



Standards in Library Technology

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THE READER who has considered the imposing array of "standards" already discussed may be too weary to now face the subtle addition of technology to all the other complications of the standards world. By now he has discovered there are standards by type of library, library function, size of library, geographical area, user public, and an almost limitless range of categories. He sees standards, having apparent authority, produced by national professional associations, by segments or even small units of organizations, by ad hoc committees both lay and professional, by many governmental agency units, in fact, by almost any group or body of real or imagined vested authority. Few are blessed with long periods of actual practice in use, or by substantial and durable authority. From this the reader can draw the conclusion that the standards world is a domain of total confusion. He is, in fact, almost right. This confused and confusing maelstrom of frequently ephemeral, inept, or unqualified standards is the natural result of the conviction of almost every human animal that his way is the best. When a committee convenes, its members usually reach a common conviction that their way is the best. When an association or a whole membership comes together, they *know* theirs is the only right way! One could go to ever-larger populations, except that once number two is reached, there may well be a disagreement as to who is right, and every added body compounds this likelihood of discord. This primitive aspect of standards development is just as applicable to the library world as to any other. It has taken nearly a hundred years to come from early library measures to the helter-skelter multiplicity of standards described in the preceding articles.

Even a superficial scanning of the numerous standards ascribed to one or another kind of library reveals at once that the primary focus of virtually all of them is statistical or measured. This pattern does not vary from the development of standards in other fields; most of them

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began with physical measures. The U.S. has always been "busting its britches" and its people have an addiction to measuring growth. It was by comparing one with another and multiplying like units that the first bases for standardization were discovered. Then, as the country and its libraries became more mature, and their functions and needs more complex, these physical measures began to be supplemented by more technical and specific areas of standardized practice, and that is when everyone began to get into the act.

With the growth of this fledgling "science," more than physical and statistical measures were needed. Analytical and descriptive standards bloomed on all sides. A good illustration of this kind of development is the unit library catalog card. Its first stage was to evolve to a standard size, out of a multitude of early formats. Its second stage can be represented by the Anglo-American cataloging rules, nominal standards for the data recorded on the face of the card.¹ The passage from phase one to phase two took approximately fifty years. We are now moving rapidly into phase three, as later examples will show. These later examples are directly related to the present and future working program of the American National Standards Institute/Committee Z39 (ANSI/Z39) and belong with new technology; before that part of standards work can be illustrated, it must be placed in historical perspective. This is essential to an understanding of the present stage of standards development.

The first formal approach to a functional relationship with the official U.S. standards organization was made by ALA in 1939.² With the ALA as sponsor, the American Standards Association, as it was then known, established the original Committee Z39 as one of its numerous committees, with a scope described as including "Standards for concepts, definitions, terminology, letters and signs, practices, methods, supplies and equipment used in the field of library practice."² The product of this committee in its early years was minimal, partly due to the disruption of communication by the war. A valiant attempt to reinvigorate Z39 was made in 1951,³ when the Council of National Library Associations assumed the sponsorship of Z39, but the fundamental problem of functioning without any visible financial support still frustrated any large-scale program of action. In 1961, through the leadership of Robert Kingery of the New York Public Library, Z39 obtained a series of grants from the Council on Library Resources and the National Science Foundation.⁴ Up to that time, the entire product of Z39 was represented by two published standards, one of which antedated

the committee itself. With this new impetus, the scope of the committee was revised in 1963 and again in 1967 to provide the ample field of operations now represented by the numerous subcommittees of Z39. The present scope statement reads: "standards in the fields of Library work, documentation and related publishing practices."⁵ In actual practice both the organization and the scope of national standards committees are directly related to counterpart committees of the International Standards Organization. ANSI is the only standards body authorized to represent the U.S. internationally. Correspondingly the international body can coordinate its work within the U.S. only through this American standards agency. Because of this organizational structure, any standards work within the committee's scope that may have supranational significance travels up through ANSI to ISO for consideration. The reverse path brings any product of the counterpart ISO Technical Committee 46, again through the ANSI headquarters. This briefly is how the present stage of development was reached and the structure within which we must work.

