post-industrial society is based on services. What counts is not raw muscle power, or energy, but information." D. Bell, *The Coming of Post-Industrial Society* (1973), 126-7; see also D. Bell, *The Winding Passage* (1980); F. Machlup, *The Production and Distribution of Knowledge in the United States* (1972); Parker, *Social Implications of Computer/Telecoms Systems,* 1 (1976) Telecommunications Policy 3.

It is not necessary for the purpose of this essay to attempt an intrinsic definition of "information". The term extends well beyond scientific information. There is a continuum which runs from pure ideas through information, data and know-how, and into the areas conventionally covered by the statutory monopolies.

of the work force and earned fifty-three *per cent* of all labour income.[4] This development is not confined solely to the United States : preliminary studies in Canada indicate that about half of the GNP and more than half of Canadian employment are attributable to the production, storage and use of information.[5]

Economists and social scientists have begun to grapple with the problems presented by this profound structural shift away from an industrial

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[4] These statistics are taken from M. Porat, *The Information Economy : Definition and Measurement* (1977), vol. 1, 4-8. See also Porat, "Communications Policy in an Information Society" in G. Robinson, *Communications for Tomorrow : Policy Perspectives for the 1980s* (1978), 3. I acknowledge a real intellectual debt to Daniel Bell and Marc Porat. They have been in the vanguard of those North American scholars who in recent years have recognized that information has come to occupy a critical role in contemporary life. Bell's analysis is conducted on a complex, abstract methodological basis. A schema of "axial principles" which both energize and organize society is created ; this schema in turn provides a number of perspectives from which macro-historical change can be interpreted. The methodology and the insights suggested created voluminous, but fruitful commentary. For a recent critique of Bell's methodology see T. Jones, *Options for the Future : A Comparative Analysis of Policy-Oriented Decisions* (1980), 111.

If Bell recognized the qualitative importance of the information phenomenon, Porat perceived his task as a quantitative one, *i.e.,* to measure the extent of the phenomenon. His massive study involves fundamental changes in conventional economic classifications. Porat divided the United States economy into a primary information sector (all those industries which in some way produce, process, disseminate, or transmit knowledge or messages) and a secondary information sector (which includes the public and private bureaucracies). The primary information services produced in the economy are sold in information markets ; the secondary information services are intended for internal consumption. It is not difficult, given this approach, to reclassify the structure of the work force and to realign standard public accounts to obtain the appropriate percentages for the primary information sector. The secondary GNP figure has to be obtained by a hypothetical sale : the information aspect of the firm's activities is sold to the non-information side. The value added by the secondary "inner firms" is defined as the employee compensation paid to information services in non-information industries plus the capital services of information machines. The net result is a tool capable of being used by policy makers and interested researchers in fields related to information and technology to analyze problems of legal and economic dimensions. Porat's analysis is not free from either classification or accounting problems, but on any view of the matter his study does document a profound structural shift. Some of the accounting problems with Porat's work are discussed by Walderhaug, "The Information Economy : Issues of Relevance", in *Proceedings of the Sixth Annual Telecommunications Policy Research Conference* (1979), 231. See also A. Carter, *Structural Change in the American Economy* (1970) ; M. Olson, *The Logic of Collective Action : Public Goods and the Theory of Groups* (1965) ; Arrow, *Limited Knowledge and Economic Analysis* (1974) 64 (No. 1) Am. Econ. Rev. 1 ; Spence, "An Economist's View of Information", in *Annual Review of Information Science and Technology* (1974), vol. 9.

[5] J. McLean, *The Impact of the Microelectronics Industry on the Structure of the Canadian Economy* (1979), 4 ; Economic Council of Canada, *Report on Intellectual and Industrial Property* (1971), chap. 2 ; J. Sauvé, *The Telecommunications Revolution : Canada Must Play to Win,* Press Release, Dept of Communications, 21 March 1979. See also S. Serafini & M. Andrieu, *The Information Revolution and its Implications for Canada* (1981).

paradigm.[6] Lawyers in turn will have no alternative but to confront the inevitable problems of realigning institutions and legal thinking.

Two broad kinds of questions emerge in a state undergoing a transition to an information-based economy. First, how is the information infrastructure itself to be arranged? Second, how are the information technologies to be applied across the broad spectrum of finance, government, media and transport? It is not necessary to indulge in the full rigours of arcane econometric modelling to be aware that such an economy creates several subsidiary long-term problems for socio-legal-economic analysis.

(i) A large percentage of the population will be divorced from the more physical aspects of industrial activities, so that intellectual acumen and technological skills will be at a premium. The concomitant problem of labour displacement will require social ingenuity both in altering the criteria of employability and in reformulating educational programs. Formal education will be effective only if it provides an extensive and universal basis for continuous learning. To the degree that unemployment places growing numbers of persons outside the mainstream of society, it is not just an economic problem but has serious psychological and cultural consequences.

(ii) There will be a sharp increase in the "bureaucratisation" of society and an increased subservience to the social machine required to run the service and information-based economy. Hence bureaucracy itself becomes an elaborately developed form of social technology.

(iii) Extraordinary changes will occur in the way in which both knowledge and language are conceived. An acute intellectual discontinuity occurs when man has to come to terms with his own intellectual "tools" in the form of advanced electronic devices.[7]

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[6] The term "industrial paradigm" was first used in Harman, *The Coming Transformation,* (1977) 11 Futurist 4, 106. The term "paradigm", *i.e.,* a particular way of thinking, perceiving and doing that is associated with a particular vision of reality, owes much to T. Kuhn, *The Structure of Scientifie Revolutions* (1967).

[7] See Tribe, *Technology Assessment and the Fourth Discontinuity: The Limits of Instrumental Rationality* (1972-73) 46 So. Cal. L. Rev. 617. I am grateful to Professor R. Macdonald of McGill University for the reference. See also Leff, *Law and Technology: On Shoring up a Void* (1976) 8 Ottawa L. Rev. 536, and Leff, *Law And* (1978) 97 Yale L.J. 989.

The term "discontinuity" is commonly used by sociologists and intellectual historians. Some theorists who espouse functionalism, developmentalism or evolutionism attempt to identify "continuous" lines of societal or intellectual development. Others ("discontinuists") attempt to identify particular "turning-points" which have changed or will change the very contours of society or ideas. The clash between continuous and discontinuous paradigms is currently most pronounced in the so-called "growth debate": see, *e.g.,* D.L. & D.H. Meadows, *The Limits to Growth* (1972); H. Kahn, *The Next Two Hundred Years* (1976). Other theorists adopt what has been called a "dice model" of change and reject models drawn from organic growth, whether continuous or discontinuous. See, in particular, R.

(iv) Information may become a "currency" of the age. The know-how element already forms a significant portion of the consideration in many commercial transactions.

(v) There are likely to be profound changes at many levels of formal legal ordering. Access to information will become an issue of critical legal relevance, replacing a concern with industrial organization and hence with subjects such as labour law and relations, competition policy and the ordering of financial markets. The growing awareness of this issue is manifested in the increasing pressure for both freedom of information and privacy enactments in those western countries which do not already have them.

(vi) As a consequence of (v) a very difficult question of principle arises: should the formal ordering of information be addressed through the ascription of property rights? This broad issue provides the subject for this article.

Some recent law-review literature asserts that new kinds of proprietary rights related to information are emerging, although none of the articles go beyond the modest analysis of decided cases.[8] It is possible that their

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Nisbet, *Social Change and History: Aspects of the Western Theory of Development* (1969), and R. Nisbet, *History of the Idea of Progress* (1979). See also Samek, *Beyond the Stable State of Law* (1976) 8 Ottawa L. Rev. 549.

[8] Libling, *The Concept of Property: Property in Intangibles* (1978) 94 L.Q.R. 103; Ricketson, *Confidential Information — A New Proprietary Interest? (1)* (1977-78) 11 Melbourne U.L. Rev. 223; Neave & Weinberg, *The Nature and Function of Equities* (1978) U. of Tasmania L. Rev. 24, 115; Stone, *From Principles to Principles* (1981) 97 L.Q.R. 224, *esp.* note 34. The views of P. North proceed implicitly on the same thesis: *Breach of Confidence: Is There a New Tort?* (1972) 12 J.S.P.T.L. 149. That commentator's views are carried through into U.K. Law Commission *Working Paper No. 58.* See also *Report on Intellectual and Industrial Property,* Appendix A, *supra,* note 5. Libling documents some cases in which extensions of proprietary theory have occurred in the twentieth century. The thesis is unassailable in claiming some kind of extension of the concept of property by the courts, but the author is much less convincing in his conceptualisation of that extension. "Entities" as such do not much matter today; neither does a "value added" approach, although some judges still endeavour to reason that way. (If Robinson Crusoe lived alone on an island, could his creation of "entities" be said to create property rights?) Neither is property a didactic relationship between a person and a thing, as both Hegel and Blackstone seem to have thought. See the extracts cited in H. & F. Cohen, *Readings in Jurisprudence and Legal Philosophy* (1951), 73.

