COSTS OF AN ABSTRACTING PROGRAM*

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Any abstracting program, to be of greatest value in a practical sense, ought to perform two principal functions: announce selected current abstracts, and provide an indexed pool of abstracts. Although a journal of abstracts such as Chemical Abstracts might serve both functions for a specialized audience, a large organization's program requires a more selective presentation of abstracts covering several disciplines in addition to chemistry. Large organizations will custom-design and manage programs for their distinctive needs by careful selection of abstracts, by editing or slanting abstracts to emphasize particular relevance of subject matter, and by employing certain formats to accommodate manual or machine systems.

Individual petroleum companies, for example, may or may not be concerned with production, natural gas, petrochemicals, etc., and therefore each would need a correspondingly tailored abstracting program. Out of 200 or so U.S. petroleum-refining companies, only 20 to 30 have abstracting programs for literature and patents.

The costs of petroleum-company abstracting programs ought to be similar to those for other large organizations, especially in the process industries, as the same elements of cost apply in both cases. The American Oil Company program is a successful operation representative of others in the petroleum-refining and petrochemical industry, such that costs based on this program can realistically be compared with costs of similar programs.

AN EFFECTIVE PROGRAM

American has evolved a satisfactory abstracting program during 30 years of continuous operation under several different systems. Originally, the research staff itself was responsible for all abstracting. Scientists and engineers were assigned patents and articles in their fields of specialty for abstracting, with the hope that the thorny problem would be resolved with benefit accruing to the individuals as well as to the staff as a whole. Several years of experience showed that presumed advantages were outweighed by resulting disadvantages. As shown in Table I, staff-prepared abstracts were of poor quality, loaned journals and patents were lost in personal files, and the entire system became unmanageable.

The situation needed correction and, because patents gave the most trouble, an opposite philosophy was tried with them. Literature abstracting was continued by the staff as before. One technical man was selected to abstract all U.S. patents; he agreed to undertake the assignment for a year. In addition he would order and screen the patents, and route extra copies of patents and abstracts of them to laboratory scientists solely for quick information. This system proved excellent for several years, but, as the company's interest broadened into new fields, the volume of patents approached the limit for one man.

TABLE I. PITFALLS OF ABSTRACTING BY THE TECHNICAL STAFF

Presumed advantages
Each expert is best suited to abstract in his field of specialty.
Each expert will keep abreast of his own art.
Each expert can be responsible for his own field.
Responsibility for abstracting would be fixed individually.
Distribution of patents would be simplified.
Abstracting would be done during free working time.
Actual disadvantages
Abstracts were narrow in outlook and rambling.
Interesting patents were hoarded and abstracts of them were late or missing.
Delegation of a multi-subject patent for abstracting by one expert became impossible.
Responsibility was unenforceable.
Bookkeeping became enormous, loaning too complicated; delays and losses resulted.
Unfamiliarity with the technique of abstracting demanded excessive time. Backlogs of items were sloppily abstracted to save time.

Meanwhile, the system philosophy began to swing away from having the laboratory staff prepare literature abstracts, and increasing emphasis was placed on procuring literature abstracts from published and professional sources and having them edited and slanted by information-staff specialists.

The growing overload in the abstracting of patents, plus the new sources of finished literature abstracts, finally resulted in adoption of the present operating system. In contrast to past operations, a major amount of effort goes into selecting items for abstracting from both literature and patents. Abstracts are purchased as much as possible, and otherwise are obtained by trading English-language patent abstracts for them.

All journals received are inspected to select those abstracts desired, with the full article available for detailed reading to check pertinency. This is a big job, involving much reading and simultaneous evaluation.

Selection of U.S. patents is somewhat simplified by automatic ordering of specific classes of known interest. Remaining U.S. patents of

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marginal interest are quickly and readily screened for importance to the program. However, the selection of foreign patents is complicated by language problems and by short titles that are often too vague to prevent ordering unwanted ones. A few general patent classes may be ordered, but usually the initial selection is conducted from the lists of patent titles in the gazettes and bulletins of each country. After ordered copies of patents have been received, it is necessary to screen out the unwanted ones to prevent needless dilution and overload of the program.

