

Symposium

Challenges and Opportunities for Chemists in Patent Work*

Introduction

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Much has been said elsewhere about the problems created by the tremendous rate at which the over-all chemical literature is growing. A very significant portion of this increase is in that part of the literature which is represented by patents. For simplicity, consider the number of patent abstracts published in *Chemical Abstracts* for the years 1950 and 1960. In 1950 the figure was about 8,000 (which incidentally is roughly equal to the total number of *papers* abstracted in 1920). In 1960, however, there were 27,675 patents abstracted in CA from the patent offices of 23 countries.

The increased flow of inventions into the literature is a mark of scientific progress, and a great deal has been said about this in many circles. However, this growth in rate is such that more and more people are required to handle the work of procuring and interpreting patents. This work discussed in the symposium all requires technical training, and in addition some of it requires legal training. Many people—including many chemists—appear to think that patent work is a form of black magic rather than a form of scientific endeavor. Those of us

who are active in the field know of course that this is not true. This symposium has been put together in the hope of clearing up some of the confusion on this point—both for those who are just embarking on careers in chemistry and for those with professional experience in other areas who might find patent work more attractive if they knew more about it.

The authors of these papers were chosen in part because of the variety of their personal backgrounds and experience in American industry. They can thus present from a wide cross-section, a story of the fascinating variety of work available in the field of patents in the chemical industry of today. One is a woman and four are men; one chemical engineer and four chemists; one is a patent attorney, two are patent agents and two are neither. Some are from small companies and some from not-so-small companies.

The patent offices of the world were not represented on the panel—not because we dislike them, but because we thought it a big enough job to try to talk about industry's part of the problem in one morning. Those readers who are interested in learning more about that part of the field should have no difficulty locating papers which should serve their purpose.

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Criteria for the Chemist in Choosing a Career in Patent Work*

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It is generally agreed that the selection of a career or lifelong pursuit is one of the most important and most difficult decisions which face most people. Nevertheless, the selection of a career often is made without benefit of adequate guidance or significant personal experience, without a full awareness of one's abilities, and often without a mature conception of lifelong desires and ambitions. Fortunately, most of us can find success and happiness in any of a number of specific careers, especially when a fairly judicious choice is made as to the general nature of work in which a specific career is sought. Thus, the individual who decides upon a career in science might

find satisfaction and success in any of several specific branches within the realm of the scientific professions. Likewise, having chosen a career in chemistry, a chemist could no doubt find satisfaction in any of several fields of specialization.

There is the possibility, however, that an optimum specific career may exist for an individual and might be discernible by a careful analysis of those factors which generally influence career selection. This discourse is essentially directed toward those who are preparing for or are engaged in a career in chemistry and who might find that the field of patent chemistry would provide an optimum career in view of their interests and abilities. Early perception of an interest in a patent career is

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desirable, since, unlike other fields of chemical specialization, the requisite specialized training and experience is not readily accessible.

There are numerous excellent publications which offer guidance in the selection of careers in the chemical professions. These usually present generalizations on educational preparation and personal requirements along with detailed descriptions of various specific careers wherein definite educational and personal requirements are delineated. In studying through the various appropriate publications on careers in chemistry, certain personal characteristics are generally mentioned as essential, desirable, or typical, and I will now mention some of these in their approximate order of general occurrence:

1. A liking for experimentation.
2. A creative imagination and desire for intellectual self-expression, exploration and discovery.
3. Patience to withstand disappointments and to avoid premature conclusions without logical and sufficient proof.
4. The desire and ability to keep abreast of new developments by continual reading.
5. Clear and persuasive self-expression, both written and oral.
6. The ability to handle problems involving facts, theories, or subjective opinions.
7. Manual dexterity.
8. The ability to get along well with others, and,
9. A desire to seek recognition for professional accomplishments through publications.

It is of interest now to compare these criteria with the general characteristics of patent work.