"Property" is today essentially concerned with relations between persons, and the analogy with tangible things is quite misleading. See B. Ackerman, *Economic Foundations of Property Law* (1975); F. Cohen, *Dialogue on Private Economics of Legal Relationships* (1975). The older conception of property — as limited to rights enforceable against an indefinite number of third parties, such as the rights and interests a man has in land and chattels to the exclusion of others — does not now even approach the way courts in fact act on this question. And for the common law jurisdictions, property is clearly not *numerus clausus* as it apparently is in civil law. See P. Arminjon, B. Nolde & M. Wolff, *Traité de droit comparé* (1950-51) t. III, 38.

methodology is not analytically adequate to deal with the real dimensions of this issue. Micro-analysis of a retrospective character may not yield all the perspectives which can be usefully applied to a problem of society-wide dimensions. Hence, the following approach has been adopted : first, with the assistance of very basic economic and public-policy analysis, an attempt is made to articulate some of the problems which might arise out of the ascription of property rights to information ; second, a brief review of some areas of the law where those problems have already arisen is undertaken ; and third, some tentative conclusions and suggestions are proffered concerning the kinds of questions which ought to be debated.

Several caveats should be noted. First, this article is set against the construct of an information-based economy, which is a particular abstraction. Modern societies are too complex to be viewed through any single construct or prism. This construct is useful because it enables certain features of legal ordering, which might otherwise go unnoticed, to be identified. It should be emphasized that several other intellectual windows into the characteristics of the interior of contemporary society are possible : no conceptual scheme ever exhausts a social reality.

Second, although this article is concerned in a broad way with the ascription of property rights to information, it does not purport to offer any answers to narrowly defined issues. Its primary purpose is to disrupt unquestioning faith in the appropriateness of conventional proprietary notions in the formal ordering of information.

Third, if the preliminary evidence of economists and sociologists is accepted on even a provisional footing as suggesting a profound shift in the nature of Canadian and American society, then North American lawyers are about to experience different kinds of problems than they have heretofore had to deal with. Those problems will require different ways of thinking.

Fourth, it is not at all clear that a common conceptual framework has evolved to deal with these new kinds of issues. We have the different approaches of economists, engineers, social scientists and lawyers all operating against a backdrop of differing political, socio-economic and ideological perspectives. Even within the legal profession there is no truly shared discourse : telecommunications, copyright and computer lawyers, for instance, have all developed different vocabularies. Yet lawyers do not enjoy the luxury of open-ended debate ; concepts and answers have to be struck because the profession advises on actual problems. *Ex ante* debate, particularly from the academic wing of the legal profession, is necessary.

In the area of "intellectual property" there is still much profit to be gained from Tawney's essay, "Property and Creative Work", reproduced in C.B. MacPherson, *Property : Mainstream and Critical Positions* (1978), 135.

Fifth, the history of legal responses to new information and knowledge suggests two critical challenges. The first relates to the ability of the profession and the commercial community to devise new social arrangements that will ensure both the creation and the effective and profitable utilisation of new information and technology. The second challenges a liberal society to protect its basic political and human values from unwise applications or withdrawals of that new knowledge. The real question is whether the institution of "property" is an appropriate vehicle for addressing those challenges.

Sixth, lawyers are going to have to become more interested in the economics of information. North American lawyers in particular have tended to try to conceptualize information as a commodity. It is not at all clear that such an approach is economically tenable, because information shows remarkable resistance to such treatment. This article will suggest that the legal equivalent of a shift from Newtonian physics to quantum mechanics may be required. Lawyers, economists and policy makers may have to face the possibility of thinking about some kinds of information as a resource in society rather than as a commodity.[9] This would be consistent with its character as a collective economic good. Such a thesis cannot presently be more than exploratory, and if accepted, it would have widespread structural and institutional implications, which would need to be worked through and tested in a series of intensive studies. The author might be prepared to argue, on another occasion, that there is even a moral basis for departing from a view of information as a commodity, in so far as the learning capacity of a nation may be at issue.[10]

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[9] The distinguished Canadian historian, Harold Innes, turned in his later works from a study of staples, *e.g., The Fur Trade in Canada: An Introduction to Canadian Economic History* rev. ed. (1970), to studies of the history and technology of communications by treating the latter in much the same way as he had looked at staples. See, *e.g., Empire and Communications* rev. ed. (1972). Innes apparently thought that such technologies influenced societies, institutions and cultures in the same way as the exploitation of staples had influenced them. Yet, curiously, (because Innes inveighed against monopolies of knowledge) he never grasped the idea that what might be at stake was a resource. For reviews of the "link" between the early and the later works of Innes see B. Berger, *The Writing of Canadian History* (1978) and Patterson, *Harold Innes and the Writing of History* (1979) 83 Can. Lit. 118. J. McHale explored some resource implications of communications in *The Changing Information Environment* (1976).

[10] The term "learning capacity" was struck by Soedjatmoko in *The Future and the Learning Capacity of Nations: The Role of Communications* (1978). Soedjatmoko, adapting the "basic needs model" developed by internationalists, argued that the social transformations required in post-industrial society depend crucially upon the collective capacity of the particular nation to generate, ingest, reach out for and utilize vast amounts of information. Innes fumbled towards the same thought at the level of the individual: "Culture is concerned with the capacity of the individual to appraise problems in terms of space and time and with enabling him to take the proper steps at the right time", H. Innes, *The Bias of Communications* (1951), 85.

I. Problems in the ascription of property rights to information

It is probably impossible to arrive at a working definition of "property" which would satisfy all lawyers and economists. The most that can be done in an exercise of this kind is to offer an explanation of how the institution of property is used as an instrument of formal ordering in contemporary North American society.

All western legal and economic systems have been grounded on the explicit recognition of property rights but the concept of property has by no means been a static one. Property is today best understood in terms of relational equities : property rights are the sanctioned behavioural relations among men that arise from the existence of goods and pertain to their use. These relations specify the norms of behaviour with respect to "goods" — something which yields utility or satisfaction to a person — that each and every person must observe in his daily interaction with others, at least without bearing some cost as a result of non-observance. Hence the prevailing system of property rights in a community is the sum of the economic and social relations, with respect to scarce resources, in which individual members stand to each other.[11]

It is by means of exchange that the prevailing property rights assignments in an economy affect the allocation of these resources. Trade generates contractual agreements not to exchange goods but to exchange bundles of property rights to do things with these goods. The right of ownership is generally recognized as a subcategory of a more generalized

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[11] Some economists, basing themselves on orthodox micro-economic theory, might question the inclusion of the word "social" here. But even the courts — traditionally among the most conservative of social institutions — have recognized massive conceptual extensions of the term "property" since the eighteenth century. For instance, the United States Supreme Court recently noted that "the dichotomy between personal liberties and property rights is a false one... a fundamental interdependence exists between the personal right to liberty and the personal right in property" : *Lynch* v. *Household Finance Corp.* 405 U.S. 538, 552 (1971) *per* Stewart J. Charles Reich, in his much discussed essay *The New Property* (1963-64) 73 Yale L.J. 733, argued that government largess was becoming destructive of the economic basis of liberty and suggested the need to find "a new property". He clearly meant a new political and social order : property as a different kind of institution in face of the threats he described. It must be recalled that American courts have sanctioned considerable "extensions" of the term "property" to bring some fact patterns within the Fourteenth Amendment of the United States Constitution. See also B. Ackerman, *Private Property and the Constitution* (1977).

A good deal of American legal writing and analysis in the property area has becn influenced by W. Hohfeld. See Hohfeld, *Some Fundamental Legal Conceptions As Applied in Judicial Reasoning* (1913) 23 Yale L.J. 16 ; Hohfeld, *Fundamental Legal Conceptions As Applied in Judicial Reasoning* (1917) 26 Yale L.J. 710 ; Corbin, *Jural Relations and Their Classification* (1921) 30 Yale L.J. 226 ; Vandevelde, *The New Property of the Nineteenth Century : The Development of the Modern Concept of Property* (1980) 29 Buffalo Law Rev. 325.

conception of property rights and as including at least three elements: the right to use the asset, the right to appropriate returns from the asset, and the right to change the asset's form. Ownership is not generally conceived in an unrestricted way: the right of ownership is an exclusive right in that it is limited only by those restrictions explicitly stated in the law. These restrictions recognize perceived social imperatives. It follows from all of this that an asset's properties can be defined both by its technical properties and by the particular set of legal restrictions governing its use and exchange. This conceptualization has been recognized through constitutional, statutory and judicially created provisions. The net result is that to say something gives rise to a proprietary right is at once comforting, convenient and "legal". The attachment of this appellation immediately brings into play a body of established doctrine and remedies painfully evolved over several centuries. Yet the most striking characteristic of information is that it does not fit easily with extended concepts of property.