The wanted abstracts of the literature and patents are then procured as authors' abstracts, through subscription services, or from professional abstractors. Next the abstracts are indexed, edited, and titled. Titling of patents includes substitution of more-meaningful titles, and assignment of a principal index title.

The present program produces about 15,000 abstracts per year, about equally divided between English and other languages as a group. Patents represent about 55% and journal articles about 45% of the abstracts. A bi-weekly bulletin contains certain of the selected abstracts and announces all the rest by title. A master pool of abstracts contains copies of all abstracts filed under each indexing term. Operation of the program involves two major items of expense: the cost of "raw" abstracts, and the cost of processing them.

COST OF RAW ABSTRACTS

The factor of selectivity makes wanted abstracts cost most. For example, the cost of a raw abstract is highest when an individual item is ordered for abstracting by a professional. On the other hand, a bulk package of many abstracts, obtained from a subscription service, costs much less per abstract. Unfortunately, in the bulk package, a sizable fraction of the abstracts are unwanted, and real effort plus corresponding expense are needed to select the ones wanted.

Bulk abstracts are available at costs of about half a cent to half a dollar apiece, as shown in Table II. Despite the 100-fold variation in the per-abstract cost of typical subscription services, all are pertinent in some degree to most abstracting programs. As an example of extremely inexpensive abstracts, the cost for Chemical Abstracts is down to nearly half a cent an abstract, but large blocks may not be wanted. The main value is for cleanup in securing abstracts of literature not normally processed. Selectivity and desirability of bulk abstracts are vastly more important to the program than mere availability.

Purchased abstracts from professional abstractors are priced on three bases: per single abstract, per hour, or per hundred words. On the per-abstract basis reported rates are $2.30 and higher for items on control technology,[1] and $5.70 to $10.00 for items on meteorology.[2] On a time basis, professional abstractors charge $2.50 to $3.00 per hour for working on articles or patents in English, French, or German on petroleum-refining technology. A more common practice is to charge per hundred words in the abstract; typical rates are $1.50 to $2.00 per hundred words and vary with the language of the original article or patent.

TABLE II. COST OF ABSTRACTS IN BULK

	Annual cost	Abstracts per year	Cost per abstract
Chemical Abstracts (1961)	$ 925	145,000	$0.006
Derwent Belgian Patents Report	$ 108	5,200	$0.021
Gas-Chromatography Abstracts	$ 240	1,300	$0.185
A.P.I. Technical Abstracts	$6,000	10,000	$0.60

Any relationship between the rates per abstract, per hour, or per hundred words cannot be a strict one, because some items are abstracted easily whereas others require lengthy analysis; moreover, some abstractors work faster than others. Patents are written in a standardized format, which usually makes it simpler to find and abstract essential information than in the average journal article. An English-language patent can be abstracted in an hour or two. Foreign-language ones, although taking about the same time, require more final interpretation and polishing.

COST OF PROCESSING ABSTRACTS

The present program covers abstracting from 450 journals and from patents of twelve countries. Table III shows the effort for selecting and further processing of abstracts, exclusive of the purchase cost. The professional effort consists of selecting, screening, indexing and editing, and titling. It takes 40 hours per week to select journal articles, and only 16 to select and screen patents. The possibility of reducing the intellectual effort for the selection process by utilizing economical machine techniques seems remote. If literature and patents were published with a list of descriptors or indexing terms, plus an authors' abstract, the effort and resulting cost of selection would be greatly reduced and abstracting programs would benefit.

The nonprofessional effort for handling, typing, duplicating, sorting, filing, and miscellaneous is about 140 hours per week for literature and 180 for patents.

These professional and nonprofessional hours per week can be used to develop a generalized cost for selecting and processing abstracts, on the basis of an arbitrary salary of $10,000 and a wage of $4200.

