THE VICTORIAN COUNCIL OF PROFESSIONS

WINDSOR HOTEL, MELBOURNE, 9 JULY, 1980

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The Hon Mr Justice M D Kirby
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PROFESSIONS IN A TECHNOLOGICAL AGE

In the eye of history the most remarkable thing about our time will surely be the dynamic forces of science and technology.

Within two or three decades have occurred the most amazing developments. Nuclear fission spells doom or promises limitless energy, according to one's outlook. In this very city, within recent weeks, the incredible advances of biology have been demonstrated. In vitro fertilisation (the test tube baby) is with us. Human tissue transplantation is a busy daily reality. Artificial insemination processes have produced, we are told, 10,000 of our fellow citizens. The cloning of plants and prize bulls is now, so it is suggested, perfectly feasible for human kind. A recent A.B.C. talk programme (which many of you will have heard) suggested that the time is not far off when medical science will permit, by the frozen storage and transplantation of the human ovum, a woman to become, genetically, her own mother.

However, the development of the computer, the miniaturisation of the 'microchip', the linkage of computers by telecommunications and the revolution in information sciences, puts even these developments in the shade. It has been said that we are at the brink of a new industrial revolution more dynamic even than the first. By a most remarkable combination of transistor technology and photo reduction techniques, the 1970s saw moves towards the miniaturisation of computers. By processes of photo reduction 100,000 transistors can be integrated with circuits crammed into a single quarter-inch of silicone. This silicone 'chip', the 'microchip', seems every day capable of containing more and more data, retrievable at increasing speeds and dimishing costs. A graphic illustration of the variety and pace of change in information technology was recently cited in the Law Reform Commission's discussion paper on Privacy and Personal Information.

- Cost per function of a chip has been dramatically reduced by more than 10,000 fold in something like 15 years
- Satellite cost per circuit year, 1965 - $30,000; 1980 - $700
- Satellite earth terminals, 1965 - $100,000; 1979 - $12,000; 1980 - $1,000
- Bytes of memory, 1964 - $2.00 byte; 1978 - .05

  ...

- A single optic fiber 1/5th the thickness of a human hair can do the work of 10,000 ordinary telephone wires.[1]

All of us have begun to feel the products of this new electronic age. When we travel, we rely on it for bookings and for keeping the airlanes safe. By satellite we can enjoy, instantaneously, the Wimbledon thrills and tantrums. Word processors have begun to invade our offices. Our accounting is increasingly linked to time recording devices which also permit an assessment of our efficiency. Some of us are beginning to use the procedures for client files. Others to retrieve an unavailable article stored in a Chicago data base and instantaneously accessible through the O.T.C. MIDAS system.

But if you think all this is remarkable, in the words of the showman, 'You ain't seen nothing!' We stand poised on the brink of a new age which presents challenges, opportunities and dangers: including for the professions. Within the last week or so a major automobile producer has announced the intended closure of its large Sydney plant. Hundreds of jobs (possibly thousands) are in doubt. The cost of modernisation of the plant to take advantage of new computerised techniques was said to be too high. In any case, the new techniques would themselves make many of the jobs redundant. According to Newsweek, last week:

> ... for the first time the new technology has made robots cheaper and more efficient than many of their human counterparts: for an hourly 'wage' of just $4.60, the average cost of maintaining them, they perform tedious and dangerous work with a high degree of reliability. The average human worker on an automobile assembly line by contrast, earns $16 an hour.[2]

We in the professions are said to be different. We have our training. We have our degrees. We have our skills. We have judgment. We are well regarded and generally well respected. We have our histories. Our leaders command the highest positions in the country. But I say to you that we are not going to be immune from the impact of the new information technology. We alone will not escape the implications of the computerisation of society and the dynamic force of the microchip. The question we must face is whether the Australian professions are prepared for the radical changes to their role and function which computerisation will inevitably bring. I want to suggest to you that they are not.

