AN EXPERIMENT IN STANDARDIZATION

This is the story of an experiment in standardization being conducted by the documentation branches of four government agencies. At least two reasons occur to me why the account may be of interest to readers of *Physics Today*. First, so many scientists are at present associated one way or another with government-supported research that improvements in techniques of disseminating information about such research become of rather general scientific interest. Second, as is shown later, this particular development represents an unusual approach to a standardization problem—one which conceivably may prove to have other applications. (Some of my friends say they find the movement interesting for a third reason; they claim the very fact that four government agencies are cooperating voluntarily on anything is newsworthy. This cynical viewpoint, however, I am prepared to ignore.)

The following paragraphs describe first the situation which made the need for this particular standardizing effort apparent, second the informal approach that is being made toward achievement of the desired end, and third the actual progress as of this writing.

The four agencies or branches of agencies which initiated the experiment have been estimated to control upwards of 80% of the 150,000 or more technical reports issued annually by the various organizations engaged in government-supported research relating to national defense. The names of the four, together with the primary responsibility of each, are as follows:

1. Technical Information Service, U. S. Atomic Energy Commission (AEC)—provides bibliographic service in the field of nuclear science to the AEC and its contractors.
2. Division of Research Information, National Advisory Committee for Aeronautics (NACA)—provides bibliographic service in all fields of interest to NACA and its contractors.
3. Central Air Documents Office (CADO), Air Materiel Command—supported by parts of all three armed services to provide bibliographic service in all fields of air technical interest to the Department of Defense and its contractors.
4. Navy Research Section (NRS), Library of Congress—supported by the Office of Naval Research to provide bibliographic service primarily to the Navy and its contractors in scientific fields pertinent to their research; the service also is available to other branches of the armed services and their contractors.

The term "bibliographic service" as used here means, in each case, carrying out most, and usually all, of the bibliographic operations of issuing catalog cards, publishing abstract bulletins and indexes, preparing bibliographies, and answering reference questions.

Although in every case the primary responsibility is as stated above, there is wide overlapping of interest with the clients of each agency needing to make extensive use of the information in scientific reports coming under the control of the others. For example, numerous Navy laboratories and contractors must keep informed regarding developments in certain aspects of nuclear science; NACA scientists have wide legitimate interest in work under way in laboratories supported by the Army and Navy; research establishments concerned primarily with nuclear science must know what is coming out of a variety of laboratories whose fiscal affiliations may encompass all of the defense departments; and so forth.

However, because the documentation activities of the four agencies listed above got started at different times and under varying circumstances, they evolved more or less independently, with each following largely the dictates and whims of its own bibliographic conscience. Consequently, it has not been possible in the past for any one of the four simply to accept the products of the other three. No two used the same format of catalog card or the same subject headings; therefore, cards of the four agencies were not "interfilable". Abstracts were prepared according to slightly different rules and published in different formats; therefore, composite abstract bulletins and annotated bibliographies could not be prepared by simple mechanical combination. The same held true for composite cumulative indexes. The result was that each agency processed not only the documents coming under its own primary cognizance but also all those of the other three agencies which were of interest to its clients. Thus, some reports received the full "treatment" four times, and a considerable fraction went through two or three of the four bibliographic mills. The desirability of some measure of standardization was obvious. The approach to its achievement which was adopted is noteworthy for its directness, simplicity, and informality.

The usual approach to standardization—whether it be of screw threads, ladies' shoe sizes, professional jargon, or what not—is roughly as follows: Top echelon representatives of the organizations concerned (a) meet, (b) decide they are "for" standardization and (c) appoint committees. The committees meet and appoint subcommittees who in turn formulate study groups. Some time later, the study groups submit reports to the subcommittees who revise and submit them to the committees who revise them and send recommendations to the top echelons. If the recommendations are approved, they are routed (or filtered) via the proper administrative channels down to the working levels for implementation. Putting the recommendations into effect ordinarily brings to light a variety of "bugs" in the new system which were not foreseen by the standardizers. Removal of these requires a reversal and re-reversal of the chain-of-command routine employed in developing the original recommendations. It probably is not unfair to say that this technique of standardization has not always been completely effective.

