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Address By His Excellency The Right Honourable Sir Zelman Cowen, A.K., G.C.M.G., G.C.V.O., K.St.J., Q.C., Governor-General of the Commonwealth of Australia, on the Occasion of the Annual Dinner of The Royal Society of New South Wales at the Hilton Hotel, Sydney, Friday, 6 March 1981

It is a great pleasure to attend the Annual Dinner of this distinguished and long established scientific Society. Your President in writing to invite me said that the Society was established in 1821, with the Governor, Sir Thomas Brisbane, as a member. I have read a little of the history of the Society. A 1961 essay by a former President tells that the 1821 Society had the grand title of "The Philosophical Society of Australasia" no less, and was formed "with a view to inquiring into the various branches of physical science of this vast continent and its adjacent regions". That, if I may say so, gave a restricted interpretation to the broad word, "philosophical", and while later descriptions of the Society's activities and objects have held open a wider prospect, your 1961 historian records that "art, literature and philosophy have had but scant attention in the proceedings of the Society which has concerned itself principally with various aspects of pure and applied science".

In 1974 at the dinner of the Society, Sir Roden Cutler spoke of the association of Governors with this Society. Sir Thomas Brisbane, already mentioned, had scientific interests, notably in astronomy, and he took an active interest in the earliest Society's affairs. Later, in the mid-nineteenth century, Sir William Denison, who, Sir Roden tells, was an engineer of some merit, gave the first paper to the remodelled Philosophical Society of New South Wales in 1855. Sir Roden says that Denison continued to write articles for the Philosophical Society, and regarded this work as compensating for what he described as the "work (of government) being taken out of my hands" by the formation of a Legislative Council.

Your contemporary activities continue in the areas of basic and applied science. Your President in writing to me says that my previous experience was in many ways akin to the aims of the Society in relating science and scholarship to the general community. Certainly, as a Vice-Chancellor of Australian universities, I had many involvements in scientific matters, and in this Office I have had many opportunities to speak on themes associated with science and technology. When I undertook the daunting task of delivering the Jubilee Oration to the Australian Academy of Science, on the occasion of its twenty-fifth anniversary, I said that it was reported that Francis Bacon had talked science like a Lord Chancellor. If it was true, he certainly claimed a knowledge and understanding of contemporary science and spoke with confidence. I claim no such knowledge, and while, like him, I am a lawyer, I am no Lord Chancellor (a Vice-Chancellor is something different), and my qualification and capacities to "talk science" are very poor.

Since I have started in this way, I can, perhaps irrelevantly, tell you that the title "Vice-Chancellor", as well as applying to university functionaries, has had and has a place in the English judicial system. Long ago, two Vice-Chancellors were sitting in adjacent courts. One was Vice-Chancellor Malins, and a discontented litigant threw an egg at him which, I think, missed. Sentencing this character for contempt of court, Malins remarked that he supposed that it was really intended for his fellow Vice-Chancellor, Bacon, who was sitting in the adjacent court.

Perhaps I can pursue briefly with you some of the themes related to science and technology with which I have been concerned. There are great difficulties in understanding and mastery; the late Lord Snow wrote long ago now of the two cultures, the science-based and the non-science based, and while his views have provoked argument, we can all understand what Robert Oppenheimer meant when he spoke of a thinning of common knowledge. Francis Bacon wrote copiously on many subjects, including science. It was a time when confidence in the capacity of a man to compass the whole of human knowledge was high, and this persisted long after. A man could feel comfortable in the description of a polymath. He could have some confidence in his claim to grasp the greater part of what was known to man. It is not so in our time.