First, sole ownership is vastly complicated in the case of information. The act of theft is often impossible to detect and difficult to prove. A piece of information can be "owned" by two people at the same time without any denial of the conventional benefits of ownership. Second, some kinds of information can be infinitely multiplied at low cost. Third, information generally does not depreciate with use and some kinds of information of a theoretical character actually inflate in value with usage. Fourth, unused information is, in general, of no use but the moment information is used it reveals both its existence and content and may actually enter what is conventionally referred to as the "public domain". Fifth, the creation of information is routinely a joint activity and the apportionment of "creativity" is then rendered extraordinarily difficult. Sixth, the creation of technology and information is tending to move on shorter frequencies: commercial advantage is today inextricably intertwined with innovation. Longer-frequency functional vehicles such as the statutory monopolies, are becoming increasingly inapt for this pronounced shift in commercial timeframes. Seventh, the volume of available information has reached overwhelming proportions. Classical economics assumes the possession of complete information about the availability of different goods, estimation of costs and maximization of utility preferences. But more information is not complete information. The disabilities of the individual in relation to the sum of knowledge become progressively more severe as the sum increases. Eighth, in economic terms, public goods are separated from private goods by a principle of exclusion. Although that principle can still apply to information it is routinely invoked only at a considerable cost.

The concept of exclusion also suggests further critical problems for legal analysis which are left untouched by conventional case analysis of *ad hoc* legal disputes. In the absence of a system of property rights to information, a

market economy will probably not produce the optimal output of information. There is no point in encouraging free-rider behaviour: X has no incentive to incur costs in producing something Y may then use at no cost to himself. Thus, if a society does wish to encourage innovation and the generation of an optimal information stock, one functional vehicle it might employ could be an extended system of "private" property rights. But if that approach is adopted, a dilemma is created. There should then not only be a concern about the stock of information, but also about what happens to it. Once a fee or cost of some kind is placed on the use of information to encourage creativity, as it is through the patent and copyright systems, two very real difficulties arise. First, there may be under-usage of information, since the optimal price for a public good is zero.[12] Second, denial of access to information in an information-based economy is clearly an affront to the most fundamental kind of rights: it is nothing less than a form of intellectual and economic subjugation. The potentiality of this situation has not gone unnoticed by third-world countries.

It is entirely possible that western legal systems have been much too concerned with the creation of a sufficient stock of information and too little concerned with usage and access. One explanation for such an imbalance has already been hinted at: Anglo-American law has a tradition of formal ordering through the ascription of extended property rights and it is more convenient to adapt existing rules and procedures than to think anew. A Marxist would doubtless advance a more sinister view: property rights are the underpinning of capitalism, and hence legalists will attempt to adapt new phenomena to the traditional market economies in which both they and their clients operate and profit. Another explanation might be that the extent of the imbalance has not yet been perceived.

It seems clear that sound policy in the field of information creation and dissemination should recognize the dilemma which has been described. The thrust of legal and economic ordering should be to acknowledge that it is better to have the information in the first place than not to have it at all. It has

[12] There has been real disagreement among economists concerning the optimal level of private investment in information production. See K. Arrow, "Economic Welfare and the Allocation of Resources for Invention", in *The Rate and Direction of Inventive Activity: Economic and Social Factors: Proceedings — Conference of the Universities* (1962), 607; Demsetz, *Information and Efficiency: Another Viewpoint* (1969) 12 J. of Law and Econ. 1; Marshall, *Private Incentives and Public Information* (1974) 64 (No. 3) Am. Econ. Rev. 373; Hirschleifer, *The Private and Social Value of Information and the Reward to Inventive Activity* (1971) 61 (No. 3, Pt 2) Am. Econ. Rev. 561. It seems to be widely accepted that a legal system which recognized no property rights in information would necessarily produce too little information. But some ecouomists have argued that a system of property rights may produce an *over* investment in information production. See, in particular, Hirschleifer, *supra*. See also Bishop, *Negligent Misrepresentation through Economists' Eyes* (1980) 96 L.Q.R. 360; A. Westin, *Information Technology in a Democracy* (1971); E. Mesthene, *Technological Change: Its Impact on Man and Society* (1970).

already been recognized in the areas of patent and copyright law that informational and innovational activity are useful to the innovator and creator and, in the long term, to the public. Further, disclosure and efficient usage of this stock of information should be encouraged. This policy is grounded partly in societal concerns: there is a very real danger that an information underclass will be created because of the over-zealous use of restrictive property theories. There are also sound economic reasons to support this policy: research and information generation is expensive; duplication of effort is wasteful; excessive secrecy promotes espionage, and serious diversion of effort occurs every day in industry to find out what competitors are doing.

It is a measure of the present failure of western legal systems that industrial innovators are increasingly avoiding the very systems set up to promote disclosure. Consensual agreements and trade-secret protection are now the paradigmatic way of dealing with information, research and development output.[13] Neither is the phenomenon of off-market innovation and information creation confined to the private sector. Kenneth Arrow long ago properly drew attention to government's role as a provider of information.[14] There is a kind of market failure where the private cost of producing information far outweighs any private advantage: a firm may not have the capacity nor a sufficient market share to capture all the benefits of information in the particular market. Thus there may be a need for legal reform to rectify that kind of market failure and to encourage the disclosure of the vast mass of information in government hands. The cheapest provider of information in the future may routinely be a source with access to government files.

II. The judicial and legislative response

Against these suggested concerns and strategies it may now be useful to examine the response of courts and legislators to the issue of property rights to information in some specific areas. Several important questions should be kept in mind when considering these disparate areas. When proprietary theory has been utilised in information related disputes, how have courts conceptualized the term "property"? Has the conceptualization been

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[13] See L. Harris, *Nurturing New Ideas: Legal Rights and Economic Roles* (1969); R. Miller, *Legal Aspects of Technology Utilization* (1974); Wall, *What the Competition is Doing: Your Need to Know* (1974) 52 (No. 6) Harv. Bus. Rev. 22. In Canada, see S. Soloway, *Public Access to Commercial Information in Government Files* (1980). Massive backlogs in the United States Patent & Trademark Office have been a contributing factor. There are approximately 200,000 patent applications awaiting final disposal in the United States Patent Office. Practitioners presently allow approximately two years for the processing of an application.

[14] *Supra,* note 12.

consistent from one area of dispute to another? Or has "property" been a variable construct functioning as a discrete response to discrete problems? What are the apparent effects of thus employing "property" analyses?

A. *Breach of Confidence and Trade-Secrets*

During the last two hundred years there has never been any doubt that Anglo-American jurisprudence would allow relief for the unauthorized disclosure of information imparted in confidence.[15] But the basis on which a court should or would interfere has been the subject of much debate. In many instances contract provides an adequate framework for analysis: the discloser is simply found to be in breach of an express or implied consensual obligation.[16] Or, there may be a breach of an express trust or fiduciary obligation.[17] The more interesting cases are those where the foregoing judicial vehicles are not available on the facts. A court is then forced to grapple squarely with the application of proprietary theory or proclaim a biblical decree that a man shall not reap where he has not sown.[18]

There has been a distinct difference in approach between the British Commonwealth jurisdictions and American jurisdictions on this conceptual issue. The majority of American courts have tended in recent years to espouse proprietary theory whereas Commonwealth courts have clearly opted in favour of an equitable obligation of good faith. In the former case, the obligation is directed to a conceptualized economic "good"; in the latter, the obligation is directed to the defendant in person.

