sum of the costs for the two segments, or about 4⅓ CPU hours. Standard statistical methods show the differences between all pairs of files to be significant. It should also be noted that the bibliographic data provided from *CA Condensates* and the Merged File includes the full bibliographic citation while the two CAISF segments provide only the CA abstract numbers directly. An additional processing step would be required to use these CA abstract numbers to retrieve bibliographic citations for display.

CONCLUSIONS

The results of this study indicate that addition of the chemical substance indexing from the Chemical Substance portion of the CAISF (e.g., Registry Numbers) markedly improves the recall performance of *CA Condensates*, as would be expected. Precision, however, is not improved significantly. Also, indications are that the text modifications of the CAISF files provide the same performance levels as do the titles and keywords of *CA Condensates*. Over-all performance suggests that an effective data base can be constructed by augmenting the *CA Condensates* records with the Registry Numbers and some representation of the conceptual index headings, providing a much smaller file than the corresponding inverted CAISF data base with an improvement in both recall and precision over either data base alone.

No direct cost comparison is appropriate as only the search system optimized toward the sequential, document-oriented data bases was used in this study. The Merged File thus takes advantage of existing computer software in this case, but it seems reasonable that comparable timings could be obtained for the inverted file structure with a system designed for this purpose.

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Evaluation of the *ACS Single Article Announcement Service**

SELDON W. TERRANT**
American Chemical Society, 1155 16th St. N.W., Washington, D. C. 20036
WILLIAM H. WEISGERBER
Omnisearch, 632 McLean Ave., Yonkers, N. Y. 10705

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The *ACS SINGLE ARTICLE ANNOUNCEMENT*, issued semimonthly, is a current awareness service which provides the tables of contents for 18 ACS primary journals. Copies of articles cited can be ordered by use of a form provided. The service began on a subscription basis in January 1971. A survey of selected samples of 1971 subscribers (renewal and nonrenewal) was conducted in 1972. The objective was to evaluate the service by identification of factors influencing subscription renewal. The survey methodology and results are presented.

Most users of primary information need access to specific archival literature and also ways to keep abreast of advances in their general fields of knowledge. The first need is usually satisfied via indexes, which provide references to pertinent journal articles. Current awareness can be achieved by the scanning of journals or by the use of alerting services. In an ACS survey[1] of users of the *Journal of Organic Chemistry* conducted in 1969, it was found that over 80% of the respondents cited the title of an article as

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** To whom correspondence should be sent.

a factor in deciding to read the article itself. Twice as many respondents based their decision on the content of the title as did respondents whose decision was based on the title and abstract. Thus, since an article title can be read quickly and usually has high information content, it was decided to test the potential acceptance of a service based upon the tables of contents of ACS journals. During a six-month period (October 1969–March 1970), a twice-monthly announcement bulletin consisting of photoreproductions of the tables of contents of 15 journals was sent free to a randomly selected group of 1000 ACS members. Later, a survey of these members showed that there was enough potential interest in the service to warrant publication on a subscription basis.[2] The *ACS SINGLE ARTICLE ANNOUNCEMENT* service (SAA) was started in January 1971. Introductory subscription prices (for members and nonmembers) were 20% less than the planned second-year subscription prices.

Since one of the best indications of the acceptance of, and interest in, any service is the subscription renewal rate, the 1972 renewal rate for SAA was monitored carefully. As occasionally happens with a new venture, some of those who climb aboard the first year jump off, for one reason or another, the second year. The 1972 renewal rate was disappointing, even for a new service. As a consequence, it was decided to conduct a survey of representative samples of both renewal and nonrenewal subscribers to determine the causes for the low renewal rate. The objectives of the study and the questionnaires used were developed jointly by ACS and Omnisearch. The survey was conducted by Omnisearch, as were the tabulation and presentation of results in the final report.