Over the past ten years, thanks to renewed and serious support by the two agencies named, ANSI/Z39 has greatly amplified its operating units, its membership, and its national and international communications. As a major producer, consumer, and leader in methods and materials of the several areas described as the assigned scope of the committee it has involved literally hundreds of domestic and foreign experts in the development of needed standards. The numbers of published American standards has increased substantially; their adoption as basic drafts for international consideration has often followed in the same pattern. It is essential in any consideration of the place of standards in library technology that international application be an integral aspect. There is now a kind of renaissance in ISO/TC46, parallel with the growth of ANSI/Z39, which speaks for ever-improving understanding and acceptance of the work-product of all participants. This is at the heart of any progress in standards, whether in library technology, publishing, documentation, or any other field.

To further delimit the subject area, one should note that ANSI/Z39 initially responded to ISO and U.S. standards work in all library areas on a broad range. There was early recognition that library-related aspects of photography presented enough problems to justify a separate standards committee, and ASA approved a new committee PH5 (Photographic Reproduction of Documents) reporting to ASA's Photographic Standards Board.⁶ Somewhat later it became apparent, with

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the strengthened program of the ALA Library Technology Program, that library equipment and supplies comprised an ample field for a standards committee. ASA responded to a Z39 initiative again with the establishment of Z85 (Library Supplies and Equipment), reporting, as does Z39, to the Miscellaneous Standards Board.⁷ These sparse organizational elements may be an ample illustration of the general pattern of standards organization, as well as sufficient evidence of the goals and means available to Z39 in the broad pattern. Now let us look at what has been accomplished by Z39, its work in progress, and what its future may hold.

It is immediately evident from the charted list of Z39 activities that its present program is fragmented and diversified. It is also obvious that a very modest dent has been made in the universe of standards needed to serve the multi-faceted worlds of "library work, documentation and related publishing practices." A vast field remains uncultivated, or at least unformalized as product. There is a multitude of quasi- or semi-official sets of "guidelines," "standards," and "approved methods" produced by either small or large groups for a wide range of purposes. This is all to the good, and one should not disparage in any sense the productive efforts of those who have worked to develop them. Any of the standards mentioned in other chapters of this issue fit this pattern. This is, in fact, the way most national standards have evolved; the only element usually lacking is the ultimate step, national review and consensus of all concerned parties, leading to formulation as a published national standard within the international system by the unique agency designated as the United States' representative in that system.

Briefly, an ANSI standards committee is composed of member organizations, including libraries, professional, technical and educational institutes or associations, abstracting and indexing services, publishers, government agencies, and commercial and industrial organizations. Z39 now has forty-five member organizations; additions or deletions in the membership group are always subject to considerations of appropriate balance by type of member. Membership is voluntary. The only absolute requirement is evidence of interest and willingness to participate in the work of the standards committee. Each member names its personal representative and may also name an alternate. It is through these representatives that all communications reach the member organizations.

The members of Z39 do not necessarily participate in any working subcommittee. The personnel of any subcommittee working on a spe-

cific standard is composed mainly of experts in the subject area selected and nominated by a chairman for the competences he believes necessary to develop an acceptable draft. Such a subcommittee may be as few as five in number or as many as ten, but the initial group is usually kept small in order to facilitate meetings and action. Once the first draft is ready, the review system amplifies the critical input until all possible issues are resolved, and a voting draft is ready. Full membership consensus is then sought and concurrently the final draft is announced for public review, so that by the time the proposed standard is forwarded to ANSI by the sponsor for final approval and publication, everyone concerned has seen it.

Tables 1-4 are derived from a more detailed progress record maintained on a continuous basis to assure constant supervision of progress in the numerous subcommittees of ANSI/Z39. The reader must already be aware that despite very considerable increases in both program and products of Z39, the record is varied and fragmentary rather than uniform. What has been done up to now constitutes a large step, or even several steps; what must be done next is to block out a complete program, with all of its parts spelled out and fitted in place. So far Z39 has established a sound basis for producing needed standards; it has made the methodology of standards production better known to our professions; and it has produced enough useful standards in published form to set a pattern for the production of future standards. What it has not done is elaborate the complete framework of needed standards in each of its three areas of operations. With thirty-four numbered subcommittees at one stage or another, ANSI has barely made a dent in the mass of methods, materials, and devices requiring standardization in these fields.

