has selected appropriate inventors in chemistry and has provided recommendations to the Chairman as to nominations and election for this honor. As a result Charles M. Hall was elected to the Hall of Fame in the 1976 ACS Centennial year, and George Eastman and Edwin H. Land were elected in 1977.

The Department of Commerce has recently reestablished a civilian Patent Office Advisory Committee which began to function in 1976. If the life of this Advisory Committee is extended beyond its present two years, the Committee has recommended that the ACS seek to have at least one professional chemist or chemical engineer appointed to serve as a member.

OTHER ACTIVITIES

This brief summary gives an overview of the more important Committee activities related to the subject of this symposium. In addition to the items cited here the Committee has been involved in a number of other matters related to patents but which are not pertinent directly to the theme of this meeting. Of these I wish to speak briefly about two.

For some years the United States Government, along with the governments of most of the other countries having patent systems, have been working toward international cooperation on patents. A treaty has been drawn up and is being adopted slowly, the U.S. being one of the first signatories. The Committee has been following this activity and believes that the implementation of the treaty will be a constructive move leading to substantial reduction in both the cost and time required to obtain international patent coverage.

The second activity, consideration of the proper compensation for employed inventors, has been discussed in some detail at the previously mentioned April 1976 symposium on legal rights for chemical scientists. This matter is an on-going concern of the Committee with final resolution of the issue not expected for some time in the future.

Chemical Abstracts as a Patent Reference Tool†

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Received April 20, 1977

Chemical Abstracts is the major permanent reference source for retrospective searching of the patent literature. Coverage is quite thorough for patents in the chemical field, although it must be recognized that CA is selective in the sense that patents are chosen for inclusion on the basis of whether new chemical information is presented. Abstracts appear about four to five months after publication. Abstracts are not repeated when equivalent patents issue in other countries than the first to publish, but a concordance is provided for newly issuing counterpart patents. CA is not as inclusive or as current as the Derwent abstract bulletins, but its permanence and widespread availability make it the principal reference tool for most people in the chemical fields.

Many chemists and chemical engineers approach the patent literature with some reluctance because they find the language and structure of patents unfamiliar and perhaps because of a widely held belief, especially common in academic circles, that patents are not an entirely reliable source of technical information. Those who have a problem with using patents can be helped by an understanding of the nature and purpose of this kind of document.

Perhaps the most important difference between a patent and a typical paper in a scientific journal is that each patent is an individual document that must stand on its own. Whereas the journal article is often one of a series and can assume prior knowledge of its subject area by the reader, patent law requires that the applicant provide in the disclosure a complete teaching of how to practice the invention. Therefore a patent will give far more detail on materials, procedures, and test methods than the usual scientific paper.

In addition, the goal of a patent applicant is to provide the basis for claims that will give him an exclusive right to every practical way to practice his invention. The disclosure therefore will include speculative information as well as a report of experiments actually carried out. If three compounds of a class have been made or used, the disclosure will include dozens or even hundreds of related compounds that can reasonably be expected to serve the same purpose. This expansion of the teachings of a patent as well as the unfamiliar legal expressions that patent attorneys introduce to ensure the precision of meaning necessary for a legal instrument tend to make literal-minded technical people uncomfortable with patents.

Familiarity solves these problems, however, and it is important that those of us in chemistry learn to use the patent literature because many important developments are published in patents long before they begin to appear in the journal literature. In both the spectacular finding of Ziegler and Natta that olefins can be polymerized under mild conditions by the use of coordination complex catalysts and in the proliferating chemistry of isocyanates and polyurethanes, disclosures in patents preceded journal publication by almost ten years. In the competitive world of chemistry, one cannot afford not to follow the patent literature.

But how does one do it? Patents are individually issued documents. There are no neatly sorted packages of related patents bound together as are the articles in our many specialized journals, except in the files of the public search room of the Patent and Trademark Office at Arlington, Va. There are collections of U.S. patents in a number of public libraries, as shown in Table I, but these are nearly all filed in numerical order and thus are not suitable for searching by subject matter.

† Presented in the symposium on "Meeting the Challenges of the Changing Patent Literature", Division of Chemical Information, 173rd National Meeting of the American Chemical Society, New Orleans, La., March 21, 1977, and the 11th Middle Atlantic Regional Meeting of the American Chemical Society, Newark, Del., April 20, 1977.