TABLE III
TIME HOURS PER WEEK REQUIRED TO SELECT AND PROCESS ABSTRACTS

	Patents	Literature
Professional		
Selecting	10	40
Screening	6	0
Indexing and editing	17	20
Titling	4	0
	37	60
Nonprofessional		
Handling	11	9
Typing	34	26
Duplicating	11	9
Sorting	45	35
Filing	45	35
Miscellaneous	34	26
	180	140

TOTAL COST OF A PROGRAM

The total cost for a program similar in scope to American's, based on generalized salary and wage figures, is the cost of raw abstracts plus the cost of selecting and processing. As Table IV shows, for patents, raw abstracts cost between $2.00 and $5.00 and the effort costs about $3.80. The total cost, then, ranges from $5.80 to $8.80. Similarly for literature, raw abstracts cost between $1.00 and $3.00, and the effort is $5.20, such that the total is $6.20 to $8.20. Excluded in these figures are costs of journals, patents, paper, ink, machines, and equipment. The total cost for literature abstracts is narrower and within the cost range for patent abstracts. The cost of raw abstracts constitutes half or less of the total cost of the program. Therefore, a program processing 15,000 abstracts per year would cost $110,000 annually.

TABLE IV. TOTAL COST OF AN ABSTRACTING PROGRAM

Patents			
Raw abstracts cost			$2.00 to 5.00
Selecting and processing	Professional	Nonprofessional	Total
Hours per week	37	180	
Rate per hour	$4.80	$2.00	
Cost per week	$178	$365	$543
Abstracts used per week			143
Cost for selecting and processing, per abstract			$3.80
Total cost per abstract			$5.80 to 8.80
Literature			
Raw abstracts cost			$1.00 to 3.00
Hours per week	60	140	
Rate per hour	$4.80	$2.00	
Cost per week	$288	$284	$572
Abstracts used per week			110
Cost for selecting and processing, per abstract			$5.20
Total cost per abstract			$6.20 to 8.20

The American Oil Company program figured on the arbitrary salary and wage basis would cost between $5.80 and $8.80 per abstract. Similarly, a program at Esso Research and Engineering Company costs $4 to $7, exclusive of the expense of maintaining a reference pool of abstracts. A synthetic example without a card pool[3] is reported to cost $6.60 on the same basis.

FUTURE DEVELOPMENTS

Several developments will tend to affect the costs of abstracting programs in coming years. The abstracting services are beginning to move toward cooperation. Trade associations, universities, publications, and government agencies are beginning to recognize the large stake they have in the cost of information.

The National Federation of Science Abstracting and Indexing was formed in 1958 by Chemical Abstracts and a dozen other agencies and services. It is aimed at coordinating the work of the member organizations, improving documentation, and looking into machine systems for simplifying the handling of information. Recently it has undertaken a survey of costs of abstracts within its membership, which covers such diverse fields as aero-space, mechanics, metals, agriculture, biology, and medicine.

Trade associations in the metals, medical, and petroleum fields have been concerned with cooperative abstracting. The American Petroleum Institute has offered a bulletin of abstracts on refining literature for several years, and it is proposing to extend coverage to refining patents. The new service ought to be valuable to most of the industry. Also, the A.P.I. is considering an abstracting service to include petroleum exploration and production.

Abstracting would appear to be an appropriate function for universities as part of their traditional custodianship of knowledge. One university is proceeding with plans to offer abstracts of petroleum literature and patents.

In the area of publications, it has been only a few years since authors' abstracts began to be required for acceptance of a paper for publication. This practice originated some 30 years ago with the Journal of the American Chemical Society, 23 years ago with the Berichte, and 13 years ago with the Journal of the Chemical Society. A simple requirement of authors' abstracts plus some indexing terms as well, in all technical journals, would greatly assist abstracting programs.

Since 1945, the government has become increasingly productive of scientific information. More recently, it has become concerned with information-handling problems. The National Science Foundation is

empowered to foster the exchange of scientific information and, in its first annual report in 1950, stated that it would sponsor research to improve existing methods of abstracting. An issued report on subject-slanting of abstracts and a guide to science-abstracting services typify the many other possibilities for investigation.

A program using purchased abstracts plus fewer prepared ones is operable for large as well as small organizations. Costs are controllable and vary mainly with the degree of selectivity desired. As more abstracts of literature and patents become available from centralized and cooperating sources, the cost of raw abstracts should drop. However, some documentary control permitting easier selection of desired patents and literature abstracts would contribute greatly to reducing the major element of cost in abstracting programs. Such documentary controls and goals can result through the continuing activities in industry, universities, and government for improving abstracts.

LITERATURE CITED

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[2] M. Rigby, "Cost Analysis of Bibliographies or Bibliographic Services," ibid., p. 383.

[3] B. H. Weil, Columbia University Library School Lecture, 1960.