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THE BNB MARC PROJECT

The MARC project has progressed from a pilot to test the feasibility of a distribution service of centrally produced machine-readable cataloging data to a full-scale operational system in the design stages in two short years. The library community, both here and abroad, has accepted MARC and recognizes its potential for the future. The single most significant result of MARC has been the impetus to set standards.[1]

These sentences were written by Henriette Avram as the opening paragraph of the MARC Pilot Project final report. By the time that report appeared in print, the potential of MARC had been fully realized in Great Britain, and a remarkable chapter in the history of Anglo-American cooperation had been written. This paper is an analysis of the British achievements over the last two years, an appraisal of the philosophy behind the British MARC Project and an examination of the suitability of MARC as a basis for future progress.

Before tackling these themes I would like to acknowledge the enormous contribution that was made to the British MARC Project by an American librarian whose name is familiar on both sides of the Atlantic but not perhaps associated with automation. The solid foundation of cooperation between the Library of Congress and the British National Bibliography (BNB) was laid on the American side by John Cronin who opened up the dialog between the two organizations and taught us all that the art and science of cataloging is the same on both sides of the Atlantic. John Cronin built the bridge we used for MARC.

MARC NATIONAL AND INTERNATIONAL

The British and American MARC Projects are shaped by many factors, most of which are rather more significant than the amount of money made available by our respective governments to carry them through. The enthusiasms, the ideas and perhaps the style of a very small group of people are decisive influences; however, much care is taken to secure the agreement of the profession as a whole to the actual course of development. The immediate environment of the project can determine the short-term course of events, particularly

when the ultimate goals are uncertain and when intermediate objectives are determined by economic factors. To put the matter bluntly, the course of the United States MARC Project cannot veer significantly from the priorities of the Library of Congress, and the British MARC Project must fit broadly into the future pattern of development of the British National Bibliography. Those of us who feel that pure logic rather than practical judgment and practical compromises must determine the course of these important projects should direct their attention not to MARC, but to the national bibliographic policies of their countries—if indeed these policies can be identified.

MARC, for all its much vaunted flexibility (which is purely superficial), must fit into an existing pattern. In a general sense this means that the separate halves of our joint project must develop along lines that are first of all acceptable to a local institution environment, which is in its turn acceptable to a national environment. The level of communication between national systems must be based on an understanding of these factors. This includes an understanding of the relative levels of compatibility and the difference between local, national and international standards. Without this understanding our efforts to create an international MARC network will be frustrated by a lack of communication between ourselves as librarians long before we can tackle the much easier problem of communication in machine-readable form. By concentrating in this paper on the particular factors that have so far shaped the development of the British MARC Project and will shape its future policy, I hope to identify more precisely the wide areas of agreement with the Library of Congress Project and the areas in which agreement must be urgently sought.

BRITISH MARC

The British MARC Project has been created in an environment which is significantly different from that enjoyed, or endured, by the Information Systems Office at the Library of Congress. It is a pity that nobody has had practical experience in both systems—a comparative view from the inside would be a fascinating document. However, I have benefited beyond measure over the past two or three years from the Library of Congress's "open door" policy.

On the basis of this limited experience I have formed the view that the British MARC Project enjoys several advantages which are denied to the Library of Congress Project. There are also serious disadvantages, but on the whole the Library of Congress environment appears to force a particular line of development that will become increasingly difficult to fit as a total package into an international context. The British situation is very different indeed. In Great Britain there is now a total physical separation between the national bibliography (BNB) and the national library (British Museum). The

British National Bibliography concentrates its entire attention on the provision of published bibliographic services and as such it is a machine for producing bibliographies. From the moment it was decided to proceed with the MARC Project, it became obvious that this bibliographic machine would be taken to pieces and re-built around a computer. We still talk about MARC as an experimental project; however for BNB the experiment ended a year ago. MARC is a production system that must work and BNB must now become both the producer and the biggest single user of the MARC record in Great Britain (a situation which concentrates the mind wonderfully). Most of the professional librarians on the staff of BNB are directly involved in the rapid changes that are taking place. In the past year the MARC Project as a separate organization has been getting smaller and smaller; there are now only two keyboard operators, two programmers, two librarians and two planners. Everyone else is handling MARC with one hand and the mutilated processes of BNB with the other. Next year a small team will concentrate on the external features of the MARC Project and the rest of the MARC organization will simply be the new British National Bibliography.