Consider for a moment the import of Z39.2:1971 Bibliographic Information Interchange on Magnetic Tape. Setting aside consideration of the machine aspects of this standards area, over 200 specific data elements which must be standardized to fit in the format of the standard have been identified.⁹ This one standard, the Marc II format, resulting from years of arduous labor at the Library of Congress, reveals the need for a whole new range of standardizing efforts. Just one of those data elements, a geographic code, has already involved scores of experts both here and abroad over several years without definitive agreement. This subject has now become so urgent it has been lifted out of the waiting mass (ANSI/Z39/SC27) for full-scale attention. And now, before taking on even the most common data elements of the biblio-

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TABLE 1

STANDARDS COMMITTEE Z39: COMPLETED STANDARDS

Subcommittee Number	Designation of Standard	Title of Standard	Price	Comment
10	Z39.1-1967	ANS* for Periodicals: Format and Arrangement	\$2.75	Being revised in 1972 per ANSI requirements
2	Z39.2-1971	ANS for Bibliographic Information Interchange on Magnetic Tape	5.00	
12	Z39.4-1968	ANS Basic Criteria for Indexes	2.75	
8	Z39.5-1969	ANS for the Abbreviation of Titles of Periodicals	2.75	Revision of Z39.5-1968
15	Z39.6-1965	ANS for Trade Catalogs	5.00	Reaffirmed May 1970
7	Z39.7-1968	ANS for Library Statistics	4.50	
18	Z39.8-1969	ANS for Compiling Book Publishing Statistics	2.25	
20	Z39.9-1971	ANS Identification Number for Serial Publications	2.25	
15	Z39.10-1971	ANS for Directories of Libraries and Information Centers	3.00	
5	Z39.11-1972	ANS for the Romanization of Japanese		In press
5	Z39.12-1972	ANS for the Romanization of Arabic		In press
19	Z39.13-1971	ANS for the Advertising of Books	3.00	
6	Z39.14-1971	ANS for Writing Abstracts	3.00	
21	Z39.15-1971	ANS for Title Leaves of a Book	2.50	

* American National Standard.

graphic record, the original subcommittee on Machine Input Records (ANSI/Z39/SC2) has been reorganized to begin work in the area of data transmission standards. This will also lead to division and subdivision of groups, and will probably perpetuate the appearance of a piecemeal approach such as the one already noted.

Another influence which compels this seemingly uncharted course is the need to move other fully developed and needed standards into the approval channel for national and international acceptance. A good example of this is the Music Industry Code.⁹ It was very fully developed, both as a national and international draft code, within its own industry groups before it came to ANSI/Z39. This method of development is a delightful one, usually resulting in a mature product, fully

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TABLE 2

STANDARDS COMMITTEE Z39: SUBCOMMITTEES WHOSE WORK IS
BEYOND INITIAL DRAFT STAGE

Subcommittee Number	Title of Subcommittee	Drafts Circulated	Comment
5	Transliteration: Slavic Cyrillic	Feb. 1970, Mar. 1970	Approved by Z39 in April-May 1971
8	Proof Corrections	Sept. 1969	Being set in type for ballot
9	Terminology	Oct. 1971	"Vocabulary of Information Dissemination" being prepared for ISO/TC46
17	Standard Book Numbers	Feb. 1969, May 1970	Final draft in hand; will be sent with letter ballot in March or April 1972
22	Library Materials Price Indexes	Jan. 1972	
24	Scientific and Technical Reports: Format and Arrangement	Oct. 1970, Aug. 1971	To go to ANSI in April
25	Thesaurus Rules and Conventions	March 1971, Sept. 1971	Final draft in hand; will be sent with letter ballot in March or April 1972
26	Preparation of Scientific Papers	June 1970, Oct. 1970	Approved by Z39 in March-April 1971; will be forwarded to ANSI by April 1972
27	Identification Codes for Countries, etc.		Working paper on Country Codes presented to TC46/WG 2 Oct. 1971; X3L8.4 members joined the subcommittee in Dec. 1971 to produce the national standard

planned to fit in a broader universe of related elements; Z39 only needs to verify its acceptance to the membership.

