

carried on indefinitely, but were finally disposed of at a lengthy conference at the corporate headquarters of the licensee. After this license was completed, the second party desired mostly to make sure that it was getting the same terms as the first party, and took a license shortly thereafter.

At this point in time the licensing program was in a completely new phase, with the license terms substantially fixed and with acceptance by major licensees. Others therefore were not as inclined to feel that they would find a flaw in the patent situation, nor were they as inclined to be leisurely about the examination of the situation. In addition, the inventor had continued to work on machine improvements and on further inventions related to the initial concept. He himself had also entered a new corporate and financial phase, in that his own manufacture was steadily increasing and the licensing income gave him a cushion for future developments. At this point, sale of the business was still a possibility but of considerably less interest. Other licenses were thereafter granted in the U.S., while a new plant was set up for manufacture only of the medical packaging item. Concurrently, tentative explorations began toward seeking a partner for the European market, preferably one who could return considerable technology to the inventor's company in subject matter related to his own interests. The European market is quite different in potential, and the manpower of the company would not permit separate manufacturing and marketing organizations. However, with the European affiliation developing quite soundly, with continued expansion of U.S. manufacture, significant growth of royalty income, and acceptance of new products, the inventor has built a situation which is both aesthetically and financially satisfying. Licensing contributed significantly to this situation, but there was

never a licensing program as such, because the financial and other pressures of business more or less dictated the decisions that had to be made at any point in time.

**About the Speaker: Raymond A. Bogucki of Fraser and Bogucki in Los Angeles. Graduate of January 1940 class of North High School in Minneapolis. Eighth grade rating certificate from Jordon Jr. High School awarded in November 1935. Certificate in Bread and Rolls at Dunwoody Industrial Institute in Minneapolis, and graduate of engineering and law schools in Minneapolis.*



The Lord Ritchie-Calder

LES PLACEMENT COMMITTEE

Jobs anyone? The services of the Placement Committee are available to applicants looking for positions in the licensing field. Please send your resume (five copies preferably) to the Chairman of the Placement Committee:

John L. Sniado
Director, Patents and Licensing
Kennecott Copper Corporation
161 East 42nd Street
New York, New York 10017

Companies or firms looking for licensing personnel are invited to send their requirements in confidence to the Chairman of the Placement Committee at the above address. The Placement Committee matches the resumes received with the requirements of the various available openings. Resumes that appear to meet the requirements of any available openings are then forwarded for consideration.

THE BLACK BOX

by

The Right Hon. The Lord Ritchie-Calder

INTRO

I was most intrigued when I was told at the Center for the Study of Democratic Institutions that "the licensing authorities" were after me. In Scotland, where I come from, "the licensing authorities" are the magistrates, the baillies, who examine applicants, for permission to sell liquor and bring them to trial when they misconduct themselves. I wondered whether, in California, I needed a license for my private consumption and that the "licensing authorities" had decided that I was an illicit drinker. I am now reassured; you have licensed my thirst.

When I discovered what "licensing" meant in your terms, I was struck by the co-incidence that the invitation should come at the moment when I had just completed a survey for the Secretary-General of the United Nations on "The Role of Science and Technology in Development." This covered all kinds of activities, including your own, during the past 27 years and in all parts of the world. I had had some things to say about

"The Black Box Principle" and I was not sure that they would stand repeating here, but Mr. Poms assured me that you were "tough guys and could take it." Anyway, I have my bullet-proof waistcoat on and I only hope that I am not abusing your hospitality. I also notice that this is Friday, the thirteenth. I am not sure who is going to be unlucky.

THE BLACK BOX PRINCIPLE

It has become customary to speak of "highly developed" and "less developed" countries. Or "rich" and "poor" countries. Or "market economies" (capitalist) and "planned economies" (communist) and "The Third World" (the less developed countries).