There are at least two logical difficulties in categorizing confidential information or know-how as property. "First, circularity in reasoning is surely involved in the assertion that the term 'property right'... may be attached to what is no more than a result of the courts' consideration of the total issues at stake in the proceedings".[19] According to this argument, a property right in ideas or information has absolutely no meaning apart from the result it is desired to achieve. A property right in this sense is simply a

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[15] See Hammond, *The Origins of the Equitable Duty of Confidence* (1979) 8 Anglo-Am. L. Rev. 71; Cornish, *Protection of Confidential Information in English Law* (1975) 6 I.I.C. 43; Vaver, *Trade Secrets: A Commonwealth Perspective* (1979) 1 E.I.P.R. 301; P. Finn, *Fiduciary Obligations* (1977), 159; R. Milgrim, *Trade Secrets* (1978). The latest judicial attempt at a definitive classification is the judgment of Fullagar J. in *Deta Nominees Pty Ltd* v. *Viscount Plastic Products Pty Ltd* [1979] V.R. 167, 190 (Sup. Ct). Apparently, a Bill relating to the action for breach of confidence is in the course of preparation by the U.K. Parliamentary Council, based on *Working Paper No. 58, supra,* note 8.

[16] *Deta Nominees Pty Ltd,* v. *Viscount Plastic Products Pty Ltd, supra,* note 15.

[17] See Hammond, *Is Breach of Confidence Properly Analysed in Fiduciary Terms?* (1979) 25 McGill L.J. 244.

[18] See *International News Service* v. *Associated Press* 248 U.S. 215 (1918) [hereinafter *INS*].

[19] Hammond, *supra,* note 17, 247.

rationalization of a desired result: property is anything the court chooses to protect. It was presumably this realization which prompted Holmes to argue that "the word property as applied... to trade secrets is an unanalysed expression of certain secondary consequences of the primary fact that the law makes some rudimentary requirements of good faith."[20] Second, it seems highly unorthodox to describe as property that which "evaporates" when it reaches the public domain, or when third parties, whether independently or by reverse engineering, make the same discovery.

It may legitimately be asked whether the question of the "right" juristic basis for a cause of action in breach of confidence or for disclosure of trade secrets actually matters. Surely justice is done as long as the plaintiff can get at the unauthorized disclosure or use. And, it might be said, whether it is done by an attack on the subject matter or an attack on the person is not of much moment. The first and most obvious problem with this approach is that of remedies. Given the relatively open-ended nature of American judicial remedies, those questions have some force in the United States.[21] But the British Commonwealth jurisdictions have shown little inclination to move from a hierarchical remedial structure to a horizontal structure accommodating more eclectic remedies.[22] In those jurisdictions remedies are ranked on the basis of outmoded jurisdictional concerns, creating an illogical, artificial and inefficient hierarchy. Second, the manner in which the

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[20] *E.I. Du Pont De Nemours Powder Co.* v. *Masland* 244 U.S. 100, 102 (1917) [hereinafter *Masland*]. See also *Curry* v. *McCanless* 307 U.S. 357, 366 (1939) *per* Stone J.: "[Intangible property] rights are but relationships between persons... which the law recognizes by attaching to them certain sanctions enforceable in courts."

[21] In general, American law allows a litigant relatively free play with the various avenues of compensation, unjust enrichment or the traditional nominate equity remedies. The opening up of American remedies law into something closer to an cclectic system clearly antedates *Brown* v. *Board of Education* 347 U.S. 483 (1954), 349 U.S. 294 (1955), although there can be no real quarrel with the thesis of Professor O. Fiss that the "triumph" of *Brown* has been highly persuasive: *The Civil Rights Injunction* (1978). See also Schwartz, *The Case for Specific Performance* (1979) 89 Yale L.J. 271.

[22] The English bar has not really grasped the possibilities of the recent challenge in *United Scientific Holdings Ltd* v. *Burnley Borough Council* [1978] A.C. 904 by the House of Lords to the well known Ashburner aphorism that "the two streams of jurisdiction [law and equity], though they run in the same channel, run side by side and do not mingle their waters": W. Ashburner, *Principles of Equity,* 2d ed. (1933), 18. See also Baker, *The Future of Equity* (1977) 93 L.Q.R. 529 and Hammond, *Interlocutory Injunctions: Time for a New Model?* (1980) 30 U.T.L.J. 240, 276.

Several commentators have suggested that breach of confidence could be clarified by making a distinction between proprietary concepts based upon the secrecy of the content of the information — which it is said, should attract "real" remedies — and concepts based upon considerations of good faith in relationships between parties — which should attract "personal" remedies. See C. Tapper, *Computer Law* (1978), 31; Roberts, *Corporate Opportunity and Confidential Information: Birds of a Feather that Flock Together or Canaeros of a Different Colour?* (1977) 28 C.P.R. (2d) 68; *Nucor Corporation* v. *Tennessee Forging Steel Service Inc.* 476 F. 2d 386 (8th Cir. 1973).

courts articulate the basis of a right determines how it is treated and utilized by the commercial community. Commerce and the courts have a symbiotic relationship.

The chief result of property theory in this area in the United States has been to encourage the evasion of the deliberate equilibrium created by the statutory monopolies. This evasion has occurred notwithstanding the claim of the United States Supreme Court that trade-secret protection is "weaker" than patent protection,[23] and notwithstanding warnings by respected American judges that precisely this eventuality might attend the emergence of a dual system of protection.[24]

It is not easy to determine whether the other common law jurisdictions have also favoured a stock of information and shown less concern with usage. In theory, a system which espouses obligations based on "business ethics" rather than proprietary notions should not attract the same concern about "locking up" information.[25] Commonwealth courts have not engaged

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[23] *Kewanee Oil Co.* v. *Bicron Corp.* 416 U.S. 470 (1974): "weaker" because it gives no protection againts reverse engineering, does not operate against the world, and is subject to greater risk of interception.

[24] As long ago as 1929 Judge Learned Hand, in commenting on *INS, supra,* note 18, noted: "We are to suppose that the court meant to create a sort of common-law patent or copyright for reasons of justice. Either would flagrantly conflict with the scheme which congress has for more than a century devised to cover the subject-matter." *Cheney Bros* v. *Doris Silk Corp.* 35 F. 2d 279, 280 (2d Cir. 1929).

[25] There is a need for empirical research on this issue in the British Commonwealth. Canadian intellectual and industrial property laws have been under investigation for a decade with a view to a revision of the statute law, but none of the base studies consider trade secret protection or compare it with the statutory monopolies. There is some doubt about the legislative competence of the Canadian Parliament in the area of trade secrets, but the omission is none the less surprising. See Economic Council of Canada, *Report on Intellectual and Industrial Property* (1971); B. Hindley, *The Economic Theory of Patents, Copyrights and Registered Industrial Designs: Background Study of the Report on Intellectual and Industrial Property* (1971); O. Firestone, *Economic Implications of Patents* (1971).

It is difficult to draw comparisons between the United States and Japan on one hand and the British Commonwealth countries on the other. For the main part, the Commonwealth countries have been *purchasers,* as opposed to developers of technology. See, *e.g.,* Gilmour, *Industrialisation and Technological Backwardness: The Canadian Dilemma* (1978) Can. Public Policy 20; Globerman, *Canadian Science Policy and Technological Sovereignty* (1978) Can. Public Policy 34. This can give rise to an adverse economic situation in which a declining percentage of GNP is directed to research and development at the same time as the information related aspects of the economy grow. For instance, in Canada the percentage of GNP directed to research and development fell from 1.4 in 1967 to .9 in 1978 at the same time as the information components of the economy grew. W. Flight, President of Northern Telecom Ltd, Financial Post Conference (Ottawa), 1980. See also *supra,* note 4.

A further complication is that — adopting the analytical framework evolved by C. Freeman in his book, *The Economics of Industrial Innovation* (1974) — the Commonwealth jurisdictions have not produced "offensive firms", such as IBM, Texas

in dialectic concerning the merits of developing a dual system of protection incorporating statutory monopolies and judicially sanctioned trade-secret protection. But if it is assumed that free and unfettered trade is in general a good thing[26] and if the statutory monopolies are conceived as qualified exceptions to that principle, then it is surely necessary to ask whether Commonwealth courts are not in fact also carving out two islands of monopoly — statutory monopolies and judicially protected "secrets" — in a sea of free competition. Trade-secrets protected by common law rather than statute are potentially a monopoly of unlimited duration — something which is not permitted in the area of patents and copyright and which creates severe economic and remedial problems.

There are a number of cases which could be used to illustrate the divergent approaches of courts in this difficult area of the law.[27] One case which raises most of the real problems is *Foster* v. *Mountford and Rigby Ltd.*[28]

A group of aborigines applied for an interlocutory injunction to prohibit the publication within the Northern Territory of Australia of a book revealing their tribal, cultural and religious secret ceremonies. This book had been written by an anthropologist, Dr Charles Mountford, who made a foray by camel through the area inhabited by the nomadic Pitjantjara tribe in 1940. Dr Mountford was taken into the tribe's confidence. He was shown sacred sites and objects, paintings and rock engravings and he recorded myths and totemic geography by means of aboriginal drawings, camera and notebook. The book was printed thirty-five years later, when the original "disclosers" of the secrets were dead.