COMPUTERS AND THE HEALING PROFESSIONS

The computerisation of the healing professions (medicine, dentistry, pharmaceutics, veterinary science and so on) has already begun. Hospitals, for example, are turning over to computerisation. In this city and in other major Australian cities, the computerisation of hospital and health records is well advanced. Last week, in a talkback programme to Perth, I was told of one woman who presented at a general hospital with a physical ailment and who was confronted in a few minutes with the full details of a consultation at a Perth psychiatric hospital 15 years before, under her maiden name. The disadvantages of bulk, inaccessibility, unretrievability and expensive manual files disappear with the advent of the computer. Its memory is indelible. Its storage capacity is virtually limitless.

So far, computerisation of hospital and medical records has proceeded in the hands of medical administrators but with members of the medical profession at their elbow. The dangers to individual privacy in the timeless, limitless storage of highly sensitive and sometimes redundant or outdated information has its own problems. But these are not specifically problems for the professions. The data system is still the servant of the profession. In many cases, most cases, it provides modern tools for diagnosis and treatment.

Will it go beyond this? Is there any possibility that computerisation may impact the healing professions in the way it promises to impact the automobile assembly line worker? Some writers think it could happen.

At the Massachusetts General Hospital in Boston, an automatic analyser is hooked to the hospital's big computers. It tests blood samples and other data. The hospital has developed a medical computer language. Using one programme a young doctor is presented with the simulated 'patient' with certain symptoms. At each step, the professional has the choice of action – and the simulated 'patient' responds. If the professional errs, the programme makes it clear. A fatal error and the programme drily informs its interrogator that the patient has died.[3] Simulators have been around for some time in the training of airline pilots: also people who carry in their decisions great responsibility for lives and property . There is no doubt that the diagnostic decision of the healing sciences lend themselves to adapted forms of this simulated professional training. But if it is possible for training, will it not go beyond into treatment itself? Can we look to the day when patients will be linked in their hospital beds to central computers which will constantly monitor their state, diagnose the signs and present the professional with an instant printout suggesting dangers, the probable diagnosis and the reasons therefor?

If this seems a fantastic suggestion to you, it did not for Christopher Evans when he wrote his book <u>The Mighty Micro</u>. In chapter 9 titled 'The Decline of the Professions' Evans advances this thesis:

> The erosion of the power of the estalished professions will be a striking feature of the second phase of the computer revolution. It will be as marked and perhaps even more so as the intrusion into the work of the skilled and semi-skilled, although the notion of precipitous unemployment among factory workers and clerks tends to be the centre of debate. The vulnerability of the professions is tied up with their special strength – the fact that they act as exclusive repositories and disseminators of specialist knowledge.4

Evans' thesis is that at the heart of professional skills is accumulated knowledge and information. He concedes at once the element of craft: no computer in the foreseeable future will replace the human surgeon's skill or the advocate's oratory. He concedes the special element of wisdom and the importance of human judgment and discretion. Having conceded these qualities, which may be impervious to the impact of the microchip, Evans still argues that a great deal of the routine work of the professions is just that: routine. It involves the application of accumulated knowledge to established facts. Not only does Evans believe that computers will be able to do much of the work of professionals at this level. His assertion is that computers will be able to do the job <u>better</u>.

In support of this contention, Evans cites the case of medical interviewing which computer experts have been looking at during the whole of the '70s:

> The initial questions (the 'history taking' in medical parlance) are extremely easy to formalise, and the preliminary diagnosis – for example a possible gastric ulcer – and the decision about further investigation and treatment – a recommendation to X-ray, a special diet and so on – follow more or less automatically in the majority of cases. Computer programmes have already been written which take satisfactory histories in a large variety of common complaints, make relatively simple recommendations for follow-up studies and even offer tentative diagnoses. And they do it all with such panache that the majority of patients interviewed by the computer prefer it to the doctor. There is also clear evidences that many patients are more truthful when they talk to the computer and are more willing to reveal their secrets to it than to a human being. In some experiments in a Glasgow hospital patients suspected of being alcoholics were interviewed by a specially tailored computer programme; they admitted drinking 50% more alcohol to the computer than they did to the clinic's highly trained consultants. In other experiments, patients visiting psycho-sexual clinics showed real eagerness to chat about sexual hangups to a computer, in striking constrast to their reluctance to talk to the most sympathetic resident psychiatrist.5