GAPS IN SCIENCE AND TECHNOLOGY

The term "less developed" (which graduated from "backward," "under-developed," and "developing" by degrees of responsive sensitivity) is normally applied to countries which have not yet made adequate use of modern science and technology to convert their natural resources into gross national product. It embraces, of course, the consequential lacks of education, health, housing, nutrition, etc., of which an enhanced GNP would, in conventional economics, be expected to take care. It subsumes historical, cultural, religious, social and political differences which cannot be ignored or changed overnight by some world blueprint or mail-order catalogue. There can be a setting of objectives, but the attainment of those objectives will depend on how far people will adapt themselves to methods or adapt the methods for themselves; how far they imitate or accommodate or initiate; or how avid or reluctant they may be about changes which will radically affect a traditional way of life or upset the mores of society or increase the wealth of one section to the comparative disadvantage of the majority. We talk about helping the less developed countries in their "leap across the centuries."

The "leap across the centuries" assumes that there is, if not a springboard at least, solid ground from which to spring. In many countries there is a morass of poverty (from which the economists' "savings" cannot be generated) and of past neglects and frustrations (from which qualified people cannot at once be got). Much of the aid, over the past quarter of a century, has been no more than laying planks or stepping-stones across the bog.

Ten years ago, when we were optimistically talking about "A Development Decade" we had lots of conferences at which we hopefully brought the scientists and technologists together with the men-of-affairs of the less developed countries. One of these was the Conference on Science and Technology for the Benefit of the Less Developed in Geneva. The Conference stressed the snares of "going shopping in the supermarket of science" with a slim purse, and being beguiled by glamorous attractions. This figure of speech, first used by Nobel Laureate Patrick Blackett, illustrated the caution which had replaced the high expectations. Science could provide no magic wand. There was to be "no reaching for the moon" by the less developed countries (although the multi-billion

dollar project "Man on the Moon by 1970" was about to be launched). Instead they were being told to prepare their "shopping list" from the production goods and processes already available and to be discriminating in their choice. Science and scientists, they were being reminded, are expensive and their financial demands clash with other imperatives. Even in the field of science and technical education there was the problem of proper allocation of finances between primary, secondary and higher education and, apart from qualifying people for research and development, there was the need for science teachers and scientifically trained administrators. These latter, it was stressed, were especially important because they were needed to advise the policy-makers in making their choices. It was incumbent to find out what technology was known and available and how it could be adapted to immediate needs. The second consideration was the application of science and technology to problems involved in the conditions peculiar to any country, the solution of which could only be found on the spot. As was pointed out then (and, of course, it is still true): there are special aspects of agriculture and medicine, for instance, which have local significance and cannot be studied elsewhere. In another category there are problems of meteorology, geology, geophysical surveying, road-building and housing where original research and development related to local conditions are required. In setting up industries, attention has to be given to the special properties of local fuels, raw materials, fibres and food-stuffs. Those require laboratory facilities but also a first-rate information service so that a country's scarce research and development personnel will not be led into expensive pursuits to find out what is already known. Conversely, it is always dangerous to assume that some process, technique or method which has been successful elsewhere can be transferred without modification. The third consideration of which policy-makers must be wary is about expecting too much from new technologies still in the experimental stage and neglecting, in their economic planning, what is already known.

Nobel Laureate Blackett's injunction about "shopping in the supermarket of science" was salutary and, in the state of science and technology in countries without the educational infrastructure to produce scientists and technologists at short notice, inescapable. But it involves the "black box principle."

The "black box principle" means that the process works, but the people handling it don't know how — like someone driving a car without understanding how the engine works. Now this makes a country dependent on outside experts and leaves it, in an emergency, with no means of improvising. It also discourages indigenous ingenuity which could profit by ideas and improve upon them for benefit to their countries' peculiar needs.

What the economists and economic historians have called "the advantage of the latecomers" is not always as beneficial as it seems. It is true that one does not have to re-invent the wheel in order to ride a bicycle. It is true that each country that undertakes the modernization of its economy relies partly on the heritage of

others. It is also true that there is a great deal of knowledge and know-how freely available for transmission from one country to another, but many of the less developed countries do not know how to go "shopping in the supermarket of science" nor how to get the "free samples" or generally available technology. The term "transfer" in this sense is a euphemism because technology and know-how is being bought and sold like a commodity, but there is no world market nor a world exchange nor world prices for technology. The "latecomers" in this case are like spectators arriving at the last moment at a cup final and having to buy tickets from speculators at excessive prices.

