

six months more of laboratory work would provide a basis for a broad patent application, instead of the narrow case which could be filed at the time. The salesman insisted that favorable timing in the market would be lost. The management decision was in favor of the attempt for broader protection, so the research work went on. It turned out that the process was operative only in the narrow, specific area, and that only limited claims were justified. Understandably, the sales manager was distressed at the delay. But he and the rest of the people concerned found some consolation in knowing the limited patent application was a strong one, since it was based on an excellent showing of critical limits.

It is instructive to consider the function of the patent man in each of those situations. He had to combine two or more points of view, adding special knowledge of his own. He had to interrelate law, technology, and economics, to arrive at a solution which offered the greatest benefit to his company. In other words, he had to look at these *patent* problems just the way his company management has to look at every problem.

This is the challenge to the patent chemist. His management needs advice on patent matters which takes into account these interrelations. It needs patent advice which does justice to research, manufacturing and sales interests, based on sound knowledge of patentability. The patent chemist can offer this synthesis to his management.

The job takes real effort, but from the management point of view, it is worth doing. In fact, at least one organization *insists* that it be done. Each of du Pont's newest fibers—"Teflon"[®] TFE-fluorocarbon fiber, "Lycra"[®] spandex elastomer fiber, and others which are still being evaluated—was developed by a team of research manufacturing and sales workers. Definition of a favorable

patent position was part of each effort, and the responsibility for that position was given to a team of a patent chemist and an attorney who stayed with the job from beginning to end. Management required the patent chemist to present to them a unified patent picture, representing the best possible integration of interests of the groups involved. That picture, revised and kept current, was considered as each management decision was made. And in each decision, the patent man knew he had made a significant contribution.

The responsibility which the patent chemist undertakes as a management advisor is not a light one, and the opportunity for participation must be earned by sound performance. He must consider each question from four points of view: Research, Legal, Manufacturing and Sales, but must not become a partisan of any one. He must weigh research goals, prior art obstacles, Patent Office requirements, manufacturing needs, sales desires, foreign filing deadlines, inventorship data and double-patenting rejections. He must remember the economic stake in each program, and scale his efforts accordingly. He must learn to work on six jobs at once, when the time available isn't enough for three. He must give honest answers, even when he knows they will be unpopular. The challenge is great; the reward is active participation in the progress of new scientific and industrial ventures.

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Opportunities for Chemists as Patent Solicitors*

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Despite the continuing need for chemists to practice the mystic arts in laboratories, there are several justifications for informing chemically trained people of opportunities in fields seemingly remote from their initial areas of interest.

It is a recognized fact that, among those in any line of work, some become restless for any of a number of reasons before they can move from the base of the profession to its apex. Such people either seek other opportunities, or remain as frustrated practitioners of the only art they know. In the chemical industry, we find that the Technical Service departments, the Sales departments, Production Scheduling departments, and the Executive and Administrative departments all require chemically trained and preferably industrially seasoned staffs. The same is true of the Patent Departments.

The symposium for which these remarks were prepared was held in recognition of two complementary facts, that some chemists do seek employment away from the bench and test tube, and that the Patent profession has several types of opportunities of offer to chemists. This segment of the presentation is concerned with opportunities for chemists as patent solicitors.

The task of a patent solicitor is to obtain patent protection for the inventions of his clients. In each country having a patent system, the work of a patent solicitor must conform to a set of standards prescribed by the statutes and administrative regulations of that country. Such national differences as exist in these standards are in matters of detail which need not concern us, because there is a common theme in the patent laws of all countries with respect to requirements for patentability. Every country requires that a patent application shall describe the invention in such full clear terms as

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to enable others to practice the invention, and most countries require that the invention be claimed in a manner such as to distinguish it from the prior art.

In order to prepare a patent application, to meet these universal requirements, it is necessary to discuss the invention with the inventor, in the technical jargon of his profession. It is necessary to know the relationship of the invention to what has preceded it. It is necessary to write a clear and precise description of the invention. When the application for patent is made in a country which examines, rather than merely registers, patent applications, it becomes necessary to study the references cited by the Patent Office, and to write a technically sound argument for patentability of the client's invention over the references.