The growth of scientific knowledge, and the development and applications of technology proceed at great speed. The social and human applications of this are very significant. When I spoke to the World Computer Congress late last year, I pointed out that the computer had made an immense impact, world-wide, within a short space of time. The first commercial computer was brought into service in 1951, thirty years ago. In 1964 it was in a museum. Within a generation (a human generation) the nature of computers has undergone revolutionary change. From bulky, expensive, unreliable, slow limited-use- "playthings of scientists" they have become small, cheap, fast and reliable, and they find unlimited applications in enterprises large and small. It was thought at one time that perhaps each major advanced nation might have a limited number of computing machines. Now they are within the comparatively easy reach of individuals. The Myers' Committee on Technological Change in Australia spoke of renewed concern about the impact of new technology on the structure of work and society, arising out of the rapid and recent development of microelectronic devices and their incorporation in products which have spread extensively. The Committee saw no signs of a slow-down in the development and application of this technology; each stage of development made microelectronic circuits more complex, more reliable, less expensive. Microelectronic technology has the potential to permeate to some degree very many fields of human endeavour. The Myers' Report quoted a statement that "this development points to the advent of the most remarkable technology mankind has ever devised".

Again, when I spoke to the Academy of Science almost two years ago, I discussed, within the poor limits of my understanding, current issues associated with research on recombinant D.N.A. That was at a time when there was an international debate on risks and dangers associated with such work. The arguments had given rise to deep concern on the part of scientists that freedom of enquiry might be threatened. Lord Todd, as President of the Royal Society, said that "ominous voices have been raised claiming that limits be set to scientific enquiry". He protested, in the context of the research of which I have been speaking, that there had been confusion and a "raising of the spectre of the production of Frankenstein-like monsters". There is an interesting and, I think, an important debate on issues of constraints and within the limits of my understanding I sought to raise these issues in my address to the Academy of Science.

It is interesting to read an account of recent developments in these areas. I quote from a recent paper on "Future Prospects for Basic Science in Medicine" by a distinguished American medical scientist:

> "It seems only yesterday that cell biology was the purest and most basic of all fields in biomedical research in constant need of defence before skeptical congressional sub-committees, hard to justify for tax-payers' funds except on grounds of rather vague prospects of usefulness years off. Now, almost overnight, it looks like a way to make lots of money. The big pharmaceutical houses are already doing cell biology in great vats while tiny new corporations are sprouting everywhere at the edges of university towns for the development of innovate and patentable technologies. Cells are not just useful, they are about to yield profits.
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> "...Wall Street analysts keep tabs on the monoclonal antibodies made by hybridomas and on the new plasmids for recombinant D.N.A. research for making things like insulin and interferons as closely as on the transistor circuits of a generation ago ... the techniques for putting novel working parts inside cells, or for exchanging the nuclei and other bits of machinery between cells, have become almost as sophisticated and precise as solid-state physics and there is no end to the list of possible applications.
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> "So it sounds as if basic research has suddenly turned into applied science before our eyes and from here on we might expect quick profits all over the place..."

Computer and biological science and technology open up a great range of issues and concerns. For society and for the lawyer, there are many and complex problems. Julius Stone wrote recently that one part of the explanation of the sharp and ubiquitous confrontations of our own age, and for the tendency for justice to split into competing versions, certainly lies in the headlong rate of social change, powered above all by accelerated technological change. This was underlined in an address by Mr Justice Michael Kirby, the Chairman of the Australian Law Reform Commission, on "Reforming The Law". He made the point that in our time pressures for change, including legal change, are very great. Science and technology, in particular, present many challenges to laws developed in earlier times, and the changes they bring to society frequently require the radical reconsideration of established legal rules.

He illustrated this by reference to specific matters, with which the Law Reform Commission is and has been concerned. One is human tissue transplants, often depending on the transfer of non-regenerative organs and tissues. It raises a complex of problems in transplants from a "dead" to a living person. This involves a need to define "death". There are problems as between living persons involving issues, among others, relating to consent. Questions of consent in this area and in the broader areas of human experimentation are difficult and complex. Advances in biomedical science and technology may depend significantly on tests applied to living human subjects; man becomes the ultimate "animal of necessity". Out of wartime experiments and work done by Nazi doctors on captive human subjects, there came an awareness of the needs for rules and controls, certainly for co-operation between physicians, lawyers and others to protect the human subject and to formulate as carefully as possible the conditions under which human experimentation might take place. It has been attempted at international and national levels. What lies at the heart is the notion of an "informed consent", and this is not easy to identify with precision. What underlies it is the principle which seems to me plainly right, that the human being must never be treated as a depersonalised thing; for this reason we seek an autonomous and informed consent. Again, we have problems associated with the test-tube baby issue; legal problems, and as one explores the possibilities, it may be problems of a broader character. I recall the comment of a writer reviewing the major events of 1978:

> "The most important birth of the year (leaving aside the little Mozarts who have not yet made themselves known) was of Louise Brown, conceived in a laboratory dish. That fertilization was less important as an achievement than as an omen; in biology, as in politics, power is expanding faster than our ethical understanding."