The status of BNB as a national bibliography is rather unusual. The council of the British National Bibliography is a private, non-profit organization established to provide bibliographical services; BNB is totally independent and totally self-supporting. Its only income apart from the MARC Project grant is derived from the sale of the services it provides. This is a rather extreme situation to be in and perhaps not one to be recommended for the future. However, it does bring BNB right up against one of the long-term objectives of the MARC Project, i.e., its practical use in the production of more efficient, more economic bibliographical services. The first objective for BNB must be to utilize MARC and, moreover, to utilize it in a highly cost effective manner.

It has often been remarked that the introduction of a computer system provides a unique opportunity to carry out a complete reappraisal of the services provided by an organization. In the context of MARC it is nowhere more true than in a national bibliography. There is virtually no hangover problem from the past. National bibliographies cannot afford to change their spots too often, but after twenty years (which is the life span of BNB) change is necessary to keep up with changing conditions—MARC has provided this opportunity. It has also provided the means to start in a small way a process of rationalizing, integrating and improving bibliographic services in general. A separate and independent bibliographic organization cannot afford to deploy more than a very small part of its resources on work that is not immediately productive. Long-term commitment to developing standards or new systems is almost out of the question. The MARC Project has provided the impetus, if not the

resources, to take a wider view. During the two years that BNB has been developing the British MARC Project, much more fundamental activities have been going forward. These include bibliographic integration with book trade services, changes in the design of the national bibliography and the development of a new generalized indexing system.

MARC AND THE BOOK TRADE

In Great Britain the book trade was getting ready for computerized book ordering and cataloging systems as early as 1966 when the Publishers' Association commissioned a report on the need and feasibility of a standard system of book numbering. It was quickly appreciated that a purely book trade numbering system would not satisfy the large library field, and the initial proposals were expanded to a plan for total numbering. Less than three years after the scheme was approved there is a system which gets numbers printed on over 90 percent of all new books, and numbers can be allocated through a central agency for all the remaining books. This operation is run by Whitaker & Sons, who produce BNB's book trade bibliographies. BNB's function is to notify the standard book numbering (SBN) agency of any item received without a number. In 1971 this will be provided before the book is entered on a MARC file, and before it is entered in BNB or the trade bibliography. In Great Britain total book numbering is an accomplished fact. The next stage, already well under way, is an international numbering system. The implications of this development on the United States will be considerable. There is already a standard book numbering agency in New York with an impeccable list of sponsors but is there any commitment by the agency and the Library of Congress to establish 100 percent coverage? There is no need to worry about the great mass of trade books. In their own interests the trade publishers, the trade associations and the trade bibliographies will quickly establish an efficient system. The non-trade material is a library problem and a library responsibility. It must be brought into the system as it enters the Library of Congress. Will it be, or does this conflict with other priorities? This situation is a classic example of a conflict between a good national system—the Library of Congress card number—and a better international system—the International Standard Book Number. Both can run side by side but the international system must be vigorously implemented.

With the SBN system established, the book trade bibliography in Great Britain was quick to see the potential of MARC. The cooperation between Whitaker & Sons and the British National Bibliography was extended to the field of data processing. Last year BNB and Whitaker developed what now appears to be a highly efficient MARC system for producing the trade bibliography (see Figure 1). This

project from design to full operation took exactly eight months. As a result the printed book trade services have now been dramatically improved and by April 1971 there will be in existence and use a massive machine file of about 300,000 items representing British books in print. This is a genuine MARC compatible system. In the spring of 1970 the final touches were put to the program which translates the book trade record to a standard communications format using the BNB MARC implementation. Already several large book-purchasing organizations in England are planning to use this file as a book order data base with records available as soon as the book is advertized. This project fills an ugly gap in MARC-based systems by providing at the time of order, however early that may be, a record which carries adequate temporary cataloging information until it is replaced by a full MARC record from BNB.

MARC AND THE NATIONAL BIBLIOGRAPHY

It may seem an unusual set of priorities that puts the conversion of another bibliography to machine-readable form above our own. The fact is we have never been seriously concerned about the data processing aspects of the change-over. I would almost go so far as to say that creating catalogs from a MARC record and using computer typesetting techniques can be considered to be a perfectly routine operation. In England the most difficult problem is finding a suitable Photon or Digiset or whatever is to be used.

It is, however, a very different matter to decide exactly how a bibliography should be organized. There is, after all, an almost embarrassing number of choices in a MARC record.

