

Centralized Abstracting of Petroleum Literature and Patents*

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The petroleum industry has taken the route of centralized abstracting as its basic tool for the alerting of chemists and other technical personnel to new developments. The industry is unusually fortunate in having two excellent central abstracting services, each tailored to serve a different part of the industry's needs. The Central Abstracting Service of The American Petroleum Institute (API) covers the most important journals and patents having to do with petroleum refining. The Department of Information Services of the University of Tulsa (TU) covers the most important journals and patents having to do with petroleum exploration, development, and production. Domestic and foreign sources are included in the coverage of both organizations.

These services came into being because petroleum companies had learned through experience that self-sufficient company programs for alerting chemists and other technical personnel to new developments are costly and involve much duplication of effort. Like companies in many other industries, many petroleum companies started with independent programs. Many of them were among the first in any industry to recognize the importance of bringing available information to bear on research and operating problems. Some started company libraries, abstracting programs, literature-searching programs, and other internal information services more than 30 years ago.

During the late 1940's, however, it became apparent that the cost for any one company to abstract all of the increasing amount of information important to it soon would become prohibitive, and that even the largest companies probably would be able to afford coverage of only part of the information they needed. It also became apparent that every petroleum company doing its own abstracting was covering journals and other sources of information that were also being abstracted by other petroleum companies. This increasing cost and duplication of effort created an interest in the development of a cooperative, cost-sharing, or exchange program to cover that information of common interest throughout the industry.

This interest led to establishment of the centralized abstracting services which today provide coverage of the information sources of greatest importance to the entire industry. First established was The American Petroleum Institute's Central Abstracting Service, which in 1954 began preparing literature abstracts and publishing them in its weekly *API Technical Abstracts* bulletin (now titled *API Abstracts of Refining Literature*) (1). These literature abstracts were so well received that interest developed in a similar service on refining patents; accordingly, the API added its weekly *API Abstracts of Refining Patents* bulletin

in 1961 (2). Similar needs in the petroleum exploration, development, and production segment of the industry led to establishment of the University of Tulsa's Department of Information Services, which began preparing abstracts and publishing them in its weekly *Petroleum Abstracts* bulletin in 1961 (3). Many companies find the coverage provided by these services to be adequate for their needs; some supplement this coverage to cover information on their specific interests.

In keeping with the primary purpose of quickly alerting chemists and other technical personnel to new developments, each bulletin has a distinctive cover to attract the receiver's attention. The API differentiates its bulletins by using a blue cover on its *Abstracts of Refining Literature* and a green cover on its *Abstracts of Refining Patents*.

The *API Abstracts of Refining Literature* service provides comprehensive coverage of approximately 140 domestic and foreign petroleum journals and other periodicals. It includes abstracts of all signed technical articles in the journals covered, and of signed nontechnical articles unless they clearly are not of interest. It also includes papers, unsigned articles, letters to the editor, discussions of previous papers, abstracts of papers published in other journals, and news items in all covered journals if the subject matter is of direct interest to the petroleum refining technologist or if the author is affiliated with a petroleum company or association. About 12,000 abstracts are published each year.

A typical API literature abstract is shown in Figure 1. Several techniques are used to make the abstracts effective alerting tools. The abstracts are written in a "title-first" version of the "reader-oriented" abstracting style pioneered by Weil (4). In this style, the findings reported in the document are presented as quickly as possible, and the bibliographic data follow the information (5). Where possible, the title of the document is used as the lead sentence or as part of the sentence, and is set in capital letters; where necessary, the title is modified, with the modification being enclosed by brackets, to convey the most important information in the first sentence of the

[IN THE CATHODE-RAY] POLAROGRAPHIC DETERMINATION OF DISSOLVED OXYGEN IN PETROL, the limited solubility of gasoline in aqueous or semiaqueous electrolyte systems is overcome by using a supporting electrolyte of 0.1M lithium chloride in absolute ethanol, and atmospheric oxygen is excluded by the special design of the cell. Calibrations are carried out by using water of known oxygen content for the preparation of standards. The oxygen wave at -0.67 v is preferable to that at -1.25 v for quantitative measurement. Results on duplicate samples containing < 1 to 30 ppm oxygen show good reproducibility and reasonable agreement with results obtained by the slower chemical method. Tables and diagram. (in English)
G. L. Woodroffe (Imp. Chem. Inds. Ltd.) *Talanta* 11
#6:967-72 (June 1964) [11-6978]

* Presented before the Division of Chemical Literature, 148th National Meeting of the American Chemical Society, Chicago, Ill., Aug. 31, 1964.

Figure 1. Typical abstract from *API Abstracts of Refining Literature* shows title first-citation last format.

abstract. Printing is done on ivory paper, to enhance readability, and the print size (30%, photoreduced IBM Bold No. 1 typewriter face) has been selected to balance readability with economy.