Table I. Locations of Libraries Which Have Printed Copies of U.S. Patents Arranged in Numerical Order

Albany, N.Y.	University of State of New York
Atlanta, Ga.	Georgia Tech Library[a]
Boston, Mass.	Public Library
Buffalo, N.Y.	Buffalo & Erie County Public Library
Chicago, Ill.	Public Library
Cincinnati, Ohio	Public Library
Cleveland, Ohio	Public Library
Columbus, Ohio	Ohio State University Library
Detroit, Mich.	Public Library
Kansas City, Mo.	Linda Hall Library[a]
Los Angeles, Calif.	Public Library
Madison, Wis.	State Historical Society of Wisconsin
Milwaukee, Wis.	Public Library
Newark, N.J.	Public Library
New York, N.Y.	Public Library
Philadelphia, Pa.	Franklin Institute
Pittsburgh, Pa.	Carnegie Library
Providence, R.I.	Public Library
St. Louis, Mo.	Public Library
Stillwater, Okla.	Oklahoma A. & M. College Library
Sunnyvale, Calif.	Public Library[b]
Toledo, Ohio	Public Library

[a] Collection incomplete. [b] Arranged by subject matter, collection dates from Jan 2, 1962.

The only comprehensive collection of foreign patents in this country is that of the Patent and Trademark Office, and these are largely in numerical order.

Retrospective searches of issued patents are available to those who have access to professional information centers that make use of computer-based services such as Plenum Data/IFI, which includes U.S. patents back to 1950 in its files. This subject is discussed in the following paper.[1] However, the key to the patent literature for most working chemists and chemical engineers is necessarily the abstract journals. Some help can be obtained from the regular feature sections on newly issuing patents that appear in many of the specialized trade journals, for instance, *Modern Plastics*, *Adhesives Age*, and the *Journal of Cellular Plastics*, to name a few. Certain trade associations, especially the American Petroleum Institute and the British Rubber and Plastics Research Association (RAPRA), publish abstracts of patents in their fields. But comprehensive coverage of the chemical patent literature can be found in only two sources, *Chemical Abstracts* and the Derwent Publications.

Derwent features rapid publication, i.e., 2–3 months from grant of the patent, and complete coverage of all patents of 24 countries. For those employed by the many industrial subscribers to Derwent, this is probably the best source for current awareness of the patent literature. Kaback discusses the Derwent services in some detail in another paper of this symposium.[2]

The current awareness needs of those doing research in academic, government, research institute, and smaller company laboratories, and the retrospective searching needs of all are best served by *Chemical Abstracts*. This paper will review the nature of the patent coverage provided by CA.

SELECTIVITY OF SUBJECT MATTER

Chemical Abstracts regards itself quite properly as the "Key to the World's Chemical Literature". The emphasis is on completeness of coverage of new chemical information. The question of the intellectual property rights of patent owners is of only minor concern to CA. For these reasons, CA endeavors to abstract only the first patent that comes to their attention on a new discovery in the chemical field. This can be a patent from any of 26 countries.

Patents of the smaller countries are abstracted only if they are by nationals of the particular country, on the assumption that the subject matter, if important, will eventually show up for abstracting as a patent from the country of origin if it is by non-nationals of the first issuing country. This rule does not apply to eleven countries where patent activity is more substantial. These are the United States, Great Britain, France, West Germany, Japan, Belgium, the Netherlands, South Africa, Australia, Canada, and Brazil. Patents from this group of countries are candidates for abstracting regardless of whether by nationals or non-nationals.

Perhaps the most important point about CA's patent coverage is that they are *selective*. The presence of significant new chemical information as judged by the editors is the key to inclusion in CA. This means, therefore, that CA should be regarded primarily as a source of chemical information rather than as a business tool for watching for patents that may have claims that could present infringement problems in one or more countries. This is not to say that patents that need study from the legal standpoint may not frequently be noted in CA, but it is not possible to rely on CA as a watch source. This purpose is served rather well by Derwent, which abstracts or at least notes by title and bibliographic data all issuing patents of 24 countries, regardless of whether they have been seen before in another country. It is also common for industrial concerns to employ local watch services in the important countries as a security measure against surprises in fields important to their business interests.