Evans' prediction that the 1980s would see the healing professions turning increasingly to computers seems a safe one. In a country with large ethnic populations, specially programmed interrogations in ethnic languages via computer have a particular usefulness. If it is already suggested that we are turning out too many doctors from our medical schools, the impact of computerisation on the healing professions will not be to create more jobs for the orthodox professional. It will be to create more jobs for the computerist. The number of decisions requiring wisdom, experience and skill will be smaller. The needs for true professional judgment, released from the routine of preliminaries, will be fewer. The skills required on fewer occasions by smaller numbers will be different. They will become the skills of interpreting the product of technological analysis.

I hasten to say that nobody is predicting that we are on the brink of a world in which a decision to remove an arm will be made by robot computer. Of course this will not happen and the revolution of which I speak will not occur overnight. But if we look into the 21st Century, there is scarcely a phase of life that will not be affected by the new information sciences. The point I want to make is that the professions will not be exempt from this. They and their professional organisations should begin considering the implications for their members, for society and indeed for professionalism itself which the revolution in information sciences will produce. A professional who carries around with him in his head the wisdom of his science or skills, amidst a society that did not share that ready access to knowledge and skill is looked on with respectful awe by laymen. He is a very different person to the professional of tomorrow. Tomorrow's doctor will be one of many on the receiving end of computerised data and his skill will be in the use to which that data is put. The process which began with external tests, X-rays, E.E.G.s, and so on continues apace into the age of CAT scanners and computerised medical monitoring. It is unthinkable that the professions alone will be exempt from such fundamental changes. They should ready themselves for the implications they have for professionalism.

THE SERVICE PROFESSIONS : LAW, ACCOUNTING ETC.

Nor will my own profession, the lawyers, nor the accountants, the public administrators or other service professions be exempt from the new technology. In the retrieval of legal information (which has less room for individual variants than is allowed by biological idiosyncracies) there is everything to be said for computerisation of legal and like data as a tool to aid professionals. The process has already begun. In the United States there are large system by which statutes and case law can be retrieved from computerised data bases. In Britain a national grid of computerised legal information, known as the National Law Library, has

recently been inaugurated by Lord Scarman.[6] It will permit the supply of legal material to the judiciary and the legal profession in a number of centres throughout the United Kingdom. Some believe that computers are being used only just in time to help lawyers cope with the massively expanding volume of statutes and case law and the escalating costs which researching the law (and simply finding out what the law is), involves, if traditional means of human endeavour are used. The U.K. National Law Library is a wholly professional body established by the professional societies of barristers and solicitors. Lord Scarman is the first President of the Trust. Seminars are being held all over the United Kingdom to explain the principles developed for data base composition and access to ordinary members of the legal profession. The accounting profession, which since the Second World War cannily out-manoeuvred the legal profession in important areas of tax, corporate and securities law advice, has an equal interest in these developments.

In Australia, despite a national committee on the computerisation of legal data in 1974, progress is occurring at a snail's pace. In the Federal sphere, the Commonwealth Statute Book has been computerised (but not the Regulations and Ordinances). An attempt has begun to put the reports of the High Court of Australia, the Commonwealth Law Reports, on computer (but not the reports of the Supreme Courts of the States). Accessibility to the Federal computer is at present limited to Federal officers. Our Parliaments continue to produce large numbers of laws. More than a thousand Acts of Parliament were produced by Parliaments in Australia last year: and all of us are deemed to know the law. Yet with some notable exceptions, inadequate efforts are made by Governments to ensure that the professions concerned, let alone the public generally, are kept informed of these changes and have them at their fingertips.