The *API Abstracts of Refining Patents* service covers patents issued by the United States and nine foreign countries—Belgium, Canada, France, Germany, Great Britain, Holland, Italy, Union of South Africa, and the USSR. Subject coverage is similar to that of *API Abstracts of Refining Literature*. About 11,000 patents are covered each year.

Typical API patent abstracts are shown in Figure 2. The format is generally similar to that of the literature abstract, but because patent titles seldom are adequate for use in the lead sentence of the abstracts, titles coined by the abstracters usually are used. In addition to the bibliographic data on the patent abstracted, information is also given on any related foreign patent which already has been published.

PURE HYDROCARBONS

A VINYL AROMATIC MONOMER CONTAINS AS POLYMERIZATION INHIBITOR about 0.001-5% of diphenyldichlorosilane. Specifically, styrene is thus inhibited. 4 claims.
U.S. 3,138,644 1.6/23/64 f.1/2/62 Cl.260/666.5
Monsanto Co. (T. Huff & E. Perry) [64-5471]

PARAFFINIC HYDROCARBONS BOILING AT 49°-100°C and containing less than 0.5% by vol of aromatics are obtained by reforming a naphtha rich in C₄-C₆ paraffins and naphthenes, stabilizing the reformat, solvent extracting the stabilized reformat to remove aromatics, alkylating the raffinate to convert any remaining aromatics to higher-boiling products, and fractionating the alkylate to obtain the required hydrocarbons. Commercial hexane and heptane fractions useful as solvents and raw materials may be thus obtained. 9 claims.
U.S. 3,138,645 1.6/23/64 f.8/21/61 Cl.260/683.61
Pure Oil Co. (L. E. Hutchings) [64-5472]

Figure 2. Typical abstracts from *API Abstracts of Refining Patents* show bulletin section heading and complete patent citation given for each abstract.

Petroleum Abstracts is on a different basis in that it provides selective coverage of articles and patents from more than 600 sources. Selection is according to subject content, regardless of the source of publication and irrespective of whether the items are signed or unsigned. Specialists in geology, geophysics, geochemistry, drilling, logging, production, and reservoir engineering select the articles and patents to be abstracted. Emphasis is on fundamental coverage of material useful to operating, technical staff, and research personnel concerned with finding and producing crude oil and natural gas. Approximately 12,000 abstracts are prepared and published each year.

A typical TU abstract is shown in Figure 3. These abstracts are arranged with four on each page of the bulletin, and guide lines are provided to make it easy for the reader to clip an abstract and retain it in his file. The presentation of document title and bibliographic information is conventional, but the information is spaced from the abstract so it does not interfere with the reader's quick and easy access to the abstracted information. Opening sentences are prepared carefully to provide a quick over-all digest of the most important concept from the abstracted document.

Abstracts are grouped in sections, according to subject, in all of the bulletins to make it easy and fast for users to find items of interest. Where appropriate, the abstracts

U.S.
515.44, 181.1, 182, 183.1

4-6526

DEVELOPMENTS IN NORTH MID-CONTINENT IN 1963 - E. E. Pugh, Jr. (Natl. Coop. Ref. Assoc.); *AAPG BULL.* v. 48, No. 6, pp 846-851, June 1964

Drilling activity in Kansas during 1963 suffered a further decline, to continue the trend evident in 1962. During the past year, 3,834 wells were drilled for oil or gas, resulting in a 7% decline from 1962. Total wells exclusive of the 707 tests drilled in the shallow stripper area of southeastern Kansas numbered 3,127. This compares with 3,210 tests in 1962. In Kansas, 951 exploratory tests were drilled in 1963 and resulted in 173 oil discoveries, 40 gas discoveries, and 738 dry holes. Available information indicates that 9 exploratory tests were drilled in Nebraska east of the 98th Meridian, 6 in Iowa, and 10 in Missouri. All were dry.

Figure 3. Typical abstract from *Petroleum Abstracts* shows use of conventional citation and carefully prepared lead sentence to convey substance of article.

are cross-referenced into other sections, so the reader can be assured of seeing everything of importance to him.

The bulletins are published weekly to get the new information quickly to readers—to capitalize on the speed of abstracting attainable with inhouse and closely coordinated technical abstracters to prepare the abstracts. The central services continually strive to reduce the already short time lag between publication of the original document and publication of its abstract in the weekly bulletin.

Each service furnishes multiple copies of the weekly bulletins to subscribing companies under their base subscriptions, the number of copies depending on company size. For example, 25 copies of the TU bulletin and 24 copies of the API bulletins are mailed each week to the largest subscribers, having assets in excess of \$1.5 billion, whereas 20 copies are sent to subscribers having assets of \$0.4 billion to \$1.0 billion. Additional copies may be obtained at cost. To save the subscribing companies the trouble of distributing the copies to offices at different locations, arrangements can be made to have the central services mail any number of copies to different addresses. This also avoids the time lag that would be involved if subscribers had to remail the bulletins to different addresses.

