"Electronic Shock": The Impact of Computer Technology on the Practice of Law

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Recommended Citation

Notes and Comments

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I. *Introduction*

This article was written on a computer by a practitioner of law of thirty years' standing. In all that time I have rarely used a typewriter, and then only in an emergency during the dark reaches of a late night. What has changed? Why not dictate this? Wouldn't a secretary do it faster? . . . and better? The answers are: a home computer now sits on the desk in my study; for me, it's much easier and surer to edit text I can see; and, even with a good secretary, it is easier and faster to review and edit when I am looking directly at my text as I type it. In addition, my secretary's time can probably be put to better use than curing my editorial inadequacies.

Then why not write this article by hand? For many of us that is far more labourious than typing, and the product, after we edit and re-edit it with numerous unreadable insertions, will be difficult for a secretary to type accurately. It will need further editing, and cannot then be automatically retyped at home, as this can. However, when I am finished here, this article can be printed in less than five minutes without the further intervention of a human hand.

Not only because it is new, convenient, and flexible, the computer represents a revolution in the way we are all going to practice law. It may well represent a change as fundamental as that brought about by the Gutenberg press. If we ignore its potential and its challenges, we will do so at our own expense. No one would argue that Gutenberg did not represent a quantum jump in the presentation, distribution, and expansion of human knowledge. The computer and its electronic associates will do the same.

The result of these innovations is the ability to find virtually any desired quantity of information; sift through it; transfer it from and to any given point, over long distances and without appreciable delay; record it; manipulate it; and rapidly produce a legible record

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of it. In short, our ability to obtain and transfer information at will has become almost unlimited: we have entered an "information revolution".

The effects of this revolution were discussed by Anthony Smith in *Goodbye Gutenberg,* as follows:

> It is hard to visualize the impact of such a change on society; it lies not so much in physical objects as in attitudes and relationships and in the distribution of power. In any case, it remains at present a series of possibilities rather than realities, and a vast area of choice is open to societies: to use the opportunities to reduce centralization, say, or to increase it; to continue to press for economic growth or to stabilize; to increase disparities between developed and non-developed societies or to close them.
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> In some senses the information revolution of the computer age offers a reduction in the regimentation of mass society, in the perception of the public as a mass. Some freedoms that were lost in the age of industrialization and mass production may be regained in the next.[1]

Like all revolutions, the qualities of this one will be determined by our ability to appreciate its implications and by the motives we bring to its use. This article will examine some of those implications and motives in relation to the practice of law and the economic context in which we practice.

II. *The Technological Changes*

Since the invention of the printing press, we have experienced a variety of mechanical and electrical improvements in the way we handle information, many of which have had an impact on our work. The list includes the typewriter, the telephone, the telex, and dictating and copying machines. Some of these have reached a high degree of sophistication and speed, but none of them has contained the potential of combining all of their capabilities into one machine. That one machine will one day bring the largest library to the door of our offices or studies. It will help us find, within a very short time, all the material in that library on the subject we want.

In its later stages, the old technology was based on improved mechanisms and on the flexibility and speed of electricity. Computer technology is based on electronics, aided by the silicon

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1. Anthony Smith, *Goodbye Gutenberg* (New York: Oxford University Press, 1980) p. 20.

chip and the laser. Although few lawyers make much personal use of them, the chip and the laser have already made available to us a wide variety of remarkable devices; none of them, not even the chip and the laser, existed in a commercially viable form twenty years ago. A short list of these devices, together with their most significant qualities and capabilities, follows: (i) the computer, with its add-ons — a machine able to do word processing, accounting, filing, calculating, graphics,. communications, re-search, programming, and printing; (ii) the printer — able, in one or more of its forms, to display on paper all the output of a computer, at speeds up to several hundred words per minute and in any desired number of copies; (iii) the OCR (Optical Character Recognition) — capable, in its most sophisticated form, of reading accurately and placing into a computer almost any form of reasonably legible print, where the source material can then be edited, revised, and rearranged at will; (iv) the disk file — a plastic or metal disk, much like a phonograph record, on which many pages of typed material can be stored (one million characters can now be recorded on a single, small "floppy" disk, and hundreds of millions of characters can be stored on larger, "hard" disks); (v) the retrieval analogue — a method of tracing all of the significant words contained in a huge volume of material (all relevant items of that material can then be found again by using a computer to enquire for them with the same significant words, to display those items for a researcher, and to print out the desired items in full); and (vi) the modem — which permits computer-stored information to be ordered up by telephone or other wire and delivered to a computer screen or printer in any desired location, including one's own office or study.