IDENTIFYING EQUIVALENT PATENTS FROM CA

It is common for a patent application to be filed in several countries; there are about 120 possibilities. The resulting group of "equivalent" or "counterpart" patents are often referred to as a patent "family". There are several reasons why one or more members of such a family beyond the one first encountered may need to be identified: (1) because copies of the patents of certain countries are more readily accessible than others, (2) to be able to read the disclosure in a more convenient language, or (3) to study the claims, which may vary from country to country depending on local patent law. For the patents chosen to appear in CA, a concordance is provided at regular intervals that can be used to identify newly issued counterparts of patents already indexed. This computer-produced concordance is easy to use and is quite reliable. Derwent has a similar index, and a new international bureau called the International Patent Documentation Center (INPADOC) in Vienna has a computer-based system providing the same service for patents that have issued since 1974. Derwent and INPADOC are the services most used by patent professionals, while the laboratory chemist is more likely to find CA the convenient source.

NATURE OF CA ABSTRACTS

The instructions that CA provides to its patent abstractors read in part:

"CAS ignores the legal status and treats patents only as technical documents. The abstract of a patent, therefore, is important only in technical alerting and in searching for new technical information. It cannot and should not be used to determine such legal matters as whether an invention has novelty and whether one patent infringes, dominates, or invalidates another. It is not intended or designed for use in interpreting the scope or meaning of the claims. Emphasis is placed, therefore, on specific examples. The abstract should describe the new chemical disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. . ..

"A patent abstract is a concise statement of the technical disclosures of the specification and should include and emphasize only that which is new. It should enable readers, regardless of their familiarity with patent documents, to

discover quickly the novelty of the subject matter covered by the technical information. . ..

"The first sentence is a concise, informative summary of the invention, as specific or as general as is necessary to reflect the extent of the disclosure. The remaining text consists of statements containing the supporting details and major variations, including, where necessary, one or more typical examples. These examples are given in informative, but not fully descriptive, form. The statement or statements should be limited to information disclosed in the specific examples and in the claims. Only the preferred conditions and reagents should be mentioned, rather than those disclosed to ensure broad legal coverage. Only the relevant and (or) new chemical information should be abstracted."

These statements emphasize the chemical information purposes of *Chemical Abstracts*, as mentioned previously. CA abstracts are more likely to give specific technical detail than are those in Derwent, which usually make a point of the alleged utility of the patented subject matter. It is interesting to compare the abstracts of Derwent and CA. Three pairs of abstracts are shown to illustrate the different approach used by the two organizations. (Figure 1).

These differences can be seen in abstracts of the same subject matter:

(1) The Derwent title is usually fairly informative, while the CA title is likely to be only a few words, emphasizing the chemical feature of interest.

(2) Derwent emphasizes the commercial utility of the subject matter, while CA emphasizes chemical detail.

(3) Derwent gives only the name of the company to which the patent is assigned. This simplifies their indexing task and emphasizes their commercial slant. CA gives the names of the inventors as well as the company because of the chemist-oriented bias of the American Chemical Society.

(4) Derwent abstracts are likely to have more typographical errors because it is a current-awareness-oriented service. CA, as a permanent reference source, puts more effort into accuracy.

Each service meets a useful purpose, depending on the requirements of the reader. Regardless of which source is used, one must resort to the patent itself if it is necessary to study the claims for business and legal reasons.

U.S. PATENT 3 849 362

DERWENT

Insoluble, infusible filled oxybenzoyl polymers - filler incorporated during polycondensation of para-hydroxy benzoic acid
CARBORUNDUM CO
A method of making a filled, insol. and infusible p-oxybenzoyl polymer (I) comprises prepg. of dispersion of filler and a soln. of p-hydrobenzoic acid (ester forming derivs) (II) in a high boiling solvent, polycondensing (III) at an elevated temp. to give (I) and sepg. (I) contg. dispersed filler. (I) may be compression moulded etc. giving prods. of better flexural strength than those obtd. merely by mixing (I) with the filler.

CHEMICAL ABSTRACTS

Incorporation of fillers in insoluble infusible oxybenzoyl polymers. Economy, James; Storm, Roger S. (Carborundum Co.). Fillers were homogeneously dispersed with good polymer to filler bonding in *poly(p-hydroxybenzoic acid)* (I) by addn. of the filler before or during polymn. before formation of the final insol. infusible polymer. Thus, 207 parts p-hydroxybenzoic acid and 204 parts Ac_2O were heated to 145°, and 24 parts milled glass fibers in 1000 parts partially hydrogenated terphenyl was added. The mixt. was heated to 340° over 1 hr. and held there an addnl. hr. to give 178 g glass filled I in which the fibers were completely dispersed and embedded.