If the basic motivating force which has led an individual to the chemical profession is the desire to perform laboratory experimentation with first-hand observance and interpretation of physical phenomena, then a career in patents or any other non-laboratory work clearly is not recommended. Although certain positions in the patent field can be found which involve some physical contact with laboratory experimentation, these positions are quite rare indeed. The closest a patent chemist ordinarily comes to experimentation is in suggesting to research personnel that a certain experiment be run, and in convincing them of the merits of the experiment strongly enough so that it will be carried out essentially as suggested. Invariably, the degree of difficulty in selling research personnel on the merits of an idea varies directly with the closeness of the idea to the work in which they are currently engaged. Thus, if the idea is fairly unrelated to any existing laboratory program, then, regardless of its intrinsic merit, it may take hours of discussion and reams of correspondence merely to authorize someone to perform even a ten-minute experiment. This sort of situation could be quite vexing to the chemist who is accustomed to being in close proximity to the laboratory and fairly unhindered in performing scouting experiments to quickly prove-out any new ideas which may be in line with or deviate from major assignments.

It should be noted, however, that a good deal of modern chemical research is devoted to almost routine type experimentation aimed at perfecting products or processes by painstaking study of the individual parameters known to be involved. Also, whereas the mental concept of a brand new idea can be a source of exhilara-

tion, a considerable amount of time may have to be spent on mundane, picayune, or even irritating details of procuring or constructing equipment or materials before the new idea can be tried and proven. Thus, mature individuals who have not been attracted to chemistry by an over-glorified vision of spending all their time making world shaking discoveries, will generally view research and patent work as affording equal fulfillment and gratification in those realms of intellectual endeavor which first beckoned them toward chemistry.

The securing of a patent is tantamount to the creation of valuable property from fairly intangible constituent elements. The extent of ingenuity involved in converting laboratory ideas and data into sound patents occasionally surpasses the degree of creativeness concerned with the patentable invention itself. Some areas for creative ingenuity commonly afforded in patent work are:

- a. The perception of patentable ideas in company research reports, or making outright discoveries by correlating information within the general literature.
- b. The determination of the suitability of alternative or improved chemicals or processes related to a given invention. Essentially, this provides a determination of the scope or boundaries of the invention and points to other inventions or areas for research.
- c. The discernment of unobvious or barely perceptible differences between a new invention and a close prior reference.
- d. The creation of a verbal picture of complicated processes, machines, physical structures or chemicals.
- e. The matching of wits with a patent examiner, or patent attorney-whichever the case may be. This is somewhat analogous to a chess game and involves basic strategies, good logical reasoning and some applied psychology.
- f. The determination of the best patent strategy for the commercial exploitation of an invention in view of customers' and competitors' activities.
- g. "Detective work" to try to elucidate a competitor's actual plant process through complete and careful introspective study of the competitor's patents in conjunction with other sources of information, and,
- h. Devising around competitive patents.

Thus, I don't think any chemist could really complain about a lack of opportunity for constructive originality in patent work. Although patent work may involve a creativeness equal to that of laboratory research, it is of a less tangible nature, requiring a more generally mature perspective.

The patent chemist generally does not experience the sort of disappointment which may overcome a research chemist when, after a long period of painstaking research which monopolizes most of his thoughts and actions, a project ends in failure due to economic or technological considerations. The patent chemist handles a great many separate patent applications at a time. The failure of any one case, representing only a small part of his over-all activity, although temporarily disappointing, would not cause any lingering sense of discouragement.

Since the patent chemist requires a broader knowledge of chemical technology than research personnel who specialize in narrowly defined fields, and since he must also keep abreast of new developments and trends in

patent law, his continual reading of appropriate literature must generally surpass that of the average research chemist. Literature searching plays an important role in patent practice, but the extent of searching required in any specific job can vary from zero to major proportions, depending upon company policy and organization. Although a patent chemist will have little likelihood of publishing papers on practical accomplishments in chemistry, theoretical papers are not beyond consideration, and there is the distinct possibility of publishing, in the *Journal of the Patent Office Society* or elsewhere, papers concerning subjective analyses or interpretations of various aspects of patent practice.