Mr Justice Kirby also referred to questions associated with computers and their development: they have revolutionised the assembly, supply, manipulation and distribution of information. This includes highly personal material, so that important questions relating to the privacy of the individual, an important value in a free society, are raised. He points out that computers can store vastly increased amounts of information, and retrieve it much more quickly, and at much lower cost than manual filing systems. They can integrate data supplied for differing purposes; they are susceptible to centralised control, and often produce their material in a form unintelligible except to the trained expert. Such developments and the proliferation of computers throughout society and the economy present many problems for the legal system. These include issues of privacy, and problems in the criminal law through manipulation and theft.

Indeed, technology generates problems for the protection of privacy in a variety of ways. The first significant and comprehensive examination of legal issues relating to privacy was published in the United States in the 1890's. That in turn arose from publication of matter of a personal and private character in the popular press: the problem assumed significant dimensions because of the development of a new technology which produced mass circulation newspapers at a very cheap price. There are also issues relating to surveillance. The original eavesdropper, no doubt, listened furtively under the eaves; then the telephone and telegraph gave him new opportunities to tap, and opportunities beyond imagining became available with the proliferation of modern "wire-less" listening and surveillance devices. I spoke of such matters as these when I gave the Boyer Lectures on "The Private Man" in 1969, and I said then that "the private man may find himself naked and uncertain in a psychological prison fashioned by a complex technology, not knowing when and by whom he is being watched or overheard".

There are many other illustrations of the way in which new technology can outdate the law. A well established technology exposes the deficiencies of a copyright law designed to protect the interests of publishers and writers of books. When I was a student, I might copy out by hand extracts from books and printed journals; nowadays, copying machines are freely available and very extensively used. A recent Commonwealth committee has examined and reported on the problems this raises. Our copyright law was certainly devised without any such technology in prospect.

These are a few illustrations of the problems posed for society and the law by the development of technology. In various contexts, there are calls for a moratorium, a halt. Lord Ashby, writing in the mid-seventies, noted significant changes in the intellectual and cultural climate of our time. For generations, he says, it has been taken for granted that all that can be done in science and technology must be done; the new ethic emerging is that somehow man must agree not to do all that he is capable of doing.

I have seen applications of this in contemporary discussions of the ethics, the wisdom and the propriety of certain scientific and technological work. I sought to explore some of these issues in the address to the Academy of Science on "What Are the Constraints"? Scientists with the support of a noble and convincing history strongly resist the imposition of any curbs on scientific research and investigations. They draw a distinction between scientific investigation and experimentation, and its technological applications. Yet it is said that in our day the distinction and separation are hard to maintain because application follows so closely on the heels of

thought that the long established immunities granted to freedom of thought cannot so readily be agreed to in the context of action. There are hard questions to be carefully debated and sensibly resolved in a free society.

It is the case that a society which is profoundly affected by a rapid and continuously developing technology requires a mechanism which will allow for appropriate legal change and adjustment. Mr Justice Kirby argues, I think persuasively, that there have to be appropriate mechanisms for law reform to adapt the law to changing circumstances and conditions which are themselves the product of a fast developing technology. "If nothing is done to adjust the legal system to (these) scientific developments, things will not just remain the same. Inconveniences and sometimes perceived injustices (and I may add serious tensions) will occur because old rules of law have become irrelevant or positively obstructive, or because situations have arisen affecting members of society upon which current laws are perfectly silent."

I raise such questions as these with the hope that they may attract the interest of the members of a Society long committed to the consideration and discussion of questions of a scientific and technological character. There is, of course, so much more to be said, but not by me, on this agreeable occasion. I thank you for your hospitality.

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