The court accepted that the information had been imparted in confidence. In the preface to his book,[28a] Dr Mountford had added a caveat, noting that "in areas where traditional aboriginal religion is significant, the

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Instruments, Xerox and Mitsubishi. The link between the growth of these kinds of firms and the particular intellectual and industrial laws of the various countries involved has not been sufficiently investigated.

[26] *White* v. *Mellin* [1895] A.C. 154.

[27] Compare *Sim* v. *Heinz Coy Ltd* (1959) 76 R.P.C. 75 (H.C. & C.A.) with *Metropolitain Opera Association* v. *Wagner-Nichols Recorder Corp.* 101 N.Y.S. 2d 483 (Sup. Ct 1950) (property in a voice ?); *Victoria Park Racing and Recreation Grounds Co.* v. *Taylor* (1937) 58 C.L.R. 479 (H.C. Aust.) with *Zacchini* v. *Scripps-Howard* 433 U.S. 562 (1977) (property in a spectacle ?); *Bernstein of Leigh (Baron)* v. *Skyviews & General Ltd* [1978] Q.B. 479, with *E.I. du Pont de Nemours & Co.* v. *Christopher* 431 F. 2d 1012 (5th Cir. 1970) (spying on private property from the sky); *Prince Albert* v. *Strange* (1849) 18 L.J. Ch. 120 and *Pollard* v. *Photographic Co.* (1889) 40 Ch. D. 345 witb *Pavesich v. New England Life Insurance Co.* 50 S.E. 68 (Ga. 1905) (use of photographs and engravings without consent). See also the several judgments in *INS, supra,* note 18.

[28] (1976) 14 Aust. L.R. 71 (S.C. North Ter.). See also *Attorney-General* v. *Jonathan Cape Ltd* [1976] Q.B. 752.

[28a] C. Mountford, *Nomads of the Australian Desert* (1976).

book should be used only after consultation with local male religious leaders". The plaintiffs asserted that "the revelation of the secrets to their women, children and uninitiated men [might] undermine the social and religious stability of their hard-pressed community".[28b]

As a matter of fundamental legal theory, how might a claim mounted on such facts be sustained? Perhaps the most extensive claim could be founded on an asserted invasion of "privacy", presumably treating that term as a cultural norm. But the extent to which that kind of claim might be recognized presently varies from jurisdiction to jurisdiction;[29] a privacy theory does not fit easily with the facts of an information-based society. Most personal information is released during a voluntary economic transaction. Giving information is the *sine qua non* for acquiring almost anything today. Individuals "produce" information at no cost to the recipient and receive in return no protection for the "privacy" they forgo; indeed, the recipient usually benefits through improved data bases which he or she then utilizes for profit. In a good number of situations, privacy theory simply will not assist the courts. The individual will be faced with an assertion that information voluntarily created and exchanged has become the property of some other person or institution, unless social imperatives eventually give rise to legislation overriding such practices.

A more plausible argument might be that there was an "understanding" with Dr Mountford that the information would be revealed to him on the basis that it not be published. Consideration, perhaps in the form of the agreement itself, but more likely in the form of trinkets, may have passed. Hence it might be possible to argue on the basis of consensual theory or alternatively, on the basis of an "understanding" of a kind which equity would protect, *i.e.*, an obligation to act in good faith.[30] Or, it might be said that the tribesmen were in possession of something of scientific and anthropological value, possibly even commercial value which they had unsuccessfully attempted to keep to themselves and that the defendant had gained it by a trick. Such an assertion, if true, would pose little difficulty for a judge with equity jurisdiction.[31]

[28b] *Supra*, note 28, 73.

[29] See, generally, Wacks, *The Poverty of Privacy* (1980) 96 L.Q.R. 73. Canadian courts have come very close to allowing what some might regard as protection of privacy in *Krouse* v. *Chrysler Canada Ltd* (1973) 1 O.R. (2d) 225 (C.A.); *Athans* v. *Canadian Adventure Camps Ltd* (1977) 7 O.R. (2d) 425 (H.C.) and *Racine* v. *C.J.R.C.-Radio Capitale* (1977) 17 O.R. (2d) 370 (Cty Ct). Each of these cases came within the category of privacy cases which Prosser designated as "appropriation" of the plaintiff's name or likeness for commercial purposes. Prosser, *Privacy* (1960) 48 Calif. L. Rev. 383, 403.

[30] *Seager* v. *Copydex Ltd* [1967] 1 W.L.R. 923.

[31] See generally, Jones, *Restitution of Benefits Obtained in Breach of Another's Confidence* (1970) 86 L.Q.R. 463.

The one element common to all of these claims is the assertion of exclusivity in respect of that which passed to Dr Mountford. If that assertion is adopted as a starting point, then it clarifies the dispute to some degree. For instance, it then becomes clear that an attempt is being made to attach exclusivity to something in a way which the law may or may not be prepared to countenance, *i.e.*, scientifically useful information. Social imperatives might impel a decision that no such exclusivity be permitted, or that it be permitted only on a sharply delineated basis.[32]

B. *Fiduciary duties and appropriation of business opportunities*

Anglo-American jurisprudence requires that persons in particular situations of "high trust" are to be classified as fiduciaries. The circumstances under which fiduciary duties arise, and the questions — to whom is he a fiduciary? what obligations does he owe? what are the consequences of a deviation from the fiduciary standard? — have aroused a great deal of juristic comment, which will not be explored in detail here.[33] It is worth noting, however, that English Chancery judges have had much less difficulty in dealing with these issues than their North American counterparts. The question to be asked is whether the latter have tended to pull the roof in over their own heads by mixing quite straightforward equity concepts with proprietary approaches.[34] Thus, if a company director benefits personally

[32] My colleague at Dalhousie Law School, Professor Alastair Bissett-Johnson, perceptively noted that *Foster* v. *Mountford & Rigby Ltd* involved an interlocutory applieation restricted in scope to the largely uninhabited Northern Territory of Australia. Assume that an application is made on an Australia-wide footing for a permanent injunction. Would such an application succeed? Should it? See *William Wilkins Co.* v. *United States* 487 F. 2d 1345 (Ct Cl. 1973).

[33] The volume of literature is such that it could be suggested, not entirely facetiously, that an article on this topic is a prerequisite for academic advancement. See, in general, Jones, *Unjust Enrichment and the Fiduciary's Duty of Loyalty* (1968) 84 L.Q.R. 472; Weinrib, *The Fiduciary Obligation* (1975) 25 U.T.L.J. 1; Prentice, *The Corporate Opportunity Doctrine* (1974) 37 M.L.R. 464; Beck, *The Saga of Peso Silver Mines :Corporate Opportunity Reconsidered* (1971) 49 Can. Bar Rev. 80; Shepherd, *Towards a Unified Concept of Fiduciary Relationships* (1981) 97 L.Q.R. 51; Loss, *The Fiduciary Concept as Applied to Trading by Corporate "Insiders" in the United States* (1970) 33 M.L.R. 34; Brudney & Clark, *A New Look at Corporate Opportunities* (1981) 94 Harv. L. Rev. 998 and Hammond, *supra,* note 17.

[34] Compare the following eases. Canada : *Canadian Aero Services Ltd* v. *O'Malley* [1974] S.C.R. 592; *Peso Silver Mines Ltd* v. *Cropper* [1966] S.C.R. 673; *Abbey Glenn Property Corp.* v. *Stumborg* (1978) 9 A.R. 234 (S.C. App. Div.), motion for leave to appeal to S.C.C. refused 29 June 1978, 11 A.R. 270; *Hawrelak* v. *The City of Edmonton* [1976] 1 S.C.R. 387. The United Kingdom : *Regal (Hastings) Ltd* v. *Gulliver* [1967] 2 A.C. 134 (H.L.), [1942] 1 All E.R. 378; *Boardman* v. *Phipps* [1967] 2 A.C. 46 (H.L.). *Industrial Development Consultants Ltd* v. *Cooley* [1972] 1 W.L.R. 443 (Assizes). The United States : *Robinson* v. *Brier* 194 A. 2d 204 (Pa. 1963); *Franco* v. *J.D. Streett & Co.* 360 S.W. 2d 597 (Mo. 1962); *Gaynor* v. *Buckley* 203 F. Supp. 620 (D. D.Or.); *Irving Trust Co.* v. *Deutsch* 73 F. 2d 121 (2d Cir. 1934).

from a business opportunity which comes to his knowledge while he is a director of the company, the issue in English and Australasian[35] courts is a relatively simple one: was he, at the relevant time, standing in a fiduciary relationship to the company? If so, a rigorous "no conflict" rule applies and the only question left is that of the appropriate remedy. In short, the battle is largely won or lost on the issue of whether the defendant stood in a fiduciary relationship to the plaintiff.