The approach used in the experiment under discussion here was the reverse of the above in that it started with working level individuals. It consisted simply in personnel actually involved directly in documentation activities in the four agencies meeting together quite informally and saying to each other essentially, "Look! Most of our overlapping activities differ in relatively minor details. Let's agree among

Brookhaven National Lab.
SOME OBSERVATIONS OF THE EPITAXY OF SODIUM CHLORIDE ON SILVER, by G. W. Johnson. Dec. 2, 1949. 12p. incl. illus. 13 refs. (AECU-754)
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The orienting effects of Ag on NaCl crystallized from solution were investigated. Strong epitaxy was observed in oriented films of Ag with (100) and (111) planes parallel to the surface and polycrystalline high purity Ag. The orientation of a small nucleus or embryo in determining the orientation of the entire crystal is supported by the growth of crystallites across grain boundaries without affecting the orientation of the growth. The orienting characteristics of Ag on NaCl were recommended as an indication of relative orientations in polycrystalline material and of testing degree of orientation in oriented thin films.

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By Dwight E. Gray

ourselves to do as many of them as possible the same way. This will permit us to stop processing each other's reports, will make our products more useful to the customers, and in general will make life simpler for all of us." This, of course, is standardization and this is just what they did.

Specifically, the routine has been as follows: At their first meeting the representatives of AEC, NACA, CADO, and NRS set up, in order of importance, a series of standardizing goals the attainment of which would permit each agency to use the products of the others. As these goals were discussed and conclusions reached, the tentative decisions were taken back to the appropriate authorities in each parent agency for approval. The fact that the conclusions were reached by working personnel directly involved in the operations being standardized has tended to keep proposals highly practical and realistic and in general approvals have quickly been forthcoming.

The first item considered was a common format for the library cards. Agreement was reached and March 1 was established as the date at least by which all four agencies would be preparing cards of the new style. An AEC unclassified card of this format is shown in the figure. Several other projects in which catalog cards are prepared already have adopted the card, thereby increasing its value to everyone. A major, and perhaps the principal, advantage of this so-called marginal type of card lies in the manner in which it can be employed to facilitate the preparation of abstract bulletins, bibliographies, and cumulative indexes. Cards of this type can be pasted up into sheets, with the right-hand margins covered up, to form two-column pages of entries, each of which consists of the citation and abstract. From these an abstract bulletin can be produced directly by photo-offset printing. Similarly, by arranging all the cards produced during any given period in the proper sequence and again pasting up pages—this time with only the citation showing—a cumulative index for that period can be produced. Thus, with a single original typing, or typesetting, and proofreading, several kinds of publication can be produced incorporating in every case the information from as many agencies as are employing the "standard" format of card. In other words, for example, the card file maintained by AEC can have interfiled in it cards from CADO, NACA, and NRS and any abstract bulletins, bibiographies, or indexes made from these cards similarly will include information from all four.

The second problem to be considered was the development of a subject heading list which as far as possible would be common to all agencies. Whereas the joint card could be created, it was evident that a common subject heading list would have to evolve. It was recognized that for each agency there always would be (a) subject headings which it alone would need and (b) areas in which it would require greater detail of subject breakdown than would the others. The first of these points poses no serious problem since it is not presence of unwanted items in a subject heading list that causes trouble; it is absence of needed ones. With regard to the second, the fact that one agency may require greater detail in certain subject areas than the others is being handled by so phrasing such headings that the agencies not needing all the detail simply can drop the latter part of the entry. For example, AEC requires the subject heading "carbon isotopes—C-14" plus similar headings for other carbon isotopes. One or all of the other three agencies, however, may find that just "carbon isotopes" is sufficient for their purposes. In general, it is being found that to a very large extent a common list can be achieved—at least sufficiently so that the subject heading problem will not prevent the interfiling of cards from the various agencies and the termination of duplicate processing.

The preceding two examples—card and subject heading list—have been treated at some length as illustrations of the kind of problem engaging the efforts of this informal standardizing group and of the manner in which it has gone about the job. Other phases of bibliographic standardization which are under consideration and which tie in closely with the possibility of eliminating duplicate processing of reports include form rules for designating originating agency and methods of integrating the overlapping distribution lists of the four agencies. The originating agency, or corporate author, which ordinarily is of minor bibliographic importance in more conventional forms of publication, plays a major role in the case of the technical reports about government-sponsored research. Personal authors frequently either are not given at all or are too numerous to serve effectively for identification of the report or the work described. Such documents tend in general to become associated in other workers' minds with the laboratory from which they come rather than with a particular one or two persons. Some integration of distribution lists among the four agencies is necessary if each is to stop processing reports from the others, because there is wide overlapping of the clientele served by AEC, NACA, CADO, and NRS.

Other problems that the group may consider (to see whether standardizing among the agencies concerned would be profitable or feasible) have to do with such matters as micro-reproduction techniques, report formats, and report numbering systems.

[*As the above account was written, the merging of CADO and NRS to form an over-all armed services technical information agency (ASTIA) was well along but not completed. This merger, however, has no essential connection with the standardizing movement discussed here except that after its formalization three agencies instead of four will be involved.*]