

tific disciplines. Paradoxically enough, the existing delay in both industry and state agencies with regard to automation, documentation, and data banks, and the almost total absence of any system of structural description have, in fact, created a situation favorable to the establishment of an up-to-date national network. Thanks to belated choices, this network, both complex and diversified, will enjoy the benefit of unified documentary techniques.

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Chemical Information in the United Kingdom*

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Progress in the development of advanced chemical information systems in the United Kingdom is briefly described.

The major producers of primary chemical information in the United Kingdom are chemistry and chemistry-related departments of universities and similar academic institutions (Colleges of Advanced Technology, Polytechnics etc.) There are approximately 70 University Chemistry Departments with a large postgraduate, postdoctoral, and staff population. Several hundred other departments (Biochemistry, Pharmacology, and so on) in both Universities and other educational establishments swell the number of potential producers of primary chemical literature in the academic field very substantially.

Private industry and Government sponsored research institutions of one kind or another are certainly less significant as producers, but have a much more significant role as users of primary and, thus, secondary and tertiary information sources.

The Chemical Society is a major publisher of primary chemical information in the UK, but, apart from the activities of the United Kingdom Chemical Information Service (UKCIS), it has an insignificant role in the secondary information field. Indeed it is fair to say that compared with its input to the world's chemical literature, the UK makes a relatively insignificant contribution to the production of secondary literature sources. There are of course notable exceptions to this somewhat sweeping gen-

eralization—Derwent Publications for example, is internationally well-regarded for its work in the field of patents. Nevertheless the UK is making, and has made, some significant contributions in the area of research into methods of handling secondary sources of chemical literature, particularly computer-based ones, and in the area of international collaboration on both the collection and analysis of primary literature for secondary use, and its subsequent dissemination. The work of M. F. Lynch at Sheffield University,^{1,2,3} of the Imperial Chemical Industries (ICI) team that developed the CROSSBOW system for handling Wiswesser Line Notations (WLN),^{4,5} and of UKCIS itself^{6,7} are examples.

Private chemical industry in the UK is dominated (except possibly in the pharmaceutical field) by a very few, very large national or multinational corporations. There is a very definite gulf between the few very large and the large number of rather small companies. The large companies have the technical and financial capability to develop internal programs for handling their chemical information problems, using external publicly available sources as well as their own internal sources; indeed some of the most notable contributions to the art of handling chemical information have come, in the past few years, from these major companies. The lack of a substantial number of middle-sized industrial users of chemical information has produced a situation in which there is a very marked gap between the sophisticated information-handling practices

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of the few, and the naive (or even antediluvian) practices of the many. Thus, the market for sophisticated secondary information products in the UK is severely limited, at least within private industry, to the few giants; most of these at present regard themselves as rather self-sufficient.

Although the chemical industry supports substantial research and development programs, the major producers of published primary literature are the academic community. The greatest proportion of the research which generates this output is funded by the UK Government through, for example, the University Grants Committee and the various Research Councils. While no doubt all research workers would like more money, it could not be claimed that there is any dramatic shortage of funds for academic research programs. But it is a major curiosity that, while 10% of the world's chemical literature comes from the UK (and much of this arises from government sponsorship), there is only a modest government support of secondary information sources and services, if support for conventional library activities is excluded.

The major government agency concerned with development of secondary information systems is the Office for Scientific and Technical Information (OSTI) of the Department of Education and Science. OSTI's main concern, which it has discharged admirably, is the support of research programs to evaluate the use of modern information handling techniques in the whole field of science and technology. It has not, except in a few isolated instances, been able to provide funds to enable the various computer-based and more conventional services which have developed from these research programs to establish themselves as commercially viable systems, a process which requires a good deal of user education and encouragement during its early stages. In the absence of such support, progress in the development of services which adopt the latest technology has been slow and will be so for some time to come.

Nevertheless, there is a considerable activity on the chemical information scene in the UK which is worthy of report and which matches the standards of the activities which other countries are reporting in this symposium.

There can be no doubt that the major event of the past few years in this area was the establishment of a formal link between UKCIS and Chemical Abstracts Service (CAS) through the medium of an agreement between the Chemical Society and the American Chemical Society (ACS). This agreement gives UKCIS the exclusive responsibility for the sale of CAS hard-copy publications and tapes in the UK, a preferred position in the use of CAS tape data bases, and an opportunity to contribute to the continuing development of CAS operations through the preparation of input for the CAS data base, in the UK.

Substantial OSTI support of evaluation studies of CAS data bases has enabled UKCIS to develop SDI and bulletin services derived from CAS tapes which are now commercially available in the UK. These services are financially self-supporting and, although progress is slow, are attracting increasing interest from UK users of chemical information. Much of the basic work on the problems of profile construction and user education for use of free-text data bases which led to procedures which are now widely adopted internationally was done by UKCIS in 1966-1968.^{6,7} It must be confessed, however, that since 1969 or so, there has not been too much in the way of new ideas in this field coming from Nottingham. We are hopeful that this position will rapidly change. We are currently installing a new search system at Nottingham which will process CAS, MEDLARS, and BIOSIS tapes in one general framework and will provide both a current-awareness

and retrospective search capability. These and other data bases are being converted to a common format (the so called EUSIDIC format⁸). This system will extend the ability of users to frame complex search strategies well beyond what UKCIS currently offers, and is designed to permit relatively easy adaptation from a batch to an on-line interactive mode of operation. Plans are in hand to use the CAS Integrated Subject File and the CAS Registry system files in a consolidated system with advanced capabilities. Though a good deal of new research must be done to bring these systems into a fully operational state, we are reasonably clear on the proper approach to adopt and will be reporting progress from time to time.