Much has been said about the need for a good creative writing ability in patent work. This point has probably been overstated, and may be a factor tending to dissuade people from entering the field. Patent specification writing is a specialized skill, and it is difficult to try to assess an individual's capabilities in this art by extrapolation from other writing skills. Even the best patent practitioners may not be able to perform well in other types of creative writing. Any chemist who can write understandable reports on complex technological subject matter probably can learn to write patent specifications. Neither should a liking for report writing be considered a necessary omen for successful patent work. Report writing is often a mere recapitulation of the same material previously written in notebooks or other reports and for this reason may constitute an uninspiring chore; whereas patent writing affords the challenge of constructing something original and interpretive. No strong showing of creative writing ability is required in securing a position as a Patent Examiner; and the Patent Examining Corps of the Patent Office constitutes the major training grounds for patent practitioners. Patent writing in general, however, requires meticulous accuracy in conforming to prescribed format and procedural details. A writer unable or unwilling to conform would be unsuccessful in this field of endeavor.

A skill probably as important as a writing aptitude, but less frequently mentioned, is an aptitude for critical reading and comprehension. More specifically, a good patent practitioner must be able to easily find the "needle" in a haystack of verbiage. Many patent cases, on first glance, may appear to involve obscure, complex, multifaceted inventive concepts and very complicated controversies between the attorney and the patent examiner. In most instances, however, if one can successfully wend his way through the maze of irrelevancies, trivialities and argumentative blind alleys, one or two clearly defined courses of action will be delineated, and the inventive concept will become pure and simple. This ability apparently is an uncommon one, since many chemists admit they cannot fully comprehend the true significance of patent specifications and claims; and the issued patent generally represents the simplified outcome of all that went into its making, and often is essentially the "needle" that was found in the haystack.

The only manual dexterity required of a patent chemist is in the successful handling of his swivel chair and office dictating machine. Unskillful handling of the former would probably constitute the only real safety hazard a patent chemist ever faces. The office environment, however, may not be an easy change for the chemist

who is accustomed to continual moving about in a large laboratory area. The ability to sit for long hours without much relief is a requirement for patent chemists not to be laughed off.

The ability to get along well with people is of greater importance in patent work than in most other careers in chemistry. Patent practice generally requires contact with inventors of all scientific levels, management personnel of various executive echelons, patent attorneys, patent examiners, liaison chemists, literature searchers, draftsmen, secretaries, file clerks and other personnel. The patent chemist may occasionally have to perform polite and subtle interrogations of reticent inventors to tactfully extract the salient features of their invention and ferret out pertinent aspects of the prior art and commercial objectives. An extroverted personality, good diplomacy, and effective oral communication are thus fairly essential.

Patents are concerned with practical accomplishments which are not directly predictable in view of existing knowledge or which, in fact, relate to unexpected exceptions to known theories. A chemist with heavy theoretical leanings, when viewing an invention in retrospect, may often feel that certain chemical laws, theories or combinations of theories could have predicted the invention; and thus might consider the invention unpatentable. The determination of the degree of unobviousness required to qualify a given invention as being patentable is based on a subjective interpretation of the facts of the invention and the prior art, viewed in the light of pertinent doctrines of patent law. Unless the proper perspective is secured, a negative attitude toward the patentability of inventions may develop and would make patent work infeasible. A good knowledge of pertinent chemical theory, however, is useful in ascertaining the scope of an invention, and in delineating its unobviousness in view of conflicting theories. An ability to solve problems having indefinite, subjective, or opinionated answers is a prime requisite, and this could constitute a barrier to those scientists who prefer the mathematical exactitude and proveable accuracy of an exact science.

OPPORTUNITIES IN PATENT WORK

The Patent Office in Washington is continually seeking new patent examiners. Generally, a Bachelor of Science degree is required in addition to fulfilling other entrance requirements. Working in the patent office as an examiner is probably the quickest way to learn the procedural aspects of patent law. After four years in the patent office, an examiner is automatically considered a patent agent. This essentially constitutes a waiver of the necessity for taking the written examination on patent law administered by the Civil Service Commission which is required to qualify one as a patent agent. Law schools in the Washington, D. C., area offer evening courses leading to an LL.B. degree. Most examiners take advantage of this opportunity, although the course generally runs four to six years and is a considerably greater ordeal for the family man than the single man. In view of their excellent experience, patent examiners are sought by corporations and private law firms, although the examiner cannot work in the technological area of his examining experience for at least two years after leaving the

Patent Office. Some employers, however, are of the viewpoint that a patent examiner may have developed a negative attitude toward patentability, *i.e.*, he may be more skilled at rejecting patents than securing them, and for this reason may *not* prefer a former examiner.