Subscription prices are on sliding scales, based on the sizes of the subscribing companies. All of the services are nonprofit, so subscription prices are set to cover operating costs, to provide a small amount of excess revenue for unexpected contingencies, and to provide modest funds for studies and the development of additional services.

Prices are adjusted from time to time in response to increases or decreases in operating costs and to make the distribution more equitable as inequitable situations are recognized. As shown in Table I, subscription prices for *API Abstracts of Refining Literature* ranged from \$500 to \$6,000 for petroleum companies and from \$500 to \$1,000 for nonpetroleum companies and institutions during 1964; they now (1965) range from \$1,000 to \$7,200 for petroleum companies and from \$500 to \$2,000 for nonpetroleum companies and institutions. Charges for *API Abstracts of Refining Patents* ranged from \$2,000 to \$10,000 for petroleum companies and from \$2,000 to \$4,000 for nonpetroleum companies and institutions for 1964 subscriptions, and now (1965) range from \$1,500 to \$7,500 and from \$500 to \$3,000. The prices for 1964 subscriptions were the same as they had been for several years, but the prices for the literature-abstract bulletin were increased and the prices for the patent-abstract bulletin decreased for 1965 to more nearly match the revenue to the operating costs.

Table I. American Petroleum Institute Abstracts
Basic Subscription Schedules (per year)

Assets, billions	Literature		Patents	
	1964	1965	1964	1965
Petroleum companies				
Over \$1.5	\$6,000	\$7,200	\$10,000	\$7,500
\$1.0 to \$1.5	5,500	6,600	9,000	6,750
\$0.4 to \$1.0	5,000	6,000	8,000	6,000
\$0.2 to \$0.4	4,500	5,400	7,000	5,250
\$0.1 to \$0.2	1,000	2,000	4,000	3,000
Under \$0.1	500	1,000	2,000	1,500
Nonpetroleum companies				
Over \$0.1	\$1,000	\$2,000	\$4,000	\$3,000
Under \$0.1	500	1,000	2,000	1,500
Nonprofit organizations	... ^a	500	... ^a	500

^a No special nonprofit category in 1964.

Table II shows subscription charges for *Petroleum Abstracts*. During 1964, prices ranged from \$100 to \$10,000 for petroleum companies, nonpetroleum companies, and institutions, alike. In 1965, prices to petroleum companies remain the same, but a different schedule is provided for nonpetroleum companies and institutions. This schedule, reducing the cost to nonpetroleum companies, acknowledges the lesser value of the petroleum-industry-oriented abstracts to nonpetroleum companies.

Table II. The University of Tulsa Abstracts
Basic Subscription Schedules (per year)

Assets, billions	Literature and Patents	
	1964	1965
Petroleum companies		
Over \$1.5	\$10,000	\$10,000
\$1.0 to \$1.5	9,000	9,000
\$0.4 to \$1.0	8,000	8,000
\$0.2 to \$0.4	7,000	7,000
\$0.1 to \$0.2	4,000	4,000
\$0.05 to \$0.1	2,000	2,000
\$0.01 to \$0.05	1,000	1,000
Under \$0.01	100	100
Nonpetroleum companies		
Over \$1.5	... ^a	\$4,000
\$1.0 to \$1.5	... ^a	3,000
\$0.5 to \$1.0	... ^a	2,000
\$0.01 to \$0.5	...	1,000
Under \$0.01 and institutions	... ^a	100

^a Nonpetroleum same as petroleum.

It is pertinent to note that the costs of all of the services to nonprofit organizations and institutions remain the same for 1965, despite some major changes in costs to companies. Both TU and the API have kept the cost to such organizations low throughout their operation, primarily to encourage availability of the abstracts for use by students and academic staffs.

These annual charges may appear high when compared with the cost of professional-society and commercial services, but it must be remembered that each service is tailored to the specific needs of only a segment of a single industry. This specificity makes the value of the service high to the industry segment for which the service is tailored, but it obviously restricts the number of subscribers among which the operating costs can be distrib-

uted. During 1964 there were about 40 subscribers to *API Abstracts of Refining Literature*, about 20 to *API Abstracts to Refining Patents*, and about 65 to *Petroleum Abstracts* (most of the major petroleum companies subscribe to all three services; the variation in number of subscribers is almost entirely within the category of small, low-subscription-price companies). Even at these costs, however, each subscribing company is paying only a proportionate share of the amount of money that it would otherwise have to spend to do the job for itself. Indeed, many companies are obtaining a service which they could not afford to provide for themselves.