The exercise of trying to design and produce a first-class national bibliography from MARC is one of the finest ways of testing the theoretical soundness of the system. In many ways MARC stands up fairly well to the test. It has been criticized by some who did not fully appreciate what MARC is trying to achieve as being too complex: this is nonsense. The analysis that has been carried through in the British and LC MARC implementations falls short of what is really needed. Other problems include an inadequate title breakdown, series fields which are messy and illogical, notes which are inadequately specified, and added entry situations which have not yet been fully analyzed. Sometimes we find ourselves checking a program specification to decide exactly how to input a particularly complex record, a sure sign that the initial design is inadequate. In making these criticisms I am of course referring to the British MARC implementation, not the Library of Congress implementations. However, except in one or two instances, the British record identifies specific subfields that are grouped as a broader subfield in the LC record.

We have been criticized, and rightly so, for making unnecessary

PUBLICATIONS OF THE WEEK

This list is compiled by J. Whitaker & Sons Ltd., and is copyright. It consists of books published or re-issued, given alphabetically under author, title and subject where this forms part of the title. Dates of publication are given as (1.70) for January, 1970, and prices are net unless marked *. Main entries are shown beginning in bold type. Standard Book Numbers are added to each entry by courtesy of The Standard Book Numbering Agency, Ltd.

The list is also published in CLASSIFIED form monthly in *Current Literature,* and at quarterly intervals in both classified and alphabetical arrangements: THREE MONTHS (Jan. to Mar.) in May; SIX MONTHS (Jan. to June) in August; NINE MONTHS (Jan. to Sept.) in November and the ANNUAL VOLUME (cloth bound) in April. 70s. net net. The four issues of *Whitaker's Cumulative Book List* are supplied post free at 5gns. per annum. *The Bookseller* monthly alphabetical list is now published separately as *Whitaker's Books of the Month and Books to Come,* covering a period of three months, 12 issues a year, £6 per annum post free.   *The symbol "n.i." indicates a new issue, cheap edition or reprint at a new price*

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A. B. M. *See* Antiballistic Missile.
Abolition of the Brazilian Slave Trade: Britain,Brazil and the Slave Trade Question,1807-69 (Bethell) D8.xvi,426. 2M. Latin Amer.Stud. 90/ Camb.U.P. (3.70) Pol   521 07583 1
About Garlic: The Supreme Herbal Remedy (Binding) C8.64.'sd.,5/ Thorsons   7225 0148 X
Thorsons (3.70) Med   7225 0147 1
About Soya Beans (Binding) C8.64. sd. 5/ Thorsons (3.70) Med   85417 219 X
Absalom and Achitophel (Dryden)
Ffol.77. facsim.e. 35/ Scolar P. (2.70) Poe   85417 218 1
Ffol.77. facsim.e. sd. 12/ Scolar P. (2.70) Poe   571 09177 6
Accounting,Introduction to the Theory and Context of (Sidebotham)
C8.224. 2r.e. C.I.L. S. 40/ Pergamon P. (3.70) Com   08 015620 7
C8.224. 2r.e. C.I.L. S. sd. 30/ Pergamon P. (3.70) Com   08 015619 3
Ackoff, R.L. Concept of Corporate Planning. D8.172. Ill. 70/ Wiley (3.70) Com   471 00290 9
Adams, Charles F & Adams, Henry. Chapters of Eric and Other Essays. D8.iv,428. n.i.of 1827e. 93/ Kelley,U.S.A.: David & C. (2.70) Hist   678 00220 7
Adams, Henry. *See* Adams,Charles F & Adams,Henry.
Adolescent Behaviour, Studies in: Project YG,Youth in Goteborg (Andersson) Tr.fr.Swedish A.Read. R8.400. tabs. sd. 70/6 Almqvist (1.70) Soc   85132 004 X
Advanced Guide to Coin Collecting (Linecar) D8.240. 60/ Pelham Bks. (3.70) Art   7207 0224 0
Advances in Radiation Chemistry.
v.1. Ed.M.Burton & J.L.Magee. M8.412. Ill. £7/15/ Interscience (3.70)
Aesthetics, Four Stu
sC8.120. 57/
Che
Africa,East. *See* Ea
African Rural-urban Migration: Movement to Ghana's Towns (Caldwell) R8xx257. 95/* C.Hurst (12.69) Soc   900966 34 3
After Slavery: Negro in South Carolina during Reconstruction,1861-77 (Williamson,Joel) IC8.454. n.e. Chapel Hill Bks. sd. 34/ Univ.N.Carolina P. (3.70) Hist   8078 4047 5
After Utopia: Decline of Political Faith (Shklar) D8.322. n.e. sd. 26/ Princeton U.P. (3.70) Pol   691 01966 5
Agrarians,Southern,as Social and Literary Critics: 'Tillers of a Myth' (Karanikas) M8.250. n.e. sd. 23/ Univ.Wisconsin P. (3.70) Lit   299 03974 9