GERMAN AUSLEGESCHRIFT 2 364 093

DERWENT

Elimination of trichlord ethyleme in 1,2-dichlord ethane - by reacting with chlorine and ethylene in presence of lewis catalyst with exclusion of light
RHONE-PROGIL SA
Trichloroethylene (I) present in 1,2-dichloroethane, is chlorinated in the liquid phase in the absence of light and in the presence of a Lewis acid, e.g. ferric chloride, at 20-80°C and in the presence of ethylene and 1,2-dichloroethane as reaction medium, Cl_2, 1,2-dichloroethane, (I) and ethylene are introduced into the reaction zone, the mol. ratio ethylene to (I) being ⩾ 50 and the mol. ratio (I) to Cl_2 being ⩾ 0.02.

CHEMICAL ABSTRACTS

Removal of trichloroethylene impurities from 1,2-dichloroethane. Strini, Jean C.; Costes, Jean R. (Rhone-Progil). $Cl_2C{:}CHCl$ (I), formed as impurity in the $ClCH_2CH_2Cl$ (II) manuf., was removed by chlorination in liq. phase at 20-80° in the dark in the presence of $FeCl_3$. Thus, 750 g II contg. ~10 ppm H_2O, 200 ppm $FeCl_3$, and 1% I, 4.28 moles Cl, and 4.2 moles of ethylene (III) were passed hourly into a reactor at 60°. After 18 hr, 94% I was converted into Cl_3CCHCl_2, and the resulting II contained ~0.05% Cl_3CCH_2Cl.

GERMAN AUSLEGESCHRIFT 2 357 751

DERWENT

Ethynylation catalyst for use in suspension - is formed from a basic copper-contg. carbonate and acetylene
BASF AG
Ethyinylation catalyst consists of a Cu, Mg and Al or ferric or chromic cpd., the structure of the Cu-Mg complex being of general compsn. $Cu_mMg_{6-m}Me(III)_2(OH)_{16}CO_3$ where m = below about 4.5 and Me(III) = Al, Fe(III) or Cr(III). The catalyst is useful in the prepn. of butindiol from acetylene and formaldehyde in the liq. phase.

CHEMICAL ABSTRACTS

Catalyst for ethynylation. Baer, Karl; Broecker, Franz J.; Hoffmann, Herwig; Marosi, Laszlo; Reiss, Wolfgang; Schroeder, Wolfgang (BASF A.-G.). Improved metal oxide catalysts for the ethynylation of HCHO to $HOCH_2C{:}CCH_2OH$ were prepd. by pptn. of the metal hydroxide carbonate precursors under conditions such that the ppt. formed had a mannasseite structure of compn. $Cu_mMg_{6-m}M_2(OH)_{16}CO_3$, where $m \leq 4.5$ and M = Al, Fe(III), or Cr(III); calcination of the precursors gave the catalyst.

Figure 1.

TIMELINESS OF CA PATENT ABSTRACTS

Chemical Abstracts puts first priority on the accuracy and completeness of its coverage of what is new in the chemical literature. This is entirely appropriate, because CA is the only comprehensive archival record of progress in chemistry and chemical engineering, going back to its genesis 70 years ago. Considering this emphasis, it is remarkable how promptly abstracts of newly issuing patents do appear in CA. Where a few years ago six to nine months was the typical lag time before a new patent was reported in CA, a random sample in a January 1977 issue showed an average and mean lag of about four months. *Chemical Abstracts* data[3] show that in 1976 the median currency of all patents was about 150 days, while that for U.S. patents was 110 days. Currency means the time elapsed between publication and the CA issue date.

This time lag is not quite adequate to provide the warning needed to undertake an opposition proceeding against foreign patents where that may be in order (the opposition period ranges from two months in Japan to four months in the Netherlands), but it is an excellent performance considering the magnitude of the undertaking. Derwent, which is specially aimed at the needs of the patent professional, shows a lag time nearer 2–3 months, with a special edition on Japanese applications published for opposition to meet the two-month deadline.