Advisory committees, made up of information specialists representing subscribing companies, assist both central service organizations in modifying the services and in adjusting coverage to suit the changing needs of the users (2, 6). The TU Subscriber Advisory Committee and the API Abstracting Advisory Subcommittee each meets periodically with staff members of its respective service to work out the solutions to operating problems, review coverage, and convey suggestions from the users. Among the more important functions of each group is to maintain an appropriate balance between coverage and cost.

These committees are outstanding examples of the remarkable support given the central services by the industry. The subscribing companies and their committee representatives have contributed many hours of company and personal time to committee work in conducting surveys of coverage, in making other studies, and in doing other homework in preparation for the committee meetings.

Both services concentrate first on prompt publication of abstracts for alerting use, but both also index their abstracts for information-retrieval purposes. The abstracts are both informative and indicative, in that they indicate the scope of the abstracted document as well as give definitive information on the main findings. Consequently, they are extremely useful in information-retrieval work where they make it possible to limit reference to original documents to only those that are likely to be truly pertinent.

For retrieval purposes in the libraries and technical information departments of their subscribers, the TU Department of Information Services provided sets of abstract cards and annual indexes to its abstracts through 1964, and the API Central Abstracting Service provided similar sets of cards through 1963. The cards were indexed according to the subject classification system of each service. Appropriate classification numbers were printed on the cards, and enough copies of each card were provided to permit cross-filing in all of the appropriate categories. In the TU annual index, abstract numbers were indexed by author, patent number, and subject.

At the beginning of 1964, the API Central Abstracting Service discontinued its card service, and switched to a computer-based indexing service which provides search tools for in-house use by subscribing companies; the TU Department of Information Services made a similar switch at the beginning of 1965. In providing these indexing services, each central organization, on an annual sliding-scale subscription basis, publishes three retrieval tools. One of these is a printed monthly alphabetical subject index to the abstracts, with semiannual cumulation.

Another is a printed dual-dictionary coordinate index, published three times a year with annual cumulation. The third is a computer search tape, also distributed three times a year with annual cumulation.

Each system is based on a unique subject authority list, or thesaurus, typical of those associated with most information retrieval systems. Each resulted from several years of intensive committee and staff work.

Development of these indexing services and information-retrieval programs is another example of cooperation and support by the subscribing companies. Except for actual computer programming, most of the development was carried out by the subscriber advisory committees and special groups and study teams which they set up. Joint committees, made up of representatives from the committees of both organizations, worked diligently to achieve the greatest degree of compatibility possible, since some technical information departments and libraries will be using both services. All told, many hours, days, and even weeks of company and personal time were contributed by the subscribers and their representatives.

These abstracting and indexing services of the American Petroleum Institute and the University of Tulsa for the petroleum industry illustrate what can be done on a centralized, cooperative basis. The cost to each subscribing company is not inconsequential, but it is only a fraction of what it would cost the company to do an equivalent job on its own.

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Cooperation within an Industry*

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The classic tradition of information exchange among scientists has undergone several subtle and some radical transformations in recent years. As a consequence of this, chemists now must select and evaluate not only primary publications, but also secondary sources designed to announce or to display research findings. In chemistry, these publications have generally employed one of two criteria. The first is the "all chemistry" approach, in which the alerting publication attempts to announce or display all chemical subject matter. The other may be thought of as mission or field-of-interest oriented, involving some form of selection of the chemical articles. From the point of view of an industry, both types are required in order to inform chemists employed therein as chemists in general and as chemists devoted to the specific requirements of that industry.

The development of alerting systems to meet the needs of the pharmaceutical industry has taken the general form of support to ventures providing one or both secondary forms. In the past, support has been largely voluntary on the part of pharmaceutical companies, with their trade group, the Pharmaceutical Manufacturers Association, providing member companies with informa-

tion on proposed services. This has been accomplished through PMA's Literature Subcommittee of its Section on Research and Development. This group, presently chaired by Mr. Eliot Steinberg of Warner-Lambert Research Institute, is charged with the responsibility of surveying developments in information technology and services. Reports are made periodically to the parent body, and annual open meetings have been held since 1962 to acquaint chemists with developments (as evening sessions in conjunction with national ACS meetings). Member companies with problems in this area may approach the Subcommittee for information. The compositions of the Subcommittee was historically limited to company representatives whose area of responsibility was something other than information science. This was done deliberately to provide an overview approach uncolored by expertise or personal preferences. Recently, however, three information specialists have been added. In contrast to some other industries, then, the pharmaceutical industry has not developed permanent, association-sponsored, technical-information activities. As will be seen, cooperative efforts in this area have been mostly supported on a per-task basis by individual companies, groups of companies, or individuals with company approval.

In order to understand the services in this report, it is important to inventory the needs of the industry in

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