Analysis of the Phenomena of the Human Mind (Mill) 2v. D8.xxi,453: vi,404. n.i.of 2e.(1869). set £11/11/ Kelley,U.S.A.: David & C. (2.70) Psy   678 00330 0
Analytical Chemistry in Space (Wainerdi) C4.284. 65ill. M0n.in Anal.Chem. £7 Pergamon P. (3.70) Che   08 006887 1
Analytical Chemistry of the Polyurethanes (David & Staley) M8.640. Ill. High Polymers S. £13/10/ Interscience (3.70) Che   471 39293 6
Anatomy, Living (Lockhart) R8.96. 214ill. n.e. sd. 15/ Faber (3.70) Med   571 09177 6
Ancient Britain. sD8.62. Col.ill. Jun.Ref.Lib. bds. 6/6* Macdonald (3.70) Schl   356 03234 5
And Now it's Sables (Spanier) D8.192. Ill. 30/ Hale (3.70) Bio   7091 1240 8
Anderson, Adam. Historical and Chronological Deduction of the Origin of Commerce,etc. 4v. C4.lxxviii,2429. n.i.of 1801e. £61/19/ Kelley,U.S.A.: David & C. (2.70) Pol   678 00259 2
Anderson, Charles P. Lettering. D4.176. Ill. 94/ Van Nost.Reinhold (1.70) Art   442 11288 2
Anderson, Bengt-Erik. Studies in Adolescent Behaviour. Project YG,Youth in Goteborg. Tr.fr.Swedish A.Read. R8.400. tabs. sd. 70/6 Almqvist (1.70) Soc   85132 004 X
Andreski,l. Old Wives' Tales. D8.176. 35/ Routledge (3.70) Nat   7100 6655 4
Andrews,John B. *See* Commons,John R & Andrews,John B.
Antiballistic Missile (Ed. Chayes & Wiesner) D8.304. 42/ Macdonald (3.70) Eng   356 03103 9
Anticipations,Uncertainty and Dynamic Planning (Hart,Albert G.) D8.xiii,98. (2.70) Pol   678 00040 9
Hutchinson (3.70) Fic   09 101090 X
ns in the Theory of Value
.100. n.i. 57/ Kelley,U.S.A.:   678 00082 4
David & C. (2.70) Mat
Arbon,M.R. *See* Carter,R.F & Arbon,M.R.
Art. *See Also* under Country.
Art, Theories of Modern (Chipp) D8.300. n.e. sd. 47/ California U.P.: 1.B.E.G. 2.4 Brook St.,W1Y 1AA (2.70) Art   520 01437 5
Arterial Disease, Peripheral: A Physician's Approach (Richards,R.L.) D8.126. 40ill.7tabs. 50/ E.& S.Livingstone (2.70) Med   443 00692 X
Arts and Crafts, Junior: Annotated List. D8.20. sd. 4/ (members 3/) Nat.Bk.League (2.70) Bib   85353 039 4
Ash,P. Nurse for the Season. C8.192. 14/ Mills & B. (3.70) Fic   263 51412 7

Figure 1.   Trade Bibliography Produced from the MARC System

distinctions here and there. This redundant information can be easily weeded out—if everyone would agree that it is redundant. I am much more concerned about the distinctions that are not made. To illustrate this point let me cite one fairly common problem which we will have to handle by extending MARC coding. If we are creating author index entries, it is extremely useful to know whether the author statement following the title needs to be included. If it is a joint author we want to leave it in, if it is a single author adding nothing to what has already been stated, we want to drop it. These considerations are important when massive indexes are being printed and we will probably need to create a distinction. This type of problem is perhaps fairly small and insignificant, and I am inclined to take the pragmatic view that the public MARC—that is, the exchange tape implementation—should be allowed to settle down now for a year or so while everyone gets some experience. MARC should not be like the Library of Congress classification with new extensions just arriving every now and then and which can be safely ignored. It is rather more difficult to ignore changes in a MARC record. In the meantime BNB will continue to develop an internal implementation that will certainly have many features that we will quietly remove before the exchange tapes are produced. A clear distinction will be made between the local BNB implementation and the exchange tape implementation. This is a logical development. We all accept that the machine structure of the exchange format is a carrier wave between machine systems. Should not the record also be considered as a carrier wave that is logically distinct from the implementation standards of the producer and the receiver?

