



# Covering the Computer Field

by G. Salton

During the past year, the *Communications* has printed approximately twenty papers in each of three main areas: programming language development, compiler management and construction, and numerical methods. In addition, about twenty new algorithms were published, as well as half a dozen papers covering the general area of education in computer science; new proposed standards were also disseminated for various types of paper tape, punched cards, and for data communication codes. Three of the twelve issues were conference issues consisting of papers originally given at the ACM Conference on Programming Languages and Pragmatics, the ACM Symposium on Symbolic and Algebraic Manipulation, and a Symposium on the Impact of Computing on Undergraduate Mathematics. A survey paper was published on simulation languages, and two reports were printed covering the computer scene in Communist China and Europe, respectively.

A large variety of additional studies covered topics such as data structures and memory organization, decision table algorithms, graph and flowchart manipulation, banking application, pattern recognition procedures, medical applications, interactive computing techniques, computer system design, graphic data processing, information retrieval, computational linguistics, statistical techniques, computing center management, and others.

When considering such a diverse list of topics, it is natural to ask whether the sum total of the published material does in fact constitute a complete coverage of the computer field. Regrettably, the answer has to be NO: first, the *Communications* does not normally contain material in certain, relatively theoretical areas, such as abstract machine theory, algebraic language theory, and coding and switching theory—some of these fields being normally covered in the *Journal*; second, the *Communications* does not, unfortunately, publish many surveys and tutorials which attempt to pull things together—as one somewhat desperate reader wrote in recently: “what is the Backus Normal Form?”; third, our coverage must be rated as very thin indeed in certain applications areas—for example, information retrieval—where a reader would get a quite incomplete picture of the state of the art, were he to rely exclusively on ACM publications.

A clue to how well the computer world is in fact served by our publications may be obtained by studying George Forsythe's “A University's Educational Program in Computer Science” included in the present issue. Professor Forsythe states in part: “computer science is not . . . merely the union of the applications of a computer to diverse problems. Rather, the core of the field is application independent and rather abstract, being concerned with languages and techniques that are relevant to a variety of different applications of computing. . . . The representation and processing of information are the core of computer science . . .” He then proceeds to outline the graduate program at Stanford University which is separated into three main areas:

- (1) numerical analysis and computational mathematics;
- (2) computer and programming systems, and programming languages; and
- (3) non-numeric applications, including artificial intelligence and, the mathematical theory of computation.

If we consider that the second area which is regarded as crucial at Stanford (and therefore compulsory for all students) is also the one best covered in the *Communications*, and that the first area also exhibits great strength in our publications, it is seen that we are probably not far removed from the mainstream of activity in the computer field, and that the coverage may not be as deficient as might appear at first sight.

But how well do we serve the reader who is not primarily interested in computer science as a field of study but would nevertheless like to relate some of the new techniques to his own field of activity? A typical reaction from such a reader is contained in the following excerpt of a recent letter: “A gradual shift in the nature of the topics covered in both the *Communications* and the *Journal* has occurred over the years; the shift has been from the applied sciences to far out esoteric fields. . . . Those of us who must be concerned with the daily bread and butter programming problems of business . . . find fewer and fewer items of interest . . .”

To such a reader one can remark that it is hard to believe that among dozens of papers in the programming language and programming techniques area there should not be many which do in fact relate to “daily bread and butter programming problems.” But it is, of course, possible that authors and editors do not try hard enough to bring out this relationship, and it is true that we do not publish a large number of tutorial articles and surveys. Why not? Because we are unable to convince more people to prepare them for us and to send them in.

Should we then try to give up our aspirations of technical excellence and put out a publication with a more popular orientation? Maybe some readers would favor such a course, but more would probably dislike it. The experiences of one correspondent who was for many years a member of a well-known data processing organization before joining the ACM may be typical in this connection: “I had been a member of the local chapter of their organization for many years. The main purpose of this chapter appeared to be social drinking. I didn't think it was worth the time and effort . . . to go to meetings. . . . The seminars . . . ended up to be tours through plants or offices. . . . The material content of their journal wasn't worth my attention.”

I feel, as this reader does, that we cannot and should not try to compete with semi-popular journals, but that we must attempt to cover the computer field while maintaining high standards and continuing our efforts to solicit outstanding tutorials and expository studies as well as the research papers which we are already publishing in large numbers.