The objectives of the study were (1) to identify the factors influencing the renewal or nonrenewal of subscriptions to SAA for 1972, and (2) to rank the factors in the order of their apparent importance. To fulfill the study objectives, a mail questioning method and a matrix design (four matching samples) were chosen. This design provided an economical, unbiased, and analytical approach to identification of the subscription renewal factors. Samples were designed to show a difference in one group of responses as compared to the other group. When no differences in certain factors occurred between the renewal group and the nonrenewal group, it was inferred that those factors did not affect subscription renewal.

The general areas of inquiry that were considered during the questionnaire development phase were: (1) general and job information interests, (2) information gathering task perceptions, (3) sources used in gathering information, (4) availability and utilization of ACS information services, (5) professional activity, (6) amount of literature read, (7) utilization of SAA, (8) evaluation of the content and scope of SAA, and (9) attitude toward the subscription price of SAA. Two questionnaires were developed and used in the study: one specifically oriented toward SAA evaluation and the other oriented toward information needs according to a person's job. Prior to finalization of the questionnaires, some telephone interviews were conducted. Minor changes were made in the questionnaires, based on the information obtained in the interviews.

Four matched sample groups were selected: subscribers and nonsubscribers for the SAA evaluation questionnaire and subscribers and nonsubscribers for the job-related information questionnaire. The latter questionnaire was designed so that it was not SAA-related. Both members and nonmembers were included in the sample. A first-class mailing of all questionnaires was made in November 1972. Two weeks after the mailing, with a response rate of about 36%, a follow-up mailing to the nonrespondents was made. At the final cut-off date for receipt of questionnaires (four weeks after the initial mailing), an excellent response had been experienced; from a low of 54% on one questionnaire to a high of 69% on another. The results were keypunched into data processing cards and the information was correlated via a computer program written for the study.

In the following discussion, "drops" refer to those who did not renew their subscriptions and "subscribers" refer to those who did renew. A significantly higher percentage of subscribers were engaged in production (25%) than were the drops (8%), whereas the converse was true for product research and development. The average age of subscribers was slightly higher than that of the drops. An interesting fact is that a higher percentage of subscribers than drops also subscribed to two or more ACS journals. This could indicate that greater use of journals equates to greater need for information. There were no differences between member subscribers and drops as far as the following characteristics were concerned: academic degree, academic major, membership in ACS divisions, and, surprisingly, job titles.

The results obtained from the "job information" questionnaire were as follows. Job-related subject interests did not appear to be a factor in influencing renewal. There was a difference, however, between subscribers and drops insofar as general subject interests were concerned. Subscribers were interested in more subjects than were the drops and also showed a greater interest in subjects covered in ACS journals. Those who dropped their subscriptions had apparently been less successful in finding titles of articles about their subject interests than had subscribers. Answers to a question concerning the relative need for specific information *vs.* general information indicated that drops felt a greater need for receiving specific information about their subject interests than did subscribers. This suggests that subscribers were using SAA to alert them to general information about different subjects, rather than just information on subjects in their own (specific) fields of interest. This is gratifying, since the most important reason for publication of SAA is to provide just such a means of browsing through all of the subject areas covered. Subscribers felt more strongly than drops did that "keeping up with relevant current information" was more frustrating than doing retrospective searching.

The availability of library and technical information group assistance appears to be a factor influencing renewal, since a higher percentage of drops than subscribers had such services available. About 35% of the drops indicated that SAA was available in their libraries and was used by them, even though they no longer were receiving personal copies. Replies to questions concerning reading habits (for example, what do you do first when you receive a journal) showed that there was no difference between subscribers and drops with respect to the reading of journals. Interestingly, over 60% of both groups indicated that they leafed through a journal first; only 25% turned to the table of contents first.

Some interesting results were also revealed by the answers provided on the second questionnaire, designed for evaluation of the SAA service. As far as use of the semimonthly issues is concerned, subscribers looked through more of the issues than did drops. Only 60% of even those who renewed their subscriptions stated that they looked at all 24 of the 1971 issues. In retrospect, it would have been helpful to have a question concerning why certain issues were not scanned. It is obvious that interest in keeping up-to-date was not constant over a prolonged period.