Patent attorneys, having a law degree and having passed the patent law examination, find a wide range of opportunities both in private practice and in corporations. The patent attorney can handle patent matters either in the patent office or in court, in contradistinction to the patent agent who is not a lawyer but has merely passed the patent law examination and can only handle patent matters within the Patent Office. The work of a patent attorney is quite varied and challenging. However, the individual gradually becomes less of a chemist and more of an attorney. This situation should be well borne in mind early in the selection of a patent career.

Probably the most important category of careers in patent work for the chemist is in the "patent liaison group" of large chemical companies. The specific functions and organization of liaison groups vary; however, certain generalizations can safely be made. The "liaison man" generally coordinates all efforts between the laboratory and the attorney in the development of patents. The liaison chemist's duties may generally include the writing of the patent specification and an outline of subject matter to be claimed. However, the attorney generally does the wording of the patent claims, determines inventorship, handles all prosecution, and decides questions of infringement and validity. Liaison personnel are usually selected from amongst the accomplished or senior chemists within the company, and initial assignments may be in the area of the chemist's recent experience. Previous knowledge or experience in patent work is not usually essential. In the environment of the liaison group, all aspects of patent practice can be learned quickly in view of the volume and diversity of patent problems and the opportunity for close association with individuals of similar backgrounds and interests. Within a few years in the liaison group, most chemists can, with little difficulty, pass the patent law examination to become registered patent agents. The liaison man may generally follow the work of thirty or more research chemists and usually secures as broad a

grasp of over-all company research objectives and progress as management personnel in the research divisions. The liaison man thus has a pseudo-supervisory position. His advice on research matters is often sought by management and research personnel. Much of the patent work in a large corporation is of a defensive nature, that is, to prevent others from patenting the same thing. Thus, seemingly minor improvements in plant processes or equipment frequently are filed upon. Accordingly, the liaison man is frequently called upon to prepare cases where the odds against patentability are high in view of extremely close prior art, but where one cannot be certain as to whether or not a competitor could, with enough ingenuity, secure a patent on the same technology. Some mechanical inventions may have to be handled if they fall within the patent man's general area of responsibility. In important company developments, groups of patent cases of interrelated inventorship and technology often arise. These are generally woven into a strategic defense network of patents to protect all aspects of a newly planned business venture. Speculative patent applications, where it is merely desired to create new patent property for possible sale or barter to others, are rare.

Experienced patent chemists generally are sought by smaller consulting or manufacturing companies for assignments which may include all aspects of patent practice plus other administrative or research duties as well. The smaller company often requires a good patent position on inventions to establish manufacturing feasibility. In many instances a small company may develop an idea which it cannot afford to commercialize. Based on a filed patent application, the company may try either to sell the invention or attract the necessary capital required for commercialization. This aspect of patent work requires the best possible patent drafting, the ability to appraise the monetary value of inventions, and the ability to sell ideas, patent applications or patents.

In conclusion, it is seen that a patent chemist is a sort of professional chameleon. He can be part chemist, chemical engineer, lawyer, businessman, or salesman. In view of the great diversity of gradations of challenging job characteristics, it is a wonder that the field is not overcrowded and "booked solid" for years to come.

The Literature Chemist in Patent Liaison*

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There are some interesting opportunities for literature chemists to take part in patent work in medium-sized and small chemical companies which do not maintain patent departments. Patent protection is sought for the discoveries made in such companies just as it is by larger firms. Recognizing the value of patents, employers usually

provide the best legal talent they can afford to obtain the patents, yet they may be disappointed with the results.

What management may fail to realize is that in many cases the research chemist who made the invention and the patent attorney from an outside legal organization—the so-called "outside attorney"—may not speak the same language and that there is no common ground on which they can get together. Unless care is taken to provide

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