Yet another track for standards input is the proposal for a new standards subcommittee to work on a specific area or requirement that becomes urgent because of implementation of another standard. The need for SC2 to work on standards for communications instrumentation evolved directly from earlier attempts to increase the usefulness of Z39.2:1971, the Marc II standard. Obviously the availability of products conforming to Z39.2 would be seriously prejudiced by failure to agree on the basic communication system through which these products must pass.

Whatever the causes—and there are others—the point is that librarians, publishers, information scientists, and any other concerned persons should now take a new look at the present and the future, and jointly

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TABLE 3

STANDARDS COMMITTEE Z39: SUBCOMMITTEES WORKING ON INITIAL DRAFT

Subcommittee Number	Title of Subcommittee	Subcommittee Formed	Status of Work on Initial Draft
4	Bibliographic References	Reorganized Jan.-March 1971 after proposal of original SC 4 was not approved by Z39	Subgroup doing initial work on draft
5	Transliteration: Hebrew	April-June 1970	Initial draft complete; being reviewed by a group of scholars before Z39 review
5	Transliteration: Yiddish	April-June 1970	Initial draft still in preparation
81	Music Industry Code	Jan. 1971	Initial draft being prepared for special TC46/WG 1 meeting to be held in 1972
82	Technical Report Numbering	March 1971	Three meetings to date; writing on initial draft underway
89	Bibliographic Entries for Microfiche Headers and Roll Microfilm Containers	June 1971	Four meetings to date; work on initial draft underway

TABLE 4

STANDARDS COMMITTEE Z39: SUBCOMMITTEES AT EARLY STAGES

Subcommittee Number	Title of Subcommittee	Subcommittee Formed	Comment
2	Machine Input Records	Dec. 1971-Jan. 1972; first meeting, March 1972	Will work on a standard for data communication links
94	Journal Article Citations	Feb.-March 1972	Will work on a code for journal article citations

mark out the full program of work to be done as well as some considerations of priorities. No one person can do this; there are too many variables and too many unknowns. However, appropriate groups of individuals, having broad competence, could hope to succeed.

Any approach to blocking out a planned program should start with thoughtful review of the products of Z39 produced over the past ten years. Some are prescriptive and belong to the book trade as well as to libraries: Z39.1 Periodicals, Format and Arrangement, and Z39.15 Title Leaves of a Book. Some are primarily publishing: Z39.13 Advertising of Books, Z39.10 Directories of Libraries and Information Centers, Z39.6

Trade Catalogs, and Z39.14 Writing Abstracts. A few, but extremely important standards provide the springboard for the entire future of mechanized systems in libraries: Z39.2 Bibliographic Information Input on Magnetic Tape (Marc II), and a pair of basic codes, Z39.9 Identification Number for Serial Publications, and the Standard Book Number code which is soon to be published. Some of the remaining completed standards reflect only a few areas of specific library problems, again related to bibliographic recording: Z39.11 Romanization of Japanese and Z39.12 Romanization of Arabic. Other standards for the conversion of one alphabet to another are in progress and many others will need to be treated.

One can readily see from these examples that there is a wide range of subject material and much remaining to be done. What is not so readily recognizable is the pivotal importance of this work as the key factor in determining the rate of change in our professional work. Even though most of the professional agencies or organizations are represented as members and actively participate in some of the tasks, more often than not their whole constituency is unaware that this kind of work goes on or how it gets done. If they do know about ANSI or ISO, they are likely to know only that these are ponderous operations, moving mountains of time and effort to produce an occasional molehill. And, in fact, this view would have been reasonably justified until quite recently. Now, however, the end-product of ANSI/Z39's work is visibly important, more of it is in advanced stages of progress, and there is steadily increasing appreciation of the change. This appreciation is also reflected abroad, in the increasing visibility of ISO/TC46, ANSI's international counterpart, which has adopted many of its national standards or drafts as basic working papers for international standards. Where formerly the U.S. was often not even represented professionally in international standards work, it now stands as the prime mover, providing long-sought leadership in these fields of work.