The developing countries pay for imported technology and use their scarce foreign exchange in several ways. They have to pay (I) for the right to use patents, licences, know-how and trademarks; (II) for technical knowledge and know-how needed both in the pre-investment and the investment and the operation stages; (III) through overpricing of intermediate products and equipment through hidden costs for "price mark-ups;" (IV) through profits on capitalization of know-how (this last means that the firm or corporation providing the know-how acquires equity participation in place of other means of payment for the transfer of technology and profits on these equity holdings are therefore payments for the transfer of technology); (V) through a portion of repatriated profits of wholly-owned subsidiaries or joint ventures which do not make specific provisions for payments for the transfer of technology; (VI) through imports of capital and other technical equipment, the price of which usually allows for the exporters' evaluation of the cost of technology.

The first, the use of patents, etc., is pretty straightforward. The second, in the absence of qualified people in the country to do feasibility studies, market research and systems analyses, may be an unavoidable expense. The rest are largely concealed and countries with no experience in dealing with monopoly control or anti-trust legislation or restrictive practices have no way of determining what is actually happening. The United Nations Conference on Trade and Development (UNCTAD) in its inquiries has found that this information is almost totally lacking and therefore the real cost of the transfer of technology cannot properly be determined. The UNCTAD inquiries in 13 countries of Asia, Africa, and Latin America — a small sample of the developing countries — brought out estimates for only the first two — for the patents and for managerial experience. This set the annual cost at the order of \$958 million a year or for the developing countries as a whole on these two headings alone at least \$1,500 million a year in annual foreign exchange payments.

The target for the expansion of manufacturing output of the developing countries during the Second United Nations Development Decade has been set at 8 per cent a year. The transfer payments on this basis can be expected to grow at about 20 per cent a year if the production target is to be achieved. An annual rate of 20 per cent means that those costs can be ex-

pected to expand by six times during the development decade to at least \$9,000 million by the end of the 1970's.

It is not just the out-going money. A study made for UNCTAD examined the policies relating to technology of the countries of the Andean Pact (TD/107). The study examined contracts for the purchase of know-how between national firms and those in possession of the technology. In five countries — Bolivia, Colombia, Chile, Ecuador, and Peru — for which precise figures were available, about 81 per cent of the contracts prohibited exports altogether and 86 per cent had some restrictive clauses on exports. Thus the production of and sale of goods and their licence were restricted to the countries themselves or, in a limited number of cases, to surrounding countries. A large percentage of the contracts for the commercialization of technology included obligatory terms requiring intermediate and capital goods to be purchased from the same source as that of the know-how. More than two-thirds of the contracts about which information was available in the five countries had such tie-in clauses. In Bolivia, out of 35 contracts analysed and in addition to the export restrictions and tie-in clauses on intermediates: 24 tied technical assistance (accepting only the experts from the licensing company) to the use of patents or trade marks and vice versa; 22 tied additional know-how needed to the present contracts; three fixed prices of finished goods; 11 prohibited production or sale of similar products; 19 required secrecy on the know-how during the contract, and 16 after the end of the contract; five specified that any dispute or arbitration should be settled in the courts of the country of the firm which was licensing the technology. It was not uncommon to find cases where a foreign wholly-owned subsidiary had capitalized in its books technology that originated from its parent corporation. As a result it could be (a) paying royalties, (b) reducing its tax payments through depreciation charges on intangible assets, (c) benefiting from lower tax coefficients in countries where taxable profits are related to invested capital, and (d) claiming higher capital repatriations. In effect, the country would be paying for the same technology four times.

These considerations explain why, over the past 30 years, the efforts at the transfer of technology to developing countries have had so far only a limited impact on their export performance. Their share in world trade in manufactures is still extremely small.