Apart from the servicing function promised by eventual computer retrieval of legal data, will the impact of the microchip go beyond this in the professions of law, accounting and public administration? I suspect that it will.

In the first place, there is no reason why much routine interrogation could not be done by specially programmed computers to 'diagnose' legal as well as physiological problems. Much of the present litigation in Australia, for example, involving motor vehicle accidents, industrial and workers' compensation cases, would readily lend itself to a form of routine analysis. Yet such litigation is said to constitute about 90% of the bulk of work in Australian courts. Having regard to our adversary mode of trial, I do not foresee the computer replacing the barrister or, I should say, the judge. Though in truth much of the work of each is routine and susceptible in part to automation, notions of human judgment and the way we presently do things, require that for the foreseeable future, the barristers' skills of advocacy and the judges' discernment, wisdom and judgment should be immune from computer controls.

That is not to say that each will not be radically affected by the computerisation of society. I predict that within a decade or so judges and barristers will have at their respective tables computer retrieval equipment to secure instanter relevant statutes and case law. I do hope that in the costly enterprise of the High Court in Canberra and other new courthouses, provision is being made for the installation of these devices in the foreseeable future. Just as the generation of schoolchildren of today were released from the multiplication tables on the back page of the school exercise book and have adapted with facility to the portable calculator of the 70s, so judges and barristers of the future will, I am sure, have instant access to their data: their professional skills being more productively devoted to using and considering data rather than, as at present all too often, searching and finding it. Evans, in his The Might Micro puts it thus:

> The law which seems even more mysterious and impenetrable will also find itself being subjected to the physical gaze of computer programmers and systems analysts. And when it does, its impenetrability may turn out to be equally illusory. Legal matters, it is true, have a different kind of depth and subtlety. ... Precedent is all-important - what happened in this case in 1964, to that judgment in 1888, to that appeal in 1932. But this is precisely the kind of information which can easily be lodged in a computer's brain and which can be called up at the press of the right button by anyone following the simplest book of rules. It is difficult to see how the 1980s will get far under way before the economic advantages of [collecting] the law in computer terms are recognised. Probably the main thrust towards computerised legal administration will come from big companies who would like to simplify or eliminate this traditionally expensive facet of their internal bureaucracy.[7]

It is one thing for computers to aid the lawyer with data and to supply instructions in a systematic, detailed way. These devices should actually help to get more people to the law. But are there threats to the already over-manned professions working in the law? I believe there are. The threat is more to the solicitor and accountant than to the barrister. In the case of solicitors it arises out of that bread and butter staple of the legal profession: land transfers and conveyancing. When I told the Surveyors' Congress in Hobart earlier this year that they would live to see a computerised land title system and land use data bank, I was denounced by the Past President of the New South Wales Law Society as a 'misty-eyed dreamer'. But the process has already begun in Britain. With a more intensive land use, old established diversions and less favourable legal regime, the British have begun the process of linking aerial photography with land use data. I have absolutely no doubt that the same thing will happen in Australia. It is only a matter of time.

A recent report of the Scottish Royal Commission on Legal Services recommended that lawyers in Scotland should not retain their exclusive right to undertake domestic conveyancing for a fee. A similar monopoly is enjoyed by the legal profession in many States of this country, including Victoria. Its retention was recently upheld by the Dawson Committee Report in Victoria. The Scottish Royal Commission came to a different conclusion. It further urged that thought should be given to the registration of title and the introduction of a simple, computerised conveyancing system provided at low cost by the State, so that domestic conveyancing could become a matter of relatively cheap routine. Again this will not come about overnight. But neither in Scotland nor in Australia does the world owe the professions a living. A great deal of the routine work of the legal, accounting and administrative professions are susceptible to computerisation. Conveyancing is a notable example. But there are others. In the accountants' world is there any doubt that the auditor's function will change greatly as more and more records are computerised? Already the word processor, with its capacity to retrieve precedents with appropriate modifications, is showing what can be done. The high costs of the delivery of legal and accounting services and the burden these costs place upon access to justice and to legal rights will force governments and professions to look for new ways of efficiently organising at least the routine work. This pressure will have implications for the future role and functions of the professions themselves. Again my point is that we should not wait for these changes to overtake us and then like Luddites resist them to the death. The responsible and indeed the professional approach will be to anticipate them and rethink in a public spirited way, the implications they have for the proper functions of highly trained professional people.