It becomes evident, then, that the work of a patent solicitor depends largely on his possession of a variety of communication skills. He must speak and understand the inventor's technical language. He must be an adept questioner and a good listener, in order to extract all pertinent facts from the inventor. He must be at ease with people. He should be a diplomat. He must be a careful reader, so that the significance of every word in a pertinent publication, or in the inventor's disclosure of the invention, is clearly understood. He must have a large vocabulary, from which he can with precision select the words best suited to define the invention, or to frame any necessary arguments. He must like to write, and be able to marshal facts in an orderly array in his writings. When using technical jargon, he should keep it diluted with plain English so as to be understood by those with less than the inventor's expert knowledge of the subject. He must remember that patents are interpreted by judges who are usually not scientists.

All of this sounds more formidable than it really is. Few of us who have transferred from chemical research to patent work were aware, when we made the change, that we possessed all or some of the qualifications just mentioned.

What are the opportunities for chemists in patent soliciting? Even if we take a very limited view of what constitutes chemical subject matter, it can be shown that from 20 to 25 per cent of all United States patents can be designated as chemical. In the past eight calendar years, the "Uniterm Index to U. S. Chemical Patents" has listed nearly 78,000 such patents. Recognizing an average 40 per cent mortality of applications, these patents represent about 130,000 chemical patent applications, or an average of over 16,000 per year. The preparation of this many applications requires the time of an equivalent of 640 chemical patent solicitors. If there are that many qualified people practicing in the United States, many of them devote a great share of their time to other aspects of patent work, including administration, opinions, licenses and litigation. Actually, many of the chemical patent applications are prepared by non-chemical personnel.

Another clue as to the need for chemically trained patent solicitors can be found in an approximate relationship between the number of graduate chemists in a research department and the number of inventions made in that department per year, coupled with the number of inventions which can be studied and disposed of each year by a chemical patent solicitor with a typical load

of other work. Let us assume that each 100 graduate research chemists may produce 60 to 90 invention disclosures per year, and that each typical chemical patent solicitor can study and dispose of 30 to 40 disclosures per year. There should then be from 1.5 to 3 chemical patent solicitors for each 100 graduate research chemists in patent-conscious laboratories, merely to handle the United States Patent applications. The resulting number should be increased one-tenth if the owner of the inventions has an active foreign patent program.

As patent solicitors gain experience, they also acquire more diverse duties. Some supervise the work of others, and this calls for a broad knowledge of the field of chemical interest of the client. Some, with the necessary legal qualifications, become involved in rendering opinions as to validity or infringement, or in licensing, or in litigation. Still others move into management positions. Some eventually reach retirement age. Each such depletion of a chemical patent staff gives rise to a place for another chemical patent solicitor. The continuing growth of industrial chemical research creates new openings for chemical patent solicitors.

It might be asked, since patent practice is a different profession from chemical research, how difficult it is to make the transition and to become a creditable patent solicitor. For those who have a reasonable aptitude for the communications skills which were mentioned before, little difficulty is encountered in making the transition and there is no significant difference based on the age at which the transition is made. There seems to be an advantage accruing to those who have had industrial research experience, as contrasted with those who have had only college training. Those with more than one degree have, as their principal advantage, a greater familiarity with the language of chemistry, while those with degrees both in chemistry and in law adapt more readily to the formal requirements of patent procedures.

Of 15 chemically trained people who joined the patent soliciting staff of The Dow Chemical Company as Patent Trainees within the last few years, 9 transferred from research or other departments, while 6 came directly from law school. This group prepared an average of over 21 applications per person in their first year. Those with recent chemical laboratory experience average nearly 25 applications, while those whose legal training had temporarily broken their association with chemistry averaged 17. Those who were from 26 to 30 years old when entering patent work averaged 19 applications their first year; those 31-35 averaged 22; and those 41-45 averaged 25. The group reviewed is too small to provide statistically sound conclusions, but there are no apparent grounds for fear of taking well trained chemists of any age for training in either domestic or foreign patent soliciting.

When asked what aspect of patent soliciting appealed most to him, a Chemical Engineer—Lawyer, now Director of the Dow Patent Department has replied, "It is illegal to do the same thing twice!" Certainly, one of the stimulating features of patent work is its variety—new products, new processes, and new inventors all represent new challenges which follow one another in rapid succession across the calendar of the typical chemical patent solicitor. A chemical corporation Patent Department, like the family doctor, shares in the exciting secrets of coming events as well as in the disappointments of projects

that miscarry.

