The Role in Industry of The Foreign Technical Representative and The Overseas Research Institute*

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Traditionally, international scientific communication has been considered only from the point of view of the working scientist. To him, the problems created by the accelerating growth of world knowledge are basically the same as they have always been: volume, time, language. True, these problems have increased in magnitude, but this is a difference of degree rather than of kind; and besides, the techniques of translating and abstracting have not stood still, but have kept pace through brilliant mechanization. I think that, in balance, the working scientist, although somewhat bewildered by the broadening horizons, can still face the future with the assurance that he is not destined to live in scientific isolation.

But today, world scientific communication needs to be looked at from a new point of view; that of the Director of Research of the large corporation. On this man's shoulders, increasingly, has fallen the difficult burden of guiding the Research thinking of his company by providing top Management with intelligent access to the new scientific knowledge of the world. Such access is both necessary and urgent to the management of American industry. It is necessary because our industrial structure has become so heavily dependent on scientific knowledge. It is urgent because of the competitive struggle between American and world industry, particularly the industries of Western Europe, a struggle which is rapidly increasing in intensity with the increased dependence of industrial nations on world trade, and with the resulting rapid elimination of the remaining world trade barriers.

From this point of view, the problems of international scientific communication appear quite different than from the point of view of the working scientist.

First looms the problem of intelligent interpretation; the jargon of the specialist often will not do for the eclectic scientist, who must direct many disciplines and integrate them into a unified program. Second comes the problem of selection, the separation of the few golden threads of real significance from the heavy cobwebs of triviality and detail. Finally, there is the problem of time, particularly of the crucial time interval between original investigation and world-wide publication.

It is about two forms of this type of scientific international communication that I wish to speak briefly this afternoon: the Foreign Technical Representative and the overseas Research Institute. Permit me to emphasize that these are only two of the methods of scientific intelligence available to research executives; they are not necessarily the most important. Communication through the working scientist at the home laboratory, who garners his intelligence from the scientific literature and from international meetings and symposia, still remains the most important source of information for the research executive. And yet, these two forms acquire increasing importance as the volume of accumulated scientific knowledge in the world increases, because of their selectivity, and because, if properly used, I believe they are more effective in bringing to the attention of an executive the right information, largely freed from extraneous matter, in the shortest time.

The position of technical representative is a relatively recent innovation. It came into prominence only after the Second World War; previously, American chemical executives had depended on occasional visits abroad by their key scientific people for communication with foreign scientific sources. In the aftermath of World War II, however, the need was felt for more direct and regular channels of communication with the great reservoir of scientific and technical knowledge which had developed in Western Europe under the pressure of the war effort. At this time, in the middle and late 1940's, many American industrial companies, among them most of the large chemical firms, began to experiment with technical people assigned to this exclusive task. The American Cyanamid Company sent its first technical representative to Europe in 1947: Dr. L. P. Moore, now President of our subsidiary, the Arizona Chemical Company.

WHAT EXACTLY IS THE FUNCTION OF THIS POST, AND WHAT HAS BEEN THE EXPERIENCE?

The technical representative has a delicate, confidential, and highly skilled job to perform. His basic function is to uncover and report back at the earliest possible stage significant scientific developments occurring in his assigned area. A superficial and uninformed observer might consider this work a kind of scientific espionage: but there could be no greater misconception. A technical representative is a scientific ambassador rather than a scientific spy; he receives much only if he has much to offer. The information which he gathers comes from scientists who are most anxious to have it known. The normal publication channels of the patent and scientific literature, in which the same information has or will eventually appear, are considered by the discoverer frequently insufficient, either because they are too slow or else because they bury the significant under a mass of material which to him is trivial. The discovering scientist

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invariably is elated at finding a special, unique channel of transmittal of his work to a foreign country.

But we must not be misled into believing that this information, because it is waiting eagerly to be shared, is available to anyone. Most scientists are busy people and they have no time to waste with every foreign visitor who wishes to walk into their laboratory to pass the time of day. However, they are happy and eager to find the time for a man who can understand their work, spread it abroad into proper channels, multiply its usefulness, and broaden its significance. To be successful, the technical representative must be, and prove that he is, just such a man.