THE TEACHING PROFESSION

The implications of what the French have called the 'informatisation' of society for the teaching profession are also enormous. Pocket calculators have been accepted throughout the Western school system. They are only the forerunners of computerised teaching aides and learning devices. In Britain, the late '70s saw the development of the so-called MINNIE, no bigger than a calculator and weighing about the same, able to translate the English language into French or any other language for which it is programmed. Evans describes the development thus:

> In its earliest form MINNIE had a relatively small vocabulary - a few hundred words only and operated off a micro processor chip with a memory of about two kilobytes. Even so, users found it really helped them to brush up their French. ... But these tiny memories are completely unrepresentative of what such teaching aids will come equipped with as we move into the 80s. Chips containing over 100 kilobytes of information - the equivalent of thousands of English words - are already being manufactured, and even bigger memories are

on the drawing board. By the mid 80s, complete book dictionaries will easily be packed into mini-type devices and by the end of the decade the chips of these tiny computers could contain not just one but several common languages.[8]

The use in language instruction is only the first and most obvious of the ways in which the computer will be used in teaching:

> Computers are advancing on a variety of fronts. Portable computers can already be plugged into T.V. sets, allowing full colour displays, and even the generation or manipulation of graphic material - sophisticated versions of [present] games ... and can be linked up to other computers to allow 'group' work. Voice output in the form of limited synthetic speech is already available at low cost and in many of the language teachers, the computer will not only display the text but also speak it. Computers which recognise the human voice and could correct spoken words and phrases, drawing attention to pronunciation and accent problems, are not likely to be commercially viable before the ... middle term, but they will come. Really powerful interactive computers capable of having extensive conversations with their users ... will not be available until the 1990s or later.[9]

One of the winners of the Brain of Britain contest[10] revealed that the way he did it was by having throughout his house a number of encyclopaedias which he could examine from time to time. How much easier it would be with a pocket calculator, ever-ready to fill our minds with diverting, instructive information. Whilst the value of 'browsing' should not be underestimated, nor the marvellous facility of the human mind to link previously unlinked data in an unscientific way, there is little doubt that both for the content of education and for the techniques of instruction about which we know so little, the information sciences will present great opportunities and challenges to the teaching profession. Again, however, they may reduce the need for teachers by substituting automated instruction for many of the routine tasks presently done by man.

> The truth is that the world is about to move on from the era where knowledge comes locked up in devices known as books, knowledge which can only be released once the keys to their use have been acquired. In the era it is about to enter, the books will come down from their shelves, unlock and release their contents, and cajole, even beseech, their owners to make use of them.[11]

CONCLUSIONS

Last year I attended a conference organised on the initiative of the President of the French Republic, M. Valery Giscard d'Estaing. The object of the conference was to bring together people of many disciplines both from France and elsewhere to focus the collective mind of the French nation for a period of a week on the implications of the prospective informatisation of society. The great opportunities of the new technology were underlined many times. There were ironies. When the French Telecommunications Minister spoke of the coming age of teletext and telefacsimile, when letters would no longer be posted but would be sent automatically from one home television terminal to another, angry Frenchmen in the audience rose to complain that he would do better to attend to the backlog of 5 million French citizens waiting for 'good old-fashioned telephones'.