At this point, it seems appropriate to give a few suggestions to those who may wish to prepare themselves for a career in chemical patent practice. Those who form this intention early, while still undergraduates, should take the most intensive courses available in English composition. It often seems harder to teach writing to a chemist than to teach chemistry to a writer. For those who have completed their intended schooling in chemistry, several procedures are open. They may go directly to law school on a full time basis, completing the course generally in 27 to 33 months, and then seek employment in a patent department. Alternatively, they may seek employment as chemists, or possibly as chemical Patent Examiners in Washington, and study law in the evenings for about four years, before moving to the practice of patent law. For those who are now employed as chemists, the alternatives are only slightly different. One can go to night law school and enter patent work after graduation, or one can enter a corporation Patent Department as a Patent Agent Trainee, and study law as the op-

portunity arises. Many chemical companies do not require all members of the Patent Department to be lawyers either at time of employment or as a condition for continued employment. It seems probable that for at least another generation lawyers who are also competent chemists will be quite rare. For that reason, those who do have this combination of qualifications will be much in demand not only as patent solicitors, but as counsel and barristers in chemical patent matters. Similarly, the shortage of lawyer-chemists insures a continuing need for writer-chemists in the solicitation of Chemical patents.

To summarize, the role of a patent solicitor is to be a communications specialist, receiving the message from the inventor, comparing it with prior knowledge, phrasing it in scientifically sound and legally sufficient terms, and advocating its acceptance by the Patent Offices of the world. In patent applications dealing with chemistry, as in other fields of technology, the best job of advocacy and the most meaningful communications can be done by those who make knowledgeable use of the vocabulary of that science. Chemical patent solicitors should be chemists or chemical engineers.

Opportunities for Chemists as Patent Attorneys

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Other papers in this symposium have given you some insight into the intriguing field of patent work and have suggested ways in which a chemist can take part in that work without giving up his professional status as a scientist. I would like to play another stanza of this tune and show you something of the patent attorney's life.

The acquisition of the necessary legal background to become a patent attorney requires further formal education—three years by day or four years by night—in law school, taking the same courses that all would-be attorneys take, regardless of whether they plan later to enter a specialized field such as patent law. The mental hurdle which may have to be overcome is that the patent attorney's colleagues will probably think of him as a lawyer rather than as a scientist. For some, the thought of being identified as an everflowing source of "whereas clauses," various and sundry Latin expressions (pronounced, by the way, as a lawyer and not as a Latin scholar), and all types of legal gibberish in general, is completely unpalatable. But for others who can ignore such gibes it is readily recognized that a patent attorney's profession encompasses deeply interesting and intriguingly challenging tasks, each of which is unique.

Mr. Heindel's paper discusses in some detail one of the principal pursuits of most patent attorneys—applying for a patent and conducting the prosecution of the application to a final disposition, hopefully the issuance of the patent.

In this role the patent solicitor begins to appreciate the truth of the expression, "We live by our words, both written and spoken, as well as our brains." That is probably the most important skill that the attorney can possess, and, undoubtedly, is an extremely valuable asset for anyone, regardless of his profession.

There are two main functions of an attorney's professional life which depend not only on his ability to communicate precisely, but also on his ability to understand and to assimilate the communications of others. The attorney is both a counselor and an advocate. The function of being a counselor is not greatly different from that same function in many other professions. Each scientist in the business world will frequently find himself advising his superiors or his co-workers with respect to his particular area of interest. Furthermore, in order to be able to advise correctly, he must be able to assimilate the theories, opinions, and observations of others as reported in the technical journals. The attorney, likewise, does this by reading court decisions and statutes in the areas of his interest, as well as dissertations on legal principles in law school journals. From the report of each decision, the attorney is trained to derive a "rule of law," which can be employed as a principle in a later case embodying a similar, but not identical, fact situation. In common parlance, this is "logical reasoning," which is an equally valuable talent for the scientist.

Another characteristic of the attorney's training is the development of the ability to look at all sides of any

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