First, he must be highly competent in science, yet humble in his limited knowledge. It does not take a good scientist long to uncover a scientific fake. Secondly, he must come to know and like the prominent scientists in his area, both in industry and in universities. This takes a good deal more than time and patience. Without a true, sympathetic understanding of the mores, the culture, and the traditions of the country and the institutions with which he deals, no man will ever be accepted into their confidence. Third, he must be thoroughly familiar with his company's scientific program and latest research achievements. The knowledge is his own true credential. A technical representative's usefulness can be killed quickly by his blank expression when asked about a recent scientific publication from one of his company's laboratories. We must also remember that scientific communication can never be a one-way street: it is a broad avenue in which scientific information must move freely in both directions. If a technical representative cannot be trusted with the judgment to decide what he may or may not reveal, he should never have been appointed. Finally, a successful technical representative must have the immediate ear of top research officials of his company. If his intelligence is related second or third hand, it will lose one of its most precious values, timeliness.

WHAT RETURNS CAN ONE PROPERLY EXPECT FROM A TECHNICAL REPRESENTATIVE?

Let me say first that the greatest danger is to expect too much too soon. A good representative will take two or three years in which to form friendships and establish channels of communication; during this period of preparation, he should not be expected, nor should he attempt, to obtain information that could not be gathered as easily from the published literature. From this point on, however, his usefulness should grow with the years.

One of the most valuable results of the technical representative's efforts is to single out the key men in the areas of research most interesting to his company, and to build direct channels of communication between them and his own company's scientific leaders. A good representative will know that the key men are not always those who make the headlines. The second result of value is to discover new trends, or new emphases in research while they are still in the formative stage, perhaps one to two years before they become public knowledge in the scientific community. Scientists well know that scientific articles, or notes to the editor of scientific journals, do not always give the true rationale for a new approach, or the ulterior goal, often too dimly seen to be revealed in print. Thirdly, a competent representative often can detect possible commercial utility in an embryonic idea and thus establish an early priority in licensing rights for his company. Discoveries that may appear of purely academic value, or of value only in a specific application, to the original discoverer, may be seen in an entirely new light by a man with a keen commercial as well as scientific understanding of his own company's business.

We believe that the technical representative position is far from a panacea for all problems in international scientific intelligence. We also believe, however, after 15 years of experience with this approach, that it can be used effectively to spotlight certain information of importance.

No matter how effectively the technical representative may enter into the pattern of life of his host country, by establishing permanent residence, learning the language, absorbing the culture, he still remains a foreigner, an American. To him, certain doors remain closed, certain intimacies forbidden. The overseas research institute may help to fill some of these gaps.

Let me make completely clear from the outset that anyone who would establish an overseas research institute purely as an outpost for scientific intelligence must be out of his mind. A research institute is a major investment. Our own European Research Institute at Geneva, Switzerland, cost us in the neighborhood of $1,500,000 to establish, and close to $400,000 a year to run. The real motivation for such a large expenditure must lie in areas other than that of scientific communication. Ultimately, it must be founded on the belief that valuable research can be accomplished there, and that this research will pay for itself.

However, it is possible, as a by-product of such an establishment, to obtain a membership card into the exclusive club of a foreign scientific community, provided certain conditions are fulfilled. The scientific leaders of such an overseas institute must be nationals of the area in which the institute is established, with their scientific and personal loyalties completely bound with that area. They must form an intrinsic part of the local scientific community, and to be such, they must contribute their proper share to the area's scientific publications, not merely in volume but in quality of fundamental significance. They must give freely of their time and talent to the professional and scientific life of the area; by lectures and seminars at universities, by training young scientists and apprentices in their laboratories, by contributing editorial, abstracting or committee services to the scientific institutions of the country. And their identification with an institute of American origin should not be too fixed, too permanent; a frequent rotation is desirable to avoid their acquiring the clear characteristics of an employee of a foreign firm.