This technical revolution has occurred over a very short time. It is still in progress. New ideas are being generated so rapidly that it is doubtful whether anyone — even the most progressive, experi-enced, and open-minded participant in the industry — has more than a bird's eye view of where the revolution will have taken us by the year 2000. There are some indicators, however. These indicators are largely in the areas of improved technology, the establishment and expansion of more data banks, and the growth of our appreciation of how to put the revolution to general use.

Some of the technological improvements just around the corner are a much greater ability to store information in small areas; the development of products that will combine a wider range of

functions in only one or two machines; the direct or easy tie-in to computer command of a wide variety of everyday activities, such as banking, shopping, and correspondence; and the addition of voice and touch to the typewriter console as methods of conveying commands to computers. These improvements in technology will increase the computer's accessibility and flexibility. But the greatest enhancement to its general utility will arise as a result of improved programming, including the development of software that will respond to everyday language in its plain, grammatical form. An increasing variety of programs that claim to provide this feature are already reaching the commercial markets.

Probably the greatest challenge of the computer will be to our imaginations and to our ability to learn how to use it effectively, both physically and intellectually. The most determined effort will be required of those who have not grown up with the computer, most of whom are over forty years of age and may have the responsibility of deciding what use their operations or organizations will make of this new capability. In the early days of data processing, many of us saw situations where there was very little communication between the people who understood the machines and the people who understood the businesses making use of them. The result was confusion and the loss of effective financial control of a variety of businesses. Fortunately, our children are being raised to develop greater skills and understanding of the computer. They are being given training that equips them to appreciate the functions of computers, and they have day-to-day access to computers in order to develop working familiarity. Those of us who missed such a background can only hope to rely on imagination, general reading, and haphazard exposure to provide a belated education, unless we are prepared to make the effort of getting special training.

It should not be surprising that most of us find it difficult to appreciate the extent of the computer revolution and its consequences. The speed of its development and the degree to which computers have become economically accessible has probably exceeded that of any earlier product of the industrial revolution. This development has been described as follows:

> The first fully electronic digital computer built in the U.S. dates back only to the end of World War II. Created at the University of Pennsylvania, ENIAC weighed 30 tons and contained 18,000 vacuum tubes, which failed at an average of one every seven minutes. The arrival of the transistor and the miniaturized circuit

in the 1950s made it possible to reduce a room-size computer to a silicon chip the size of a pea. And prices kept dropping. In contrast to the $487,000 paid for ENIAC, a top IBM personal computer today costs about $4,000, and some discounters offer a basic Timex-Sinclair 1000 for $77.95. One computer expert illustrates the trend by estimating that if the automobile business had developed like the computer business, a Rolls-Royce would now cost $2.75 and run 3 million miles on a gallon of gas.[2]

There is no reason to believe that the rate of change will soon decline. It may well be that the direction of change will wander, but a sprawling, aggressive, and well-financed new industry of unprecedented diversity and ability, much of which is owned and guided by people still in their most intellectually productive years, is devoting itself feverishly to extending and refining its products. Many participants have become millionaires and widely recognized for their accomplishments. No other industry has ever produced so many heroes and so many changes so fast. It is not likely to stop now.

The substance of these changes is likely to prove even more revolutionary than their speed. David R. McCamus, president of Xerox Canada Inc., said:

We have only just begun to recognize information as a resource — a resource which ranks in importance with energy, labour, raw materials and agriculture. As with other resources, we cannot afford to squander information.

It must be discovered, captured, organized, communicated and utilized as efficiently as possible. Electronics has given us the means, but electronics will not eliminate marks on paper, which make information available.

What electronics will do forever is alter our ways of recording, transferring, storing, and communicating information . . . Raw information on its own is of little use. It must be manipulated and transferred to impart knowledge. This knowledge, in turn, assists in decision-making — which is the ultimate goal.[3]

The practice of law can be regarded as decision-making in one of its purest forms. Any good lawyer will attempt to make his decisions (in the form of advice to clients) on the basis of the fullest possible information, derived from established law, precedents, and experience. In the electronic age, these sources of information have become more readily accessible than ever before.