Postal delivery service apparently was not a factor influencing renewal, since both groups were satisfied with the speed with which they received their copies in the mail. Questions were included concerning the acceptability of the SAA service or its need for change. The primary usefulness of the SAA service, based upon survey replies,

is as an access route to the ACS journals covered. A number of respondents suggested that coverage of some non-ACS journals would improve the service. A significantly higher percentage of subscribers than drops (33% *vs.* 14%) judged the subject area coverage of SAA to be adequate. With regard to display of the article titles, about 50% of both the subscribers and drops indicated a preference for display of titles in groups according to general subject areas, rather than in the original table of contents format. This approach will be considered, along with others, in any future modification of the service. About 20% of both subscribers and drops would prefer standardization of the amount of information provided in the various tables of contents, as well as in the formats of the tables.

SAA's frequency of publication (semimonthly) did not appear to be a factor influencing renewal, nor did the way in which the service was perceived (about 70% of both groups considered SAA as an information system). The last question dealt with pricing of the SAA service if suggested changes were made. This approach was used to see if there was a difference between subscribers and drops in their attitudes toward pricing of information services (the first-year subscription price was 20% less than the price of a renewal subscription). The results indicated that the price of the service did not influence renewal. This was borne out by the absence of any reference to cost in the "comments" section of the questionnaire.

As stated above, the 1972 renewal rates were disappointing: about 42% for member subscriptions and 32% for nonmember subscriptions. The 1973 renewal rates (as of August 31) are much better (about 59% for members and 73% for nonmembers), but still not satisfactory. However, enough new subscriptions have been received in 1973 so that total 1973 subscriptions exceed 1972 subscriptions.

Based upon the results of this study, a number of factors can be identified as having an influence on subscription renewals. First, the subject range of articles published in the ACS journals did not adequately cover the subject interests of a number of drops. Secondly, drops were less satisfied with the information content, arrangements, and format of the tables of contents. And, thirdly, the availability of other information sources influenced renewal.

While a number of factors influence subscription renewals, they also influence first-time subscribers to any publication. Design of a successful information system requires information about individuals' career goals, perceived needs in reaching these goals, and their reactions to the system. Studies such as the one described can help organizations in understanding the motivations of users and how information services can aid them.

One of the prime requirements of any system is its ability to adapt to a changing environment. Ways and means of disseminating information that were successful in the past are now questionable in light of what is known today. Adequate feedback via periodic evaluation is necessary so that modifications can be made in time to provide useful and efficient systems.

Since the information business is like any other business, it must have its own source of decision-making information if it is to serve its customers well.

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Computer Search Center Statistics on Users and Data Bases*

PETER B. SCHIPMA
IIT Research Institute, Computer Search Center
Chicago, Ill.

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Statistics gathered over five years of operation by the IIT Research Institute's Computer Search Center are summarized for profile terms and lists, use of truncation modes, use of logic operators, some characteristics of *CA Condensates,* etc.

The Computer Search Center, at IIT Research Institute in Chicago, has been operating for some five years. Basically, the Center is a collection of people, hardware, and computer programs that provides SDI and retrospective search services to paying customers. That last phrase, "paying customers" is very important. Although the Center was established with funds provided by the National Science Foundation, it now operates on a cost-recovery basis from subscription income. The figures that I present, therefore, are not the result of a controlled experiment, but reflect the real world. You will note that many of them contain a price- or cost-dependent bias, but in this period, the dollar, or its lack, is a definite fact of life. This paper presents summary data collected on the users of the Computer Search Center and the data bases that are searched therein. Further information can be obtained from NTIS.[1]

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THE USERS

The users of the Computer Search Center are scientists (Figure 1). These scientists are employed at various organizations, primarily industrial— and that probably be-