For all this, the prospects of the future were painted with a broad brush and their implications thoughtfully and carefully considered. The French conference identified a number of dangers for France as perceived in the new technology. First, there was a concern about the impact of the new technology on employment. Here there were optimists and pessimists. The pessimists predited gloomy replacement of large numbers of workers and unemployment in geographical pockets of France where automation took over from human labour. The optimists predicted many new jobs, though they conceded that some would not be suitable for those thrown out of work.

The vulnerability of a society dependent on nuclear fission and computerised information was stressed by meany speakers. It is so much easier to damage a society which stores vital information in centralised computers, portable tapes and microchips than a society with information scattered in many places.

The danger for individual liberties was also identified. The people of Western Europe have in recent memory been through a regime controlled by personal dossiers in which the storage of vital personal information was literally a matter of life and death. They are therefore, understandably, more sensitive to the implications for liberty of the new information sciences than we are in Australia. But even here, the alert has now been sounded. The Law Reform Commission's discussion papers on protection of privacy in the computerised society are now being widely distributed and discussed by expert and citizen alike. We have proposed laws for the protection of privacy of personal information. The government has undertaken, upon receipt of our final report, to introduce Federal legislation for the protection of individual privacy in Australia.

The most acute and emotional of the French concerns however, was none of the above. It was the concern that in the onrush of computerisation, with data bases in the English language, frequently in the United States, the French would lose their 'culture' and 'mission'. The fear was expressed that in future the history of France would be written from English translations of Le Monde newspaper, stored and analysed in a data base in Chicago. Though our concerns in Australia are somewhat different, each of the issues identified by the French conference should have the attention of thinking Australians. Each has implications for our country too.

But the point of what I came to say tonight is that computerisation has implications not only for our country but also for our professions. To some extent computers will liberate the professions from routine, systematic, preliminary tasks which can be equally done, and better done, by interrogation by machines of heightening intelligence.

To some extent the computers will replace the routine tasks of checking, monitoring and testing the problem of the client, patient or pupil.

But if the professions think that they will be immune from the onrush of the computerisation of Australian society, they should think again. True it is, some professionals look safer than others for the time being. Others look distinctly vulnerable. The need for large numbers to perform routine tasks will probably be diminished either because the technology will restructure the tasks or because the tasks, being routine, will be susceptible to automation in the professional's office. In his analysis of the impact of 'The Mighty Micro' on the professions, Christopher Evans talks of 'the decline of professions'. He does not, mark you, predict their fall. A role for judgment, discretion, wisdom and the pursuit of excellence, the idiosyncratic linkage of previously unperceived connections are all facets of the still unique intelligence of man. They remain the indispensable qualities of professionalism. Many commentators believe that the challenges before the professions today are :

. The decline in respect for institutions
. The greater number of citizens having access to professionals
. The growth of consumerism
. The growing role of government
. The persistent inclination of professionals to 'live on their fat' and to spurn compulsory continuing education
. The repeated disappointment of professionals 'gone bad'.

For my own part, I believe that in the long-term, the greatest challenge to the professions may be none of these but the challenge of science and technology. I predict that it will change the functions of the professional of the future. I predict that it will reduce the need for the current numbers of professionals. I predict that it will change the perception of professionalism itself. If recent developments of technology are any guide, all of these changes will come upon us with a dynamic that we are not expecting. Professional bodies and those who lead them should begin consciously to consider the computerisation of society and its implications for professionals and professionalism.

FOOTNOTES

1.   Irwin, U.S. Telecommunications Policy : Beyond Regulation, mimeo, Max-Plank
      Institut, Bonn, February 1980, 14-15, cited in The Law Reform Commission,
      Privacy and Personal Information, (ALRC DP 14), 1980.

2.   Newsweek, 30 June 1980, 41.

3.   ibid, 38.

4.   See Evans, The Mighty Micro, 1979, 111.

5.   ibid, 112-3.

6.   (1980) 77 Guardian Gazette 81.

7.   Evans, 114-5.

8.   ibid 120.

9.   ibid 127.

10.   ibid 122.

11.   ibid 129.