2. *Time* Magazine, (Toronto: Time Canada Ltd., January 3, 1983) p. 8.
3. David R. McCamus, President of Xerox Canada Inc., in a speech to the Association of Records Managers and Administrators.

Another set of clues to the future is contained in a remarkable book by Jeremy Campbell, called *Grammatical Man*. Among other things, it explores the connections between the development of the human brain, linguistics, and information theory, including the relevance of these matters to, and their interaction with, computer technology. The computer is constantly being brought into closer interaction with the brain: voice-actuated computers are already a reality, computers that emulate human thought processes are being developed, and, by the end of this century, the aspects of computer use that inhibit us today because of unfamiliarity and awkwardness will have disappeared. Their utility will be limited only by our own capacity to appreciate and take advantage of all the opportunities they present. Campbell sees the computer as an agent both of freedom and expansion of choice:

> The new information machines make people aware of variety. More than that, the machines are agents of variety; they can both stimulate and satisfy a demand for it. If this should lead us to a theory of variety, that would be a social idea which is quite new. Such a theory would be a way of escaping the stale alternatives of traditional capitalism and traditional socialism, because it would pose an altogether different question: How much variety do we want in a society, and how much control? Asking that question at once shifts the center of intellectual gravity. The argument ceases to be over this or that doctrine or political theology and moves to a different ground. It considers instead the range of possible choices which should be made available to the members of the society. It begins with that consideration. Which choices should be restricted and which extended? Which made difficult and which made easy? This is a second-theorem approach to the design of institutions that elevates choice to a high place on the social agenda, but recognizes that choices must be constrained, made unequal, in ways that answer to the systemic needs of the society, just as redundancy answers to the systemic requirements of an information source. This is a very different point of departure from the simple slogans of the two extreme ends of the ideological spectrum: freedom for the sake of freedom, versus control for the sake of control. Carried to the limit, the first results in equilibrium, or chaos, and the second binds the system so tightly that it cannot move: it can transmit only one message. In the one case there is too much change, in the other too little."[4]

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4. Jeremy Campbell, *Grammatical Man* (New York: Simon and Schuster, 1982) p. 264.

III. *Implications for Legal Practitioners*

Mr. David G. Barry, in the Canadian Bar Society's publication entitled ''Computers and Word Processors — Your Silent Partners'', included a helpful summary of the operations in a legal office that can be carried out with improved efficiency by computer technology. In his introduction, he noted that: ''The age of electronic office technology is here and the legal profession must take advantage of same if only to keep legal costs down and to compete with the quality and the cost of services delivered by other law firms.''[5]

Many of the applications of such technology that were reviewed by Mr. Barry relate to those accounting and administrative functions of a law office that can be materially streamlined by use of the computer. It is surely significant to all practitioners that the support functions of a law office frequently consume fifty percent or more of the office's gross income. There is probably no segment of that cost of operation that cannot be diminished or made more productive by the intelligent application of computer technology. In the result, even if the legal office is regarded only as a business machine, the computer can make it more productive and rewarding. If the office is operating with demonstrable efficiency, that fact will inevitably display itself to clients, who are likely to conclude that an office that displays business efficiency will probably display legal efficiency. Obviously that is not necessarily so, but it is a natural assumption for a client to make.

The categories of accounting and administrative applications covered by Mr. Barry are: client accounting as applied to filing systems, client disbursements, time, billing, trust, and work in progress; financial accounting as applied to accounts receivable, accounts payable, and payroll; lawyer/paralegal accounting; administrative applications with regard to conflicts, calendar/docket control, and personnel scheduling; and legal information as based on word processing and library management/legal research. This article will not review the details of how the computer can assist in carrying out these functions. We can reasonably accept that these tasks are now within their capability. My object is to explore how our practices will be affected by that fact.

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5. David G. Barry, ''Computers and Word Processors — Your Silent Partners'' (Ottawa: Canadian Bar Association, 1981).