MAGNITUDE OF THE CHEMICAL PATENT LITERATURE

At the present time, well over a half-million patents issue worldwide each year, including equivalents in the various countries. Roughly a third of these are of a chemical nature. In 1976 *Chemical Abstracts* published about 67 000 patent abstracts and indexed about an equal number of equivalents in the concordance, for a total of 134 853 patent citations.[3] Since 1907, CA has published about $1\frac{1}{4}$ million patent abstracts.[4]

This is a vast source of chemical information. It is available in the library of nearly every college, university, research institute, government laboratory, and chemical industrial establishment in the United States and most of the rest of the world. Chemists and chemical engineers who are working to discover and develop new chemistry and technology should take

advantage of this valuable information resource.[5,6]

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A User's Experience with Searching the IFI Comprehensive Database to U.S. Chemical Patents†

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Received April 20, 1977

The use of the IFI Comprehensive Database to U.S. Chemical Patents to provide patent information services to an R&D staff is described. The history of the database, its present structure, and their effects on search techniques is presented. A new method of searching tapes of the vocabulary and USPO classification text by a string search program provides the search staff with quick access to these search aids. Experiences in training new searchers to use this database are given. Costs of operating the file are presented.

The IFI Comprehensive Database to U.S. Chemical Patents (IFI database) is the result of a merger of the IFI Uniterm Index and the Du Pont Index to U.S. chemical patents. These two files were merged in 1971.

The Uniterm Index was developed in 1955 as a coordinate term index. It was first published in printed form as a dual dictionary which allowed the searcher to perform simple Boolean logic intersections by comparing the inverted index lists of the dictionary for matches. The vocabulary was open ended and uncontrolled. In addition to the dual dictionary of major terms, a single dictionary of minor terms was provided for index entries with low postings. The minor terms were primarily chemicals. In 1961 the Uniterm Index was published in magnetic tape and sold with a software package that used a weighted term retrieval technique. The searchable elements included the assignee and the major terms of the dual dictionary. The minor term section of the index was not issued in computer format. In 1964 the USPO classifications for the patents were added to the file. Subscriber demand also produced a controlled vocabulary and a review of the minor term vocabulary for new candidates to the major vocabulary.

The Du Pont Index to U.S. Chemical Patents was begun in 1964. A controlled open-ended vocabulary was used for both chemical and nonchemical concepts. A chemical fragmentation scheme was designed to index both specific chemicals and generic chemical structures. A system of roles was developed to specify whether the chemical indexed was present, reacting, or a reaction product. An elaborate role scheme was also designed for the indexing of polymers.[3]

The Comprehensive Database was created in 1971 when the IFI/Plenum Data Co. acquired the Du Pont Index and merged it with their Uniterm Index. This database now contains 400 000 U.S. chemical patents dating back to 1950. The file is updated quarterly. Lag time from patent issuance to appearance in the database is six months. The growth rate is approximately 20 000 patents a year.

Table I. Combinations of Search Elements Used

Search elements	No. of searches
Terms and/or Compounds (T C)	198
T C/Class Code/Fragments	77
T C/Class Code	60
T C/Fragments	43
T C/Assignee	24
T C/Assignee/Class Code	14
Assignee	12
Class Code/Fragments	8
Fragments	5
Class Code	5
Assignee/Fragments	3
Assignee/Class Code	1
T C/Assignee/Fragments	1

The selection of patents for the database is done on an automatic basis for a specified list of USPO subclasses. The Official Gazette is scanned for patents of chemical interest appearing in other subclasses.

The searchable elements of the database are: accession number, patent number, assignee, USPO subclass OR and XR, compounds, chemical fragments, and general terms. The accession number indicates the year of issue. Both the patent number and accession number can be used to retrieve the complete index record for a patent. The index elements can be used in any combination in search strategies. Table I presents the variety of combinations of search elements used in designing our search strategies.

The assignee is that appearing on the face of the patent. This requires the searcher to investigate the name, history, acquisition, and merger history of any company to be searched. At the present time a major revision of the assignee vocabulary is in progress. Name changes such as Pennsylvania Salt Manufacturing Co. to Pennsalt Chemicals to Pennwalt Corporation are being collected into a standard format. However, patents issued to companies which have merged or been acquired are not posted to the parent company. An example would be the patents issued to Sharples, Wallace &

† Presented in the symposium on "Meeting the Challenges of the Changing Patent Literature", Division of Chemical Information, 173rd National Meeting of the American Chemical Society, New Orleans, La., March 21, 1977, and the 11th Middle Atlantic Regional Meeting of the American Chemical Society, Newark, Del., April 20, 1977.

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