With this much organizational and basic data as a point of departure, what should one look for in planning a full-coverage program for the future? There is a clear mandate to devise standards for the full range of library and documentary materials; this implies all audio and visual forms, all photo formats and library products, all computer or machine-assisted methodology, and any representation of bibliographic data in any form. ANSI is concerned with hardware of any kind (cf. ANSI/Z85, Ph5, X3), and also with standards for software to enable

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use of the machines and with any contributing element needed for software development.

Although it may be visionary to presume one can forecast a complete framework for even one area of interest, one may begin with the basic records needed to identify bibliographic elements used by libraries. The readiest approach speaks for following the current pattern of bibliographic representation by libraries. This would begin with the author entry, with reduction and simplification of other forms of entry, ending with title entry when no alternative seems appropriate. Next would come the descriptive data, from title to imprint data, all of which are now readily amenable to standard treatment. One or more standards can be designed to handle collation. Special notes could be rigorously defined and spelled out in standard form. The character and form of subject indicators needs to be reduced to a basic standard for inclusions and exclusions, designed for more general approaches, with the specifics to be developed as separate standards. Now if all of these types of standards are developed in a suitable manner for codification, the major task of converting to machine manipulation is already done, and the standard codes can easily be added to the pattern. The numbers of essential codes need not be too great. There must be codes for each type of library material: the ISBN, the ISSN, the MIC, the eventual codes for each type of audiovisual materials. There will be sub-codes, derived from or attached to each of the major codes, such as identifiers for internal bibliographic citation (volume, issue, pages) or formats of the MIC (tapes, discs, cassettes, etc.). Although we are now in a seemingly primitive stage of conversion to machine handling, no available time can be lost in preparing for the inevitable total conversion. The rapid evolution of technology at present suggests an even more rapid rate of change in the near future.

In the fields of greatest concern to the documentalists or information scientists, there are whole new classes of standards work. Here must be added new work in standards for format, for content analysis, for evaluation, for identification and for many aspects of production. A good start has been made in indexing and abstracting, but much work remains in many of the areas mentioned.

The many varied fields of the media specialist have not been touched, mainly for lack of resources, both fiscal and human. Despite the occasional association or industrial guidelines, there are virtually no national standards for most of their materials or methods. There lies a vast program of work, which should be led by the specialists, each in

their domain, and finally subjected to the national consensus and approval system of the official U.S. standards body, ANSI. This reference to the "official" standards agency of the U.S. is equally valid for any field, not only the media types. This official status derives from both the design of ANSI and from its place in the ISO. As the only recognized official U.S. standards body, ANSI is the only one qualified to represent the entire population in any area of standards effort. It is also the only agency recognized as the U.S. representative body for communication with its international counterpart, the ISO. There is only one member organization from each member-country of ISO; ANSI is the only direct communication channel to any international parallel function. It is for these reasons that it has sought to clearly define and include in our (Z39) membership all related or concerned groups within its scope, and then to encourage their internal standardization work, leading up to final promulgation as national standards through ANSI.

If one accepts the conviction that what is past is prologue, one may be willing to accept my views of the future place of technology in libraries and the imperative need for swift development of the standards that will be needed. It is evident that the rapid advances in standards development over the past ten years have grown out of the concurrent rapid evolution of library applications of new technological devices. Increased population, increased available information, and natural demand for improved access have all led to insistent pressures to establish standards. This is not to suggest that the machines now own people, nor that technology is ready and able; it is to say that technological developments make it imperative that one reviews carefully everything done in order to set new patterns for the work of the next half century. Everyone now knows that the machines are useless without accompanying software; not enough people comprehend their responsibility for planning the software or the crucial role of standards in this function. Not enough of our colleagues are aware of their individual need to share in this work, to give their wisdom and strength to it, to assure the swiftest application and the most effective utilization of new technology which only new standards can make possible.

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