Apart from administrative functions, two main areas of lawyers' practices are affected by the computer. The first is the production of documents, which a computer can do with great speed and flexibility. For most of us, this is the starting point, because we tend to regard the computer as a faster kind of typewriter. With skilled operation and good machines and programs, complicated and extensive documents can be prepared, edited, revised, and printed to suit the most exacting standards. The efforts of teams of lawyers can be greatly enhanced through the ability of each team member to keep completely up-to-date with the efforts of every other team member and then instantaneously integrate his own product into documents, if desired. When the final result has been achieved, it can be printed accurately and at a very high speed, reproduced, or, with appropriate equipment, sent to any destination desired, such as the client or a commercial printer. If the destination is the printer and he has the necessary equipment, the document can then be fed directly into the printer's composition equipment, thereby eliminating the need for retyping by further sets of hands, a stage at which new and unexpected errors can occur. If placed in skillful hands, the computer excels as a piece of production machinery.

Of much greater intellectual importance is the use of the computer as a storehouse, refiner, and communicator of information. This role demands much more attention on the part of the lawyer, but its potential rewards are far greater than mere speed of production. Inside the legal office, precedents, legal memoranda, filing dates, limitation periods, conflict material, client files, and any desired quantity of additional legal material can be placed in memory and retrieved at will. Until recently, computer storage has been limited and costly. However, this feature is changing rapidly, and new storage and retrieval techniques will soon reach the market that are capable of holding and giving access to volumes of material, hundreds of times larger than heretofore, from very small memory spaces.

Outside the office, more legal and legally relevant data bases are becoming accessible by computer every day. For example, most of the major Canadian case reports and many federal and provincial statutes are now available and can be reached by computer, using key words for the search. The use of key words for such searches is itself of fundamental importance. The entire meaningful text of a case report is retained in the computer's memory, so that nothing of importance is inadvertently omitted, as might be the case with

headnoting or summarizing. In addition, the search for a specific decision or part of a decision is not dependent upon the imagination and accuracy of the compiler of an index. A search which uses key words will find every use of that word throughout the data base being searched, and will then permit examination of the context of the word for relevance to the enquiry. If the key word search brings forth from the data base more material than can possibly be reviewed in the time available, or if the word is so general as to be relevant to a wide variety of legal subjects, it can be used in combination with other words to narrow its application. A smaller volume of information will then be produced by the search. Many other useful data bases are available to the computer user, covering almost every imaginable field. For a fee, information can be brought from that field directly to your computer screen, and, if you want to keep a copy of it, from there to your printer. The best existing example of such a generalized service is probably The Source, which is owned by The Readers Digest Association and provides over 1,200 data bases and programs.

This technology should make us think about our own methods of practice. The opportunities presented should be examined in terms of how much more effective we can make ourselves, both for our clients' benefit and for our own. Obviously, there is an immediate cost to informing ourselves about the computer and, if we so decide, equipping and training ourselves and our staffs. At this stage in computer development, these costs are considerable, but they are diminishing. Based on the present degree of acceptance of this technology by the profession, it is clear that the rewards already exceed the costs in the eyes of many practitioners. So it seems we would all be well-justified in taking the time to at least inform ourselves of what the computer can do for us. In a town or city of any size, no one should have difficulty finding a suitable seminar for that purpose.

If our investigations lead us to accept computers as a useful tool, we should consider how to adapt our style of practice to them. To make computers truly useful, there needs to be a strong commitment to organization and discipline. Many of us look to our secretaries for that, and likely always will. But the machines, while almost infinitely flexible and fast, are absolutely dumb about following instructions. Thus, their characteristics and their limitations have to be well understood. Many older practitioners may have a style of practice to which the computer is largely irrelevant on a daily basis,

and their secretaries or juniors may have to carry the load of adapting to the necessary disciplines. Younger lawyers, if properly trained, will already have some familiarity with computers by the time they start practice. If they are twice blessed, they will be given direct access to a computer soon after they start practice, and the computer revolution will have started in earnest inside those offices.