An institute so organized, particularly if not too commercial or too applied in its research outlook, can in time become an indistinguishable member of the scientific establishments of its area, and its scientists fully accepted members of the area's scientific community, able to influence that community's actions as well as be influenced by them. The staff or "faculty" of such an institute can be a real asset in giving research executives of an American

firm an insight into the life and thought of a foreign scientific community. If this staff is brought occasionally into the U. S. and made to feel like welcome associates, rather than direct dependents, of the American enterprise, they can give valuable guidance in assessing important research trends in their country, and even predicting important break-throughs before they occur.

The American Cyanamid Company established such an institute in Geneva, Switzerland, in 1959. Its laboratories house some 50 scientific workers exclusively engaged in fundamental research. The institute's scientific directors., comprising English, German, Swiss and Danish subjects, have been exceptionally well accepted in European scientific and academic circles. Significant scientific contributions in theoretical organic and inorganic chemistry, molecular orbital theory, and the physics of the solid state, have begun to issue from that laboratory. It is really too early to say whether the Cyanamid European Research Institute will also prove of some value as a means of communication with the European scientific world, particularly since we have made no effort to utilize the institute or its staff in that manner. Indeed, it is not our intention to make such an effort, except as it may occur naturally in the frequent scientific interchange between our institute's scientists and their counterparts in our domestic laboratories.

The Role of the International Union of Pure and Applied Chemistry*

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It has been said many times that science knows no national boundaries. If proof were needed the history of chemistry has much to offer by way of evidence. Papers in the early journals of chemistry were not submitted only by citizens of the country in which the journal was published. They were just as likely to come from abroad. Further, there has always been that important supplement to the published literature of chemistry—personal correspondence between investigators in different countries.

But such means as these fall far short of meeting the full needs of communication. It is the purpose of this symposium to explore some of the other means for promoting world-wide exchange of information in the field of chemistry. My assignment is to describe the ways by which the International Union of Pure and Applied Chemistry contributes to international communication in its area of science.

The Union, commonly known by its English initials as IUPAC, was organized in 1920 as the successor to the International Association of Chemical Societies. The predecessor body was formed prior to the first World War and was composed of about fifteen national chemical societies, all in Europe. In Europe few if any chemical societies are as broadly representative of the whole field of chemistry as is the American Chemical Society in the United States. It became apparent to the chemical leaders of the time who were interested in promoting international communication that the adhering bodies of an international organization that was to be truly representative should, each in its own country, represent the whole field of chemistry and chemical technology. Such representation was provided for in the statutes of the new Union. Thus, in the United States, the Division of Chemistry and Chemical Technology of the National Research Council became the adhering body. Although the American Chemical Society, through its divisional structure, and in other ways, has very successfully integrated most of the organizational interests of chemists in the United States, there are several specialized societies, all of which find a common meeting ground in the National Research Council's Division of Chemistry and Chemical Technology. In Great Britian it is the British National Committee for Chemistry that is the adhering body, in Canada, the Division of Chemistry of the National Research Council, and in France, the Comité National de la Chimie. Because of this basic principle of operating through broadly representative national bodies the Union has a network of communication with chemists throughout the world that is potentially very effective. I shall have something to say later of the extent to which the effectiveness has been and, hopefully, can be realized.

The Union's devices for international communication are broadly divided into two kinds—international congresses and symposia, and the commissions. I feel certain that chemists in the United States know more about the former than the latter. The usefulness of international congresses of chemistry was recognized by chemists before there was a formal organization to sponsor them. The first such congress was held at Brussels in 1894, under the sponsorship of the Belgian Association of Sugar Refining Chemists. The second was held in Paris in 1896, and succeeding ones in Vienna (1898), Paris (1900), Berlin (1903), Rome (1906), and London(1909). The last congress held before the first World War was in New York, in 1912, with 4400 chemists participating. Nearly 800 papers were presented in a program divided into 23 sections. This may well have been the largest congress ever held in proportion to the number of chemists available to attend one. The proceedings of the 1912 Congress, in 29 volumes with a total of 7500 pages, made an impressive contribution to the literature of chemistry and provided an

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