American and Canadian courts, in corporate opportunity cases, have embarked on an excursion into the analogue of a conversion action, except that the excursion is clothed in the rhetoric of equity. Starting with an affirmation of the fiduciary status of the defendant, and paying lip service to the rigour of the incidents which attend that classification, North American courts have often suggested that the prospective business opportunity which was taken "belongs" to the plaintiff. The opportunity so appropriated is treated as a conceptualized economic good: either it is property or it is something which could reasonably have been expected to ripen into a property interest.[36] Having thus apprehended the matter, and the lid of Pandora's box having been opened, these jurisdictions have then inevitably been tempted to hear submissions in mitigation since taking some things is apparently more reprehensible than taking others! Thus the fiduciary standard is subverted and a variable standard of liability is introduced.

This approach may mask some ambivalence concerning the appropriateness of the fiduciary standard in the contemporary corporate world. The "property" approach may also be related to the problem of remedies: the practice of treating what was "taken" as "property" rather than categorizing it as reprehensible behaviour is used to justify attaching a constructive trust to the subject matter of the opportunity[37] rather than leaving the plaintiff to a personal remedy.

All of this has an air of unreality about it. Some courts have said that the defendant's actions amounted to a breach of a relational duty; on similar facts, others will assert that a proprietary right has been infringed. It is apparent that the famous Holmes *dictum* in *Masland*[38] would also bear

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[35] *Coleman* v. *Myers* [1977] 2 N.Z.L.R. 225 (C.A.) and *Winthrop Investments Ltd* v. *Winns Ltd* [1975] 2 N.S.W.L.R. 666 (C.A.).

[36] See the cases cited *supra,* note 34. English courts have occasionally adopted this approach. See, *e.g., Bell Houses Ltd* v. *City Wall Properties Ltd* [1966] 2 Q.B. 656 (C.A.), where the chairman of the board's knowledge, acquired in the course of administering the company, was held to be a company asset. In *Boardman* v. *Phipps, supra,* note 34, members of the House of Lords held different opinions on whether information should be regarded as property in the eyes of equity. See, in particular, Lord Hodson's judgment at p. 107 and Lord Upjohn's judgment at p. 127.

[37] See *J. R. Canion* v. *Texas Cycle Supply, Inc.* 537 S.W. 2d 510 (Tex. Civ. App. 1976).

[38] *Supra,* note 20, 102. Mr Justice Holmes said: "Whether the plaintiffs have any valuable secret or not the defendant knows the facts, whatever they are, through a special confidence

repetition in this area of the law. While it may be true, as a distinguished English legal historian has suggested, that "equity has proved that from the materials of obligation you can counterfeit the phenomena of property",[39] the converse argument is also sustainable. Property theory had proved that from its incidents you can fashion all the obligations of equity. Or, more likely, in this area of the law neither proposition is totally accurate, for what is being applied stands in terms of the "explanation" of property herein before proffered.[40] Equity and property have merged.[41]

C. *Freedom of information legislation*

Democratic theory posits a "right to know" about the workings of government, presumably as part of a wider concern with the accountability of elected representatives. It is one thing to hold that value ; it is another to find an adequate legal concept to accommodate the concerns which need to be addressed. Legislation of this kind in fact raises acute "property" issues.[42] If it is asserted that the government is the greatest repository of information and that all citizens have in general a right of access to this information, it amounts to saying that the information is public property. This in turn might afford a basis for standing to sue. It might also afford a basis for the exemptions which would necessarily have to be created. For example, it is routine in the course of licencing and trade applications for private firms to disclose relevant trade and financial data to a particular government department. The empowering statute, or regulations made thereunder, typically require such disclosure. Will the information thus disclosed become public property? Clearly it should not, and freedom of information legislation usually recognizes that competitors are not entitled to gain access

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that he accepted. The property may be denied but the confidence cannot be. Therefore the starting point for the present matter is not property or due process of law, but that the defendant stood in confidential relations with the plaintiffs."

[39] S. Milsom, *Historical Foundations of the Common Law,* 2d ed. (1980), 6.

[40] See *supra,* II. Problems in the ascription of property rights to information.

[41] Compare the differences of opinion which have emerged in recent years in the British Commonwealth over "mere equities". See, *e.g.,* Wallace & Grbich, *A Judge's Guide to Legal Change in Property : Mere Equities Critically Examined* (1979) 3 U.N.S.W.L.J. 175.

[42] See Freedom of Information Act of 1967, 5 U.S.C. § 552 (1976). *An Act to enact the Access to Information Act and the Privacy Act, to amend the Federal Court Act and the Canada Evidence Act, and to amend certain other Acts in consequence thereof,* Bill C-43 (1980) 1st Sess., 32d Parl. received its first reading in the House of Commons on 17 July 1980. The essential scheme of the Canadian Act (Schedule 1) will permit citizens and permanent residents (s. 4) to obtain recorded information under the control of a government institution (s. 6) after payment of a fee (s. 11). If a department refuses to comply, a complainant can carry the matter to an Information Commissioner (s. 31). The proposed *Act* contains broad exemptions against disclosure of information which could injure national security and safety (see ss. 13-8) or which will disclose personal information (s. 19) as defined in Schedule II. For a discussion of the proposed Canadian and the existing U.S. legislation, see J. McCamus, *Freedom of Information, Canadian Perspectives* (1981).

to this information and hence destroy the applicant's competitive edge. Without this ability to retain some degree of exclusivity, commerce would face a disincentive to do business with the government.

Yet whatever the benefits, in terms of political theory, there are in treating information in government hands as public property, new kinds of problems will arise. A good deal of the information will have economic value. Thus governments enacting this type of legislation will likely face two types of property claims : first, claims emanating from those who want access to the information for private gain, and second, claims from those persons who oppose the release of information because it would constitute competition to the private sector. Faced with those kinds of claims, tribunals exercising delegated authority can either make a series of *ad hoc* decisions which might or might not eventually create a coherent response, or evolve at the outset a policy which has some integrity.[43] In this area it is impossible to evolve legal responses to such claims except in terms of a theory of "relational equity".

D. *Criminal law and information related offences*

From the standpoint of economics, crimes against "property" might be viewed as straightforward "transfers" or rearrangements of purchasing power that do not directly consume any resources. A conventional lawful transfer involves a small administrative cost relative to the total value of the transfer, while in the case of a criminal transfer the size of the transfer is a crude measure of the total amount of resources used to achieve criminal revenues. Thus "the function of the criminal law, viewed from an economic standpoint, is to impose additional costs on unlawful conduct where the

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[43] In the United States, these kinds of difficulties have already caused acute concern. See *Chrysler Corporation* v. *Brown* 441 U.S. 281 (1979) and, Connelly, *Secrets and Smokescreens : A Legal and Economic Analysis of Government Disclosures of Business Data* (1981) Wis. L. Rev. 207.

The U.S. Freedom of Information Act of 1967, 5 U.S.C. § 552 (1976), has been severely criticized because it has been used as an instrument of industrial espionage rather than as a means of opening government operations to public scrutiny. See *Hearings on H.R. 11192 before the Subcom., on Science, Research and Technology,* 95th Cong., 2d Sess. 73 (1975) (Statement of Arthur R. Whale).

McGarity and Shapiro point out that "private regulatees... have suceessfully forestalled most efforts by agencies and interested citizens to disclose their contents by claiming that health and safety data are statutorily protected 'trade secrets'", in *The Trade Secret Status of Health and Safety Testing Information : Reforming Agency Disclosure Policies* (1980) 93 Harv. L. Rev. 837, 837-8. See also Steinbach, Note, *A Procedural Framework for the Disclosure of Business Records Under the Freedom of Information Act* (1980) 90 Yale L.J. 400; Smith, Note, *The Fiduciary Duty of Former Government Employees* (1980) 90 Yale L.J. 189 (discussing the U.S. Ethics in Government Act of 1978, 18 U.S.C. § 207 (Supp. III 1979)).

conventional damages remedy alone would be insufficient to limit that conduct to the efficient level".[44]

The pervasiveness of information related problems has extended beyond civil law in the areas of private and public law: more criminal sanctions against appropriation of information are being enacted.[45] The results have been paradoxical. First, the thesis that property is necessarily associated with "things" has been substantially weakened. Second, the notion that information can and will be legally protected has received the *imprimatur* of the criminal law and this seems to have reinforced, at least in the United States, the notion that trade secrets are proprietary in character. It may be demonstrable that the civil law protection of information based on ethical principles declined as the criminal law began to address more directly the idea of information as property for the purposes of that body of law.[46]

The three most serious problems which have arisen have concerned:

(a) the redefinition of theft,
(b) the problem of information stored in an electronic impulse, and
(c) theft of services.