Among many of us who are ready and willing to embrace the computer, there is a recurring dream: we will take computers to our cottages and practice ''armchair law''. Or, if our spouses refuse to live out of town for sustained periods of time, we will at least try to do much of our work at home. There is no good reason why that should not be possible with relatively little expense. If the time and money spent travelling to and from work were devoted to useful work on a home computer, the machine would pay for itself in a very short time. This would be especially true of a lawyer practicing with a firm, of some size, to which the home computer could have access. If the firm were also computerized to a useful extent, the lawyer working at home could look up precedents, prepare, edit, and print new documents, search law, write opinions, correspond with clients, keep dockets and record them on the firm's computer, and, in fact, do nearly all of the things he now does in his office, yet without the usual irritating distractions. The important element that is missing in this scenario is face-to-face contact with clients and with other lawyers. It is doubtful whether many practitioners, partnerships, and client relationships could survive without such contact. Experiments in other fields have shown that relatively few people can work happily in isolation for sustained periods of time, and, in general, lawyers are inclined to enjoy and benefit from their interaction with others. So the dream of a home or cottage practice appears to be practical from the point of view of the capability of the computer. For most lawyers, however, it is unlikely that it would be realized on more than a part-time basis.

The computer is not the entire answer to practicing law away from the office; in fact, it may tend to produce the contrary result of making it necessary or desirable to practice in a large legal office. On the face of it, the argument that only a large office can afford the costly equipment and the training to use it would seem to be valid. Yet that is not necessarily so. In the first place, the cost of computer equipment is falling steadily. No doubt there are several reasons for this, including the economic climate, Japanese competition, fast obsolescence, and volume production. In any event, cost reductions

are taking place and have done so for twenty years. The biggest breakthrough has been the introduction of micro-computers. Although their development is by no means complete, they can already do for small businesses almost all of the things that much larger computers used to do. Similarly, micro-computers and their software programs can perform most of the routines required to administer and carry out the word processing tasks of a law firm. The smaller firm is unlikely to be able to hire its own computer specialist or programmer, but the equipment and programs now available for micro-computers make such a cost unnecessary for most practical purposes. Probably the greatest deficiency of micro-computers, as compared with the larger office systems, is the inability of many of them to interact with other similar machines. However, the same effect can be obtained, albeit less handily, by the transfer of memory diskettes from one machine to another. At this time, many large offices still use this system, in any event.

From the point of view of data and word processing, therefore, it appears that the computer now does not give the large law office any significant advantage, except possibly in terms of specialized staff. From the point of view of access to better legal information, the computer is an even greater leveller. As more and more legal data bases become available on computer, the single practitioner and the small firm will be able to search law with much the same facility as the large firm. Lengthy trips to a central library for rare precedents or esoteric case law will be unnecessary, and general information will be equally available. Teams of students reading law will not be likely to turn up material other than what the computer can obtain. Ingenuity and application will continue to be as important as ever, but large firms have no monopoly on these. The important point is that, as the broadest possible legal data bases become available, they become readily accessible to all legal practitioners, regardless of firm size or location.

If the above analysis is correct, any competitive advantage created by the computer will accrue not so much to large law firms, versus small law firms, but to those firms which are most the open-minded and adaptable to change. There is a strong possibility that these qualities are more likely to appear in smaller organizations, where the decision-making processes and the introduction of change are apt to be easier. Even if the costs of introducing computers may appear relatively more daunting for a small firm than for a large firm, the understanding of the

commitment and what it is expected to achieve may be more readily apparent in a smaller firm.

From the client's standpoint, the intelligent use. of computers should yield nothing but positive results. There will probably be a period during which the client will pay the bill for the new equipment and for the process of learning to use it. In most cases, however, this is apt to take place gradually, so that the lawyers' extra costs of operation will not intrude noticeably on clients. On the other hand, when computers have been fully introduced into, and understood within, the operation of an office, the client should become aware of better and quicker results, especially where the work calls for the production of a large volume of paper. If the client is some distance from the legal office doing the work, there will be an ever-increasing capability to deliver work to him over the telephone wire, even if that work is extensive. In addition, it will be possible to keep clients advised over the telephone wire of changes in the law. For example, the analysis made by many lawyers of the federal budget could be transmitted easily and quickly to clients by wire, assuming, of course, that the client is equipped to receive the information.

As legal data bases expand, clients should be able to feel that nothing that is relevant to their interests on a particular matter has been overlooked. This is the kind of service we all try to provide now. In reality, however, many questions of law receive only a cursory examination; the lawyer relies more on his experience and "feel" of the situation than on hard precedent. If an office is large, previous research on a question may not be generally known or available throughout the office. Consequently, the same point of law can be researched many times over, and no one, least of all the office's clients, benefits from that. Proper use of computer storage for legal memoranda and precedents should eliminate much duplicated effort.