Various proposals for overcoming the restraints have been put forward. These included the suggestion for "Technology Transfer Centres." The work of the centres could be supplemented by the establishment of an internationally financed consultancy service aimed at reducing the cost and improving the access to transfer. These centres could also be operated at the regional or subregional level, involving close co-operation between the developing and the developed countries. There is also a proposal for a "Patent Bank for Developing Countries." This would be a self-operating Patent Bank, making available to partners in developing countries, modern technology under advantageous conditions. A third pro-

posal is a "World Bank for Technology." This involves the selective use of multilateral credits in cases where lack of bilateral facilities prove to be serious obstacles to access.

The influence of tied aid on access to technology, of course, demands close examination. The World Intellectual Property Organization (WIPO) and its predecessor organization, the United International Bureau for the Protection of Intellectual Property (BIRPI), have published model intellectual property laws for developing countries, and these laws have been approved by committees of experts from those countries; have organized and largely financed training courses for national administrators; and have developed a framework for such action required in a Patent Cooperation Treaty. Under this plan the resources of major industrial searching facilities in various countries, as well as those of the International Patent Institute would be made available to all the countries joining in the Treaty. Under the Treaty technical assistance would be available, and the Treaty explicitly foresees the financing of such assistance under various sources of international financing including the UNDP through WIPO. The Treaty itself is not expected to come into force until 1975, but the actual operations can precede that. The aims of this technical assistance programme, in conjunction with the regular legal-technical assistance programme of WIPO are:

(a) To assist all countries, particularly developing countries, in modernizing and adapting their national industrial property laws and administration in a way that will enable them to take advantage of the Patent Cooperation Treaty and to take into account the Secretary-General's recommendations;

(b) To assist in the establishment of such administrative systems as will enable technological information contained in patent documentation or assembled for purposes of the examination of patent applications to be channelled efficiently for the purposes of research and development.

Another handicap to developing countries is the lack of standardization. The total number of standards published by national organizations is in the neighborhood of 70,000. The number of recommendations issued so far by the International Organization for Standards (ISO) and the International Electrotechnical Commission (IEC) are approximately 1,425. It is obvious that international standards will have to be improved during the 1970s and special consideration must be given to the resources and industrial needs of developing countries. The creation of an institute for the study of standards and technology, working as an autonomous research body has been recommended. It could be located either at the International Organization for Standardization at Geneva or in a country which has already a fairly well developed national standards body. In cooperation with the regional economic commissions and UNDP, UNIDO should encourage industrial standardization training programmes, which may include courses for general standard experts, for planning, developing and running the national stand-

ards bodies; and specialized courses such as company standardization, the introduction of quality control techniques, and certification mark schemes. Standardization, including quality control, is essential if the developing countries are to make their entry into world trade in reasonable competition with the highly developed countries.

**About the Speaker: The Right Honourable The Lord Ritchie-Calder of Balmashannar is a Senior Fellow of the Center for the Study of Democratic Institutions, Santa Barbara. He commutes between California and London for major debates in the House of Lords to which he was elevated as a Life Peer in 1966. He was Professor of International Relations at the University of Edinburgh and, as part of his commuting, is Visiting Professor (Social Effects of Technology) at Heriot-Watt University, Edinburgh.*

He is the author of 32 books and his works have appeared in 42 languages. In the past 25 years he has travelled over 2½ million miles to most parts of the world, including the desert, jungle and Arctic areas, seeing how science and technology can be applied to human problems.

Since coming to the Center (August 1972) as Senior Fellow he has completed a survey of the role of science and technology in development since the Second World War. This report will be submitted by the Secretary-General at the next UN General Assembly. He is now engaged in organising a conference to be held at the Center in May on "Guidelines for a Global Science Policy".



Daniel R. Sadler

**SOME SNAPPY REAL LIFE
DO'S AND DON'TS**

by
Dan R. Sadler*

My talk is about some of the "do's and don'ts"