The common law definition of theft, *i.e.*, the permanent deprivation of a tangible object, has proved hopelessly inadequate. Most American jurisdictions began undertaking amendments either to criminal codes or enacting specific criminal trade-secret provisions from 1964 onwards.[47] In the United Kingdom, under *The Theft Act*, 1968, "'Property' [now] includes money and all other property real or personal, including things in action *and other intangible property*".[48] On the second limb of the offence —

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[44] R. Posner, *Economic Analysis of Law*, 2d ed. (1977), 163. See also Becker, *Crime and Punishment: An Economic Approach* (1968) 76 J. Pol. Econ. 169.

[45] See C. Tapper, *Computer Law* (1978), in particular, chap. 4, "Computer Crime"; R. Bigelow & S. Nycum, *Your Computer and the Law* (1975); and Vandevoort, *Trade Secrets: Protecting a Very Special "Property"* (1970-71) 26 Bus. Law. 681.

[46] Fetterley advances a different thesis, *i.e.*, that criminal trade secret laws are generally used by the world leader in technology to preserve its lead over the rest of the world. *Historical Perspectives on Criminal Laws Relating to the Theft of Trade Secrets* (1970) 25 Bus. Law. 1535, 1538.

[47] Tapper, *supra*, note 45.

[48] *Theft Act*, 1968, c. 60, s. 4 (1) (U.K.) [emphasis added]. The *Act* was preceded by a report of the Criminal Law Revision Committee: *Theft and Related Offences*, Cmnd 2977, (1966). In the debate in the House of Lords, Lord Wilberforce suggested "business secrets" fell within the scope of the definition. House of Lords Debates, Vol. 259, col. 1309. But in *Oxford* v. *Moss* [1979] Crim. Law Rev. 119 (Q.B.) it was held that the "acquiring" of an examination paper by a student and the "information" contained therein did not come within s. 4. The commentary to the case report states, "[t]here is no difference in principle between trade secrets and the examination questions and the decision may be taken to settle that trade secrets cannot be stolen", *ibid.*, 120. See also, Tettenborn, *Stealing Information* (1979) 129 New Law J. 967; Zegas, *Personal Letters: A Dilemma for Copyright and Privacy Law* (1980) 33 Rutgers L. Rev. 134; Hammond, *supra*, note 15.

permanent deprivation — the United Kingdom statute attempted to address the problem[49] but the particular section still seems to be addressed to a tangible object.

With regard to the second problem concerning information stored in electronic impulses which exist for only a moment in time, there seems no reason in principle why improper interception of or interference with such an impulse could not be subjected to criminal sanctions. However, few jurisdictions have yet made the necessary legislative adjustments.

Theft of services was not recognized by the common law until recently. The American *Model Penal Code* does contain provisions aimed at this area,[50] and the major American industrial states have adopted these provisions.

It seems that a decision will soon have to be made by the commonwealth jurisdictions on how to handle offences of dishonesty or misuse in relation to information.[51] Given that economies will increasingly become information-based, those proscriptions are likely to reinforce the expansion of the concept of property.

In *Scallen* v. *The Queen* (1974) 15 C.C.C. (2d) 441 (B.C.C.A.), it was held that the definition of theft in s. 283 (1) (a) of the *Criminal Code* R.S.C. 1970, c. 34 was broad enough to include intangibles. In particular, see the opinion of Bull J.A. at pp. 471-4. The Supreme Court of Canada held in *R.* v. *McLaughlin* (1980) 113 D.L.R. (3d) 386 that the improper appropriation of computer programmes did not amount to theft. However, the Court's opinion was based on the narrow, technical ground that the improper use did not involve use of a "telecommunication facility" as required by s. 287 (1) (b) of the *Code.*

[49] *Theft Act,* 1981, c. 60, s. 6(1).

[50] American Law Institute, *Model Penal Code,* § 223.7.

[51] The extent of the problem in Canada is still a matter for speculation. It has been suggested that the "average theft runs from $450 — 600,000 all the way up to $1.5 million". See Robinson, *Law Outdistanced by Technology,* The Financial Post, 30 May 1981, 24, col. 3. The same article quotes John Carroll, Professor of Computer Science at the University of Western Ontario as suggesting that "1,065-1773 (detected) illegal actions against computers... will occur in 1981, with the higher end of the range the stronger probability." Illegal actions are in this case defined to include the theft of service time, hardware or software. Another "seven to ten" times that number of crimes are said to go unreported.

A private member's Bill containing an expanded version of the definition of property "so that computers and their integral elements such as magnetic tapes, programs, and data are included in the offences against property" has been introduced into the House of Commons. See *An Act to Amend the Criminal Code,* Bill C-628, (1980-81) Ist Sess. 32d Parl. (1st reading). Like most private members' Bills, its fate is uncertain.

Quite apart from the availability of a suitable offence, there are pragmatic difficulties involved in criminal proscription in this area of the law : difficulties of proof, embarrassment on the part of the complainant in admitting that a security operation has been breached, and the risk of disclosure in open court of vital corporate information. These kinds of problems have exacerbated the movement into contractual and trade secret protection.

Conclusions

"Too large a generalisation leads to mere barreness. It is the large generalization, limited by a happy particularity, which is the fruitful conception."[52] Given the importance of the question in contemporary high-technology societies, it is important that some attempt be made at accurate generalization with respect to the questions : is information "property" for some or all legal purposes ? Should it be ? What kind of property is it ? Yet there are apparently intractable obstacles which inhibit adequate responses by the courts. Judges use loose terminology, there are diversities of jurisdiction, and the economic facts vary widely from case to case.

A rational conceptual structure seems far distant at this time. It would conceivably be possible to take solace in "justice". The judiciary somehow manages to solve individual cases, usually by shrewdly applied appraisals of the real intent of parties and legislatures, a good deal of common sense and a straightforward arrogation of the privilege and duty of doing justice regardless of technicalities and the duplicity of words. But if the essence of justice consists in getting to the merits of an individual case, the essence of law consists in even-handedness, and without a rational structure that larger end may remain distant. The ultimate task of compromising justice and law is then subverted.

This preliminary survey suggests that the level of intellectual abstraction employed by the courts is of a low order. The cases do not yield any insights of real significance for policy-makers or theorists, but solve particular disputes in relatively crude terms.

Nevertheless, this article might suggest at least tentative conclusions and some avenues for further investigation above the level of individual law suits. Some of these observations are necessarily, in the absence of further detailed field studies, at the level of "heroic generalizations".

(1) It is trite learning that the conception of property has not been a static one in western legal and economic systems. Agrarian economies, in which the prevailing low level of economic activity was consistent with and actively fostered a notion of absolute property rights, have come and gone.[53] The industrial age adopted an instrumental view of property : it sanctioned and abetted the gods of productive use and development. Hence, exclusive property rights overtook absolutist notions, as a reward for perceived "good" economic behaviour. The result was not the exhaustion or

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[52] A.N. Whitehead, *Science and the Modern World* (1925), 46.

[53] See Horwitz, *The Transformation in the Conception of Property in American Law, 1780-1860* (1972-73) 40 U. Chi. L. Rev. 248 ; J. Hurst, *Law and Social Order in the United States* (1977), in particular chap. III, "Science, Technology and Public Policy" ; R. Tawney, *The Acquisitive Society* (1920) ; Danzig, *Hadley v. Baxendale : A Study in the Industrialization of the Law* (1975) 4 J. Leg. Studies 249.

replacement of the prior learning, but rather the creation of a coarse, layering effect.

(2) The analytical construct of a post-industrial state is not yet anywhere a physical reality, although first-world countries are increasingly seeking to attain that status. The value of the construct is that it raises a perspective against which the adequacy of present day legal and economic thinking can be tested.

(3) It is not yet apparent what the prevailing conception of property rights will be in a post-industrial state and what effect that will have on the layering process which has heretofore accompanied the development of western legal systems. But this much at least is clear: the law is presently hung-over and economic theory is hung-up. The law still overtly encourages development and exclusivity in the growth of information. At the same time it exhibits much less concern for access to, and usage of, that information. At the domestic, corporate, national and international level the law abets retention of information.[54] Economic theory seems uncertain how to respond to the construct of an information-based economy because it challenges traditional free-market analysis.