With the expansion of legal data bases, the term "boiler-plate" should take on new significance. Through use of the computer's power to substitute, at a touch, one word or phrase for another throughout lengthy documents, boiler-plate documents will become more nearly true to their name. Suitable, additional sections will be easily included in the first drafts of new documents through quick reference to existing recorded precedents, provided those precedents have been previously indexed. The need to adjust existing precedents to new situations through careful review, thought, and

redrafting will never disappear, but the physical processes necessary to achieve the final result will become much faster and less labourious.

The application of the computer's utility solely to previously organized data bases is perhaps trite. As business, regulation, and litigation become more complex, the resulting business records, applicable law, and verbal evidence can be too massive for any person or coordinated group to absorb intelligently or recall immediately for use. It can thus become useful to establish a data base for the purpose of only one case. With the computer, relevant law and evidence can then be quickly located and recalled for use in negotiation and litigation.

Some lawyers worry about the confidentiality of computerized client information. It is a perfectly justified concern, but one which is probably overdone. Information on a computer is certainly not as readily available to a wandering eye as information on a printed page, nor is it as easily portable without the use of similar computer equipment. More importantly, all information can and should be coded, so that only authorized persons can pass through the various code stops. There are horror stories about computer thieves dialing into banks and transferring large amounts of money to fake accounts, sophisticated codes notwithstanding. But examples of such thievery are rare and usually involve the cooperation of some inside party. If an employee of a legal office made a dedicated attempt to loot a legal file that existed on paper, the job would be easy to do. If the computer assures nothing else, it should ensure that a higher degree of skill will be required to obtain access to confidential material.

IV. *Wider Implications Relevant to Law*

In addition to the computer's direct effects on the way we practice law, it seems likely that there will be side effects that may not be readily apparent. For example, many of us believe that government intervenes in too many aspects of our lives, with the result that there are too many laws on the books for any one person, or even a small group of persons, to possibly comprehend. It is a mockery to say that everyone is presumed to know the law when experienced legal practitioners can deal with confidence only within their own specialties. If the computer does nothing else, it may help to redress the imbalance between the citizen's knowledge and the number of laws. It is not the case that the laws will be re-examined, and

repealed where possible; that would be too much to hope for on any extensive basis. But the computer will make it possible to locate, more readily than ever before, all the law that affects a particular subject. Given the speed at which legislators move, the computer's abilities should allow it to keep well ahead of the production of new laws.

The effect of the computer on the way our courts function could also be profound. It is arguable that the courts will no longer be obliged to rely primarily on the adversary system to produce the correct legal result. A properly equipped court could carry out its own legal research without relying solely, and possibly to the detriment of the correct legal result, on the arguments and cases presented to it. A more perfect application of the rule of stare decisis could result. Fortunately for the profession, there will still be ample room for ingenious argument and fine distinctions, but the legal basis for those arguments and distinctions should be more reliable and more easily verified by computer research.

The same process should work in the field of legal education. It seems to many people who have practiced law for more than a decade that legal graduates are getting smarter, by and large, all the time. With greater exposure to relevant case law made available to them and with a well-honed ability to use the computer in legal research, new graduates should become even more impressive. It is possible that the computer will inspire a tendency to consider legal research as more of a mechanical process than it has appeared to some of us, but that is not likely to occur with serious students. At the very least, much of the drudgery of legal research should be eliminated and effective results should be easier to obtain, although at the same time, some of the contemplative quality of legal research may be lost. After all, who is to say how much law has been learned inadvertently while reading inapplicable cases in search of a relevant one?

The computer may well require a re-evaluation of many aspects of legal training. It is not likely that legal text books and the volumes of law reports will soon disappear, nor, one devoutly wishes, will dedicated, provocative, and irascible professors. In fact, it could be valid to say that the case method of instruction is ideally suited to the computer. The computer's capability for total recall should reinforce that method of teaching and permit its more searching application. But in specialized subjects and in dealing with particular questions, the enquiring student may be able to

become better informed than his professor. If on-line computers should enter the classroom during lectures, research and discussion could occur simultaneously. It may be argued that this will never be permitted, yet hand calculators, once regarded with suspicion, are now commonplace in classrooms and during examinations. At the very least, life in the classroom should become more challenging for all participants.