UKCIS has just completed the report on a major evaluation study of *CA Condensates*; a particular feature of interest in this report is a description of a procedure for semiautomatic (or perhaps better machine-assisted) profile construction, which will, we believe, be of some benefit to users in the future in easing the problem of converting the users query into a machine processable form.

Besides UKCIS activities in this field, some interesting comparative evaluation studies have been made by the Oxford Experimental Information Unit (sponsored by OSTI) and will be reported soon. These studies have compared the performance of CT, ASCA, and a conventional service available in the UK.

But perhaps the most significant developments in the UK in the last year or two have been the attempts, some still in planning, others successfully functioning, to develop collaboration both between major information centers in the UK and internationally. Under the stimulus and guidance of OSTI, UKCIS, INSPEC, UK MEDLARS, and a group in the University of Nottingham running an SDI service on BA Previews tapes are collaborating in various bilateral arrangements to develop common procedures and practices. It is already the case that *all* computer processing of CAS, MEDLARS, and BIOSIS tape data bases in the UK, other than that being done by private industry, is centred at UKCIS, and since October, 1972, has been done by a single generalized computer system on an ICL System 4/50 computer installed by UKCIS in July 1972. A particularly important collaborative effort is that between UKCIS and INSPEC; all the OSTI sponsored research programs of these organizations are being developed in a single framework so as to reduce duplication of effort. Though this concentration of activity has led to more than its share of problems, we can already begin to see the great benefits that will arise in the future. Mirroring this national collaboration is the international collaboration between UKCIS and CAS on input. Relatively little information on the progress of this collaboration has been reported. At the present moment, UKCIS is preparing input for CAS for all papers in journals published by the Chemical Society and in the *Journal of Biochemistry*. The effort required to prepare an abstract and index entries is done in a single analysis step. Manuscript input is being sent to CAS at an annual rate of 4,000-5,000 abstracts at present, and it is planned to build this to 40,000 abstracts per annum by 1976/77 when UKCIS will be preparing input for the entire UK chemical literature. The UKCIS input operation has served as a pilot in the CAS plan to move to a unified abstracting/indexing operation and, so far as I am competent to judge, is serving its purpose admirably. Within the next two or three months UKCIS and CAS will begin to tackle the formidable problem of the mechanization of this decentralized input. Though there will be many problems, the experience of the past two years suggests that they will be overcome and that resulting combined input operation will serve as a model for the way in which such complex international collaborative exercises should be tackled.

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Handling of Scientific Information in Romania*

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The Scientific Documentation Center of the Romanian Academy acts as the focus of information activities. It ensures centralized procurement of difficultly assessable reports. It maintains contact with similar national and international organizations. Review and state-of-the-art articles receive special attention. An answering service is provided, giving references in response to specific subjects. Romanian scientific efforts are summarized in Russian and English-language bulletins and offered in free exchange for similar foreign publications. The organization of this activity and the individual tools are described, emphasizing the needs of chemistry and chemical engineering.

Practitioners of scientific information handling usually believe that their field of activity has a universal character. This is reinforced by the fact that most of us entered this field through the back door, after having been trained in one of the physical or biological sciences. However, the very fact that a *Symposium on Chemical Information Services Abroad* has been organized by the Division of Chemical Literature, indicates that special situations prevail in various areas of the world and organization of scientific information services is greatly affected by certain factors.

The history of science is full of examples which indicate its all-pervading, supernational nature, preconditioning us to feel that as long as we ask the right question, science will always provide the correct answer. On the other hand, it should be emphasized that organization of a system to serve the information needs of scientists and engineers is not purely scientific, but is also a social problem. It is affected by special factors such as location, environment, etc. Examples abound to illustrate this state of facts. Even within this country, a more or less lonely chemist in a small remote college has different requirements with respect to an information system than his colleague employed in a research laboratory of a large chemical compa-

ny in northern New Jersey, with access to a well stocked library and all the information resources of his employer and of the New York metropolitan area.

Local conditions prevailing in a given country affect even more various aspects of information handling. Therefore, instead of a detailed description of the organizational structure, I would like to examine primarily the factors which influence the development of the information system of Romania, using that country as a model to show how the needs of a scientist and engineer in that country differ from those of his colleagues in a large, technically fully developed country.

I hope that this personal analysis, based on earlier acquaintance with local conditions and recent impressions, will make up for the lack of detail concerning the various agencies. After all, organizations usually are in a constant state of flux; they are subject to change because they are affected by these forces. My subject is a study of the factors which differentiate the information needs of the Romanian technical man and are responsible for the specialized tools developed during the recent years.

The first factor to be considered is *geography*. Instead of reciting well-known encyclopedic facts about the country, it suffices to point out that it is an Eastern European country, between Hungary, Yugoslavia, Bulgaria, the Black Sea, and the Soviet Union. Up to recently, it has been somewhat out of the way of the general tourist traf-

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