(4) The employment of proprietary theory with respect to information could have adverse consequences for society. For example:

(a) It may result in a "locking up" of information for private advantage. Even in pure economic terms this must be counterproductive since information begets information.

(b) A less than appropriate concern for the moral dimensions of the law may be engendered. Ideas are the common heritage of mankind.[55] Reliance on the market, which necessarily posits the existence of exclusionary rights to information, to produce adequate social accommodations to new knowledge is terribly hazardous when so many of the proposed uses of such knowledge may destroy basic human values, *i.e.,* privacy, human dignity and the physical quality of human life as affected by the new genetics, and democratic values as they are subverted by an increasingly technocratic bureaucracy.

(c) At a more abstract level, such an approach can involve a return to an attitude obsessed with creating "things" around which "rules" can be hung.

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[54] The degree to which the law encourages the retention of information varies. Trade secrets are very strictly protected. Yet the *Patent Act* R.S.C. 1970, c. P-4, ss. 67-8 and the *Copyright Act* R.S.C. 1970, c. C-30, s. 14 provide for compulsory licencing when the 'property' is not utilized. Patents are often supported by know-how agreements. Unless the expertise can be obtained, access to the patent is commercially useless.

[55] "[T]he female law student may have had a healthier reaction to insider trading than her professor when she stamped her foot and declaimed, 'I don't care; it's just not right'". Loss, *supra,* note 33, 37.

It must be asked whether such a regression is useful and consistent with the prevailing relational concept of property which has evolved in response to present day concerns with respect to the environment, resources and land use planning. Is such reasoning consistent with the tendency — already apparent in the common law jurisdictions — to separate social function from property? Private property is increasingly tending to lose, or is being stripped of, its social purpose, *i.e.,* protection of labour in the Lockean sense, or reward for risk, in favour of function alone. The inexorable logic of such a thesis is that property loses its moral claim to reward.

(5) The most obvious advantages of applying exclusionary property theories to information are that:

(a) From a legal perspective, it brings into play an available body of doctrine. This "advantage" must be qualified: the existing body of doctrine may or may not yield or be capable of yielding results which are considered appropriate.

(b) It enables the commercial handling of information. For instance, licencing of know-how is not possible unless there is some "thing" to be licenced.

(6) These considerations should evoke some caution before traditional proprietary concepts are blandly applied to information ordering or information related disputes. It may be that in this area lawyers and economists will not be capable of successfully passing off old wine in new jugs. The problems of addressing the real needs of the polity in an information-sodden world may require new ways of thinking. In the quantum movement to a post-industrial world, the distance that both lawyers and economists have to travel in their thinking may be analogous to the shift from Newtonian physics to quantum physics. In that strange sub-atomic half world of psychoenergetic systems, physical things are "not a structure built out of independently existing unanalyzable entities, but rather a web of relationships between elements whose meanings arise wholly from their relationships to the whole".[56]

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[56] See also Stapp, *S. Matrix Interpretation of Quantum Theory* (1971) Physical Rev. D3, 1303, 1308; Einstein, *On Physical Reality* (1936) Franklin Institute J. 349; N. Bohr, *Atomic Theory and Human Knowledge* (1958); W. Heisenberg, *Physics and Philosophy: The Revolution in Modern Science* (1958).

The common notion that the law evolves slowly and painfully is not always an accurate one. In legal history it is possible to find periods of sharp, almost quantum leaps forward. In the mid-eighteenth century, for example, a series of cases concerned with the protection of literary property held that property rights were not natural rights or absolute in character. Professor P. Atiyah has recently noted that at that time "property suffered its first major defeat." See Atiyah, *The Rise and Fall of Freedom of Contract* (1979), 107-9. See also B. Kaplan, *An Unhurried View of Copyright* (1967), in particular, chap. I "The First Three Hundred and Fifty Years".

(7) A starting point for a quantum shift in perspective with respect to information would involve the realisation that information is not necessarily a private good.

In traditional North American market-oriented thinking, which has been utterly dominated by transactions between private producers and consumers, information is viewed by economists and jurists as a *commodity.* Such a perspective creates the possibilities of information handling as an industry in its own right, and the sort of infrastructure posited by Porat,[56a] and urged by Thompson in Canada.[57] But if information is instead conceived of as a *resource,* then its characteristic as a collective good would lead to quite different approaches with respect to the production and distribution of information in society.

A legal system would then have to address questions such as — how should this resource be allocated in order to respond to social requirements and individual needs? Who controls and retains power over this resource? Which policies, structures and rules are the most adequate in this perspective?

Choices will have to be made between these two alternative perspectives. Or, perhaps the issue could be more accurately seen as being — in what circumstances should the emphasis be on one or the other.[58] If the election is in favour of the collective good approach then it will be necessary to explore more fully whether co-operative legal and economic strategies could realistically be adopted to encourage both creativity and dissemination of useful information. Reference has already been made in this connection to the failure of commentators to generate any real dialectic in the Commonwealth concerning the comparative merits and demerits of the various statutory monopolies versus trade-secret protection in adjusting the trade-off between incentives to create and incentives to use new information.

[56a] Porat, *supra,* note 2.

[57] Thompson, *supra,* note 2. Thompson is concerned with the apparent disparity between the potentiality of an information society and its realization. He argues that the intensive "first order" impact of innovation is operating smoothly, but extensive "transformative interactions" are not. The reason is that "there seem to be fundamental demand constraints based on our centuries old experience in the trade of goods and our dedication to the application of industrial technology", *ibid.,* viii. He correctly notes the economic difficulties in classifying information as a public or private good, but then argues strongly for the creation of private good "information markets".

Thompson is probably correct in asserting that some, as yet imperfectly understood, constraints are at work. This article has raised the possibility that the institution of private property itself may be the critical constraint. And Thompson seems to give quite insufficient consideration to the probability that "in the final analysis, while companies may occasionally publish data as a contribution to scientific knowledge, much data will be kept secret out of economic self-interest". See McGarity & Shapiro, *supra,* note 43, 848.

[58] See E. Ploman & L. Hamilton, *Copyright: Intellectual Property in the Information Age* (1980), 213 *et seq.*

There is no published material in Canada which compares each of those avenues with the third possibility of direct government financing. This is surprising since the cost of serving additional users is negligible in the cases of some of the information which falls within the ambit of one of the statutory monopolies, so that a high price which discourages use is socially undesirable.[59] However, a very low price is likely to be incompatible with recovery of initial investment outlays for its development. When this is a significant consideration[60] then neither copyright nor trade-secret protection will be in the public interest, for both operate *via* the extraction of prices high enough to bring a return that will attract private investment. In that kind of case, if the investment in the product is worthwhile to society but compensatory pricing is not, then the only other present alternative is government financing. Even if another method of making such an investment financially attractive to private industry were to be conceived, it would, by definition, be no more satisfactory than the use of copyright or reliance on trade-secret protection.

Thus, in the marketing of individual goods a competitive strategy still makes some sense. But this article has stressed that information by its very nature is a collective good. Designing a strategy for the optimal social investment in knowledge may therefore need to be "co-operative" and a thorough discussion of both government financing and any other alternatives in Canada is a pressing priority. This should involve critical analyses of how societal units other than the private market can more effectively produce and disseminate knowledge — either in tandem with the private sector, or on their own account — and how to "price" that information and knowledge for users. Admittedly this task is predominantly one for economic theorists — but lawyers have an important role to play since ultimately a balance has to be struck in law between private advantage and public gain.[61]

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[59] See Beier, *The Significance of the Patent System for Technical, Economic & Social Progress* (1980) 11 I.I.C. 563.

[60] On this point see Baumol & Ordover, *On the Optimality of Public-Goods Pricing with Exclusion Devices,* (1977) 30 Kyklos (Fasc. 1) 5-21.

[61] Since this article was written, further studies have come to hand. (1980) 9 J. of Legal Studies, is devoted to the proceedings of a conference entitled "The Law and Economics of Privacy". See, in particular, Kitch, *The Law and Economics of Rights in Valuable Information,* 683, the Comment thereon by Carlton, 725, and Gould, *Privacy and the Economics of Information,* 827. See also R. Posner, *The Economics of Justice* (1980), 232; W. Cornish, *Intellectual Property: Patents, Copyright Trademarks and Allied Rights* (1981); Brooks, *Social and Technical Inventions: Challenges to Legal and Political Institutions* (1981) 22 IDEA: The Journal of Law and Technology 138. In the area of breach of confidence, see *Talbot* v. *General Television Corporation Pty Ltd* [1981] R.P.C. 1 (S.C. Vict.).