The computer may cause substantial changes in the expenditure of university funds and in university architecture. Our present proud libraries will, no doubt, be preserved through nostalgia, at least. However, the quantities of money and space we now devote to masses of printed materials will likely be diverted, to an ever-increasing extent, to the development of computerized data bases and related access equipment. If libraries fall into disuse and decay, much of the charm of university life as we know it will go with them. But there is a strong likelihood that the computer will take us in that direction. The resultant availability of large amounts of funds, even if they are used for the development of superior teaching and research techniques, may seem to many of us to be small compensation for the loss of our dusty books.

It was not my intention to review the increased legal work brought forth by the computer in its various working applications. It is enough to note how rapid and widespread the advent of the computer has been and how deeply it has affected and will affect many aspects of our economic life. Billions of dollars are being directed to the field of computer technology in Canada alone. In the result, the computer deserves close attention as a source of work for the legal practitioner. Many law firms already have members who specialize in that work. Any lawyer who wishes to undertake such work will obviously be better equipped to handle it if he is familiar with the technology and its application.

V. *Larger Social Effects*

The computer's effects will be profound outside, as well as inside, the legal profession. Some of those effects and the accompanying economic changes have been reviewed in *Forbes* magazine. Its finding was that, at least in the United States, the economic emphasis has moved away from heavy industry and toward the development and manipulation of information. The production of goods for consumption will not stop, but that type of activity will

involve fewer and fewer people as robots and other forms of automation replace them. Even in the construction and direction of this type of machinery, the development and application of various forms of information is of key importance. Large portions of our traditional industrial production will move to countries where labour rates and related costs are lower than ours. According to *Forbes:*

> A Congressional Budget Office study estimates microelectronic technology could cost the U.S. 3 million jobs by the end of the decade — 15% of the manufacturing work force — and 7 million by the year 2000. Dataquest's Fred Zieber doubts whether many of these job losses can be avoided. "You can say, 'Don't use electronics because electronics is going to cost jobs.' But you can't hold them back anymore than you can hold back Pac-Man. Somebody in some other country will use it, and those jobs are going to be lost anyway."
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> The cost savings — and the competitive impact — can be so extraordinary that companies and countries have no choice but to adopt the technology if they want to survive. The Japanese success in the microelectronics market was based in part on their ability to produce a lower-cost and higher-quality product using automatic equipment than the U.S. producers could turn out by hand. And the U.S. producers retaliated by turning to automation themselves.[6]

This shift in the emphasis of the economy will have important side effects on many aspects of our lives. Increasingly, the economic world will be divided into those who can and those who can't use or make use of the computer. We already see many articles in our news columns about the number of people in the work force who have become technologically obsolete. Without retraining, many of these people may never obtain satisfactory employment again. We therefore have the choice of mounting extensive retraining programes or dealing with long-term unemployment, along with its resultant individual suffering and social cost. Even among those people whose employment is secure, there will be a competitive necessity to keep abreast of the computer revolution. Within a country such as Canada, the social strains caused by these changes will be severe. They may well be even greater between nations. Some of the production activity formerly carried on in developed nations will move to less developed ones, but the information revolution is not likely to spread to them quickly or on a

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6. James Cook, "The Molting of America" (New York: *Forbes* Magazine, November 22, 1982) p. 161.

meaningful scale. In the result, the rich nations may become even richer, due partly to the labour of the poor ones. Perhaps this has always been true to some extent, but the situation is likely to be aggravated for some time by the current economic climate, the fall in oil prices, unrest in the Middle East and Central America, and the inability of several of the most populous third world countries to service, let alone retire, their international debt.

The broadest possible social impact of the computer was forecast in *Goodbye Gutenberg*, as follows:

> The switch from stone inscription to papyrus and handwriting signaled new patterns of thought and social organization. The switch from a scribal society to a printing one changed the whole focus of knowledge in the West and created new locations for information in society. The transition from paper to telecommunications systems can hardly prove to be less important, necessitating the development of new skills and new equipment, a new kind of text and a new method of text storage . . . . the change is becoming evident in government before its impact reaches society in general. The defense and intelligence communities in the United States have already undergone a thorough changeover, and well over half of all documents relating to intelligence work are now transmitted, filed, and indexed electronically, passing through specialized networks without generating paper copy. The text is generated in video terminals and passed into data storage, to be retrieved and read by those concerned on other video terminals. Even in this and other comparable microsystems a host of moral, organizational, and economic problems are raised by the phenomenon of paperlessness. Technical librarianship is one of the next fields likely to undergo substantial transformation, and from there the change of system cannot but spread outwards throughout the education system to society as a whole. Banking and monetary systems are meanwhile undergoing parallel and simultaneous transformation, and the work of conceptualizing mass systems of electronic funds transfer (creating a moneyless society?) is well underway. When governmental and financial communities adopt a new technology, they inevitably drag the rest of society between them, however inconceivable it may still be to nonspecialists that they should acquire this totally novel information skill and conduct the basic transactions of civil life via computer.

> Today a major break with the past is clearly at hand, and with it will come. . .an important shift in the way we treat information, the way we collect and store it, the way we classify, censor, and circulate it. People will regard the process known as education in a quite different light in a society in which human memory will be needed for different purposes than in the past; we

shall think of librarians, journalists, editors, and publishers as different creatures from those of today, since they will be involved in different mutual relationships, using a different technology.[7]

University and other teaching hierarchies are likely to change. The computer will alter the functions of and, consequently, the relationships between students, professors, librarians, computer and information specialists, administrators, and funding authorities. Precedent for such changes may be found most recently in the broadcasting field, which was the first to introduce electronics to the mass movement of information. Radio and, to a greater extent, television have altered politics in favour of their manipulators, changed the public perception of war, substantially penetrated and influenced education, greatly extended the influence of the industry's participants, and substantially superseded the persuasive powers formerly enjoyed by authors and journalists.

If the computer brings about changes of a similar significance, it is possible to imagine that bureaucratic and other invasions of privacy will reach unprecedented levels; information retrieval specialists and other information theorists will become the new gurus of many of our educational and economic institutions, the power of special interest groups in society may far exceed its present level and the home or the small office may supplant the factory as our basic economic unit, stepping into the place vacated by the family farm.

VI. *Conclusion*

Some commentators are more deeply impressed by the risks of computerization than they are convinced of the rewards. In *Entropy: A New World View,* Jeremy Rifkin applies the first and second laws of thermodynamics to show why our present industrial society is too wasteful to survive much longer. He does not consider that the information revolution of the computer and communications will eliminate that waste. On the contrary, he says that:

This massive increase in information translates into a massive expenditure of energy. Along with it has come mounting disorders, increased centralization and specialization, and all of the other features that accompany a speedup of the entropy process. Already, the information and communication in-

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7. *Supra,* note 1 at 323.

stitutions — in both the private and public sectors — are turning into giant bureaucratic fiefdoms exerting enormous power over the lives of every American. The collection, exchange, and discarding of information is proliferating at an unparalleled speed. The increasing energy flow of the so-called information revolution is already creating massive disorders all along society's energy flow line, requiring more energy to be diverted into the ever increasing costs of maintaining the information and communication institutions and machinery.

The current computer and microchip "revolution" is a case in point. Its advocates are fond of pointing to the fact that during the past thirty years, the prices for individual computers have plummeted dramatically, the size of the computer has decreased sharply, the amount of material resources as well as the energy necessary to run them has significantly dropped. At the same time, as computers have become smaller, cheaper, and less energy consumptive, the amount of information they can store, and the rate at which they can sift through facts, has increased astronomically.

Strangely enough, it seems that the more information that is made available to us, the less well informed we become. Decisions become harder to make, and our world appears more confusing than ever. Psychologists refer to this state of affairs as "information overload", a neat clinical phrase behind which sits the Entropy Law. As more and more information is beamed at us, less and less of it can be absorbed, retained, and exploited. The rest accumulates as dissipated energy or waste. The buildup of this dissipated energy is really just social pollution, and it takes its toll in the increase in mental disorders of all kinds, just as physical waste eats away at our physical well-being.[8]

It seems inevitable that, on any view of the computer and its accompanying information revolution, we are certain to suffer a considerable degree of "electronic shock". Whether that shock will be stimulating or extremely disruptive to our society is, so far, only dimly perceived.

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8. Jeremy Rifkin, *Entropy: A New World View* (New York: The Viking Press, 1980) p. 168-170.