For every MARC record there are three distinct categories of users: 1) the actual producer of the record—at present the Library of Congress and the British National Bibliography, 2) the local user within the country of origin, and 3) the international user. In attempting to fix implementation standards it will be impossible to face three ways at once. The conflict between the producer and the local user within the country of origin is no problem. The conflict between the user in the country of origin and the international network will become serious. Taking my previous title field example, if all British MARC users demand a more complete analysis, then we will have to provide it regardless of any agreements made with the Library of Congress. The Library of Congress is in exactly the same position.

The solution to this problem is not difficult. In fact much of the work leading to a solution was done by Ann Curran and Henriette Avram three years ago when they produced "The Identification of Data Elements in Bibliographic Records."[2] At the international level we should stop looking at the BNB implementation or the LC implementation. All we need is a conceptual interface between implementations—not a real subfield code for subfield code identity.

Translating a format through an interface is a fairly trivial data processing operation. Using this approach we can concentrate on establishing the minimum level of analysis and the minimum set of fields that we will call a MARC record, and the optimum sets that might be achieved between two closely related systems such as BNB and LC.

The above diversion was caused by the remark that BNB would need to add refinements to the record analysis to produce a national bibliography. When this is done the British MARC Project will have transformed the two major bibliographic services in Britain. The improvement in the services provided to librarians and the book trade will be dramatic.

The new national bibliography will adhere rigidly to standards where they exist. The classification standard will be Dewey— probably the eighteenth edition to begin with. The cataloging standard will be the Anglo-American code (British version). Unfortunately there is no filing standard and as yet no one has given any serious thought to a subject indexing standard. In the existing MARC record no one has given any serious thought to subject indexing. This is an omission that must be remedied and as BNB will be using MARC records within a few months to produce a classified catalog with a specific index, a great deal of effort will be concentrated in this area.

A MARC SUBJECT INDEX

Anyone wishing to construct a classified catalog from the existing MARC record has a choice of two classifications, both of which are non-specific. There is no indexing provision at all; obviously MARC was born in the home of the dictionary catalog. Faced with this situation, BNB had the choice of indexing outside MARC or devising a special indexing system which would be carried on the record. Our final choice has been a compromise, a string of indexing terms will be carried on each record. This will be backed up by a machine-held thesaurus which will hold the necessary framework of cross-references. In planning this system BNB is breaking its rule that each MARC record should be totally self-contained; however I hope it will not be long before MARC subscribers have direct access to the master store of records and ancillary files. Large storage systems with direct links between local computer and central data banks are a rapidly developing area of technology.

The indexing system BNB is developing has two unique features: 1) it is totally hospitable and can be used to index any subject at any depth of analysis and 2) it can also be used to index back into any classified arrangement. These factors are essential in the context of MARC. The index can best be regarded as a bi-product of a new classification technique now in use at BNB. The history of classification theory shows a steady progression from the Dewey concept of a

universe of knowledge subdivided into smaller and smaller subject disciplines, through Bliss and Ranganathan to the special-faceted schemes which allow a great freedom in the combination of concepts taken from various parts of the system.

BNB has now taken the final logical and evolutionary step of starting the process of classification by identifying the individual concepts in a compound subject and expressing their relationship to each other in a symbolic form. The result is a subject statement which is absolutely neutral and precise and can only have one possible number in a formal classification schedule, even though the symbolic notation in the schedule will not always carry the same depth of analysis. A particular subject statement, or concept analysis, is permanently associated with a unique set of alternative system statements. At BNB there are already four such systems—DC, LC class number, LC subject heading and a MARC subject descriptor string. The subject descriptor string is the indexing statement that will appear on British MARC records later this year. It will be used by BNB as a rotated element index, but it could be used equally well as an uncoordinated keyword system. At present the system is being tested on general intake at BNB and in one or two highly specialized areas. An example of depth indexing in the field of sociology of education is given in Figure 2.

So far I may have given the impression that in Great Britain we do not primarily think of MARC as a method of exchanging bibliographic data and this is partly true. We think of MARC as a data base which is being created to form the foundation of bibliographic services of the new decade. In England, as in the United States, bibliographic services are provided at the center and these services are utilized and added to at the local system level. Experiments in local handling of MARC are going forward but we feel that at this stage such projects should remain strictly experimental. There are several reasons for this; the immediate one being that we still need time to evaluate what we have learned and to implement changes. Maybe libraries are anxious to start utilizing MARC data but they would be well advised at this stage not to go too far. The more important reason is that any library system using MARC today is almost inevitably assuming that a MARC service is just another centralized service which it can purchase like a catalog card; nothing has really changed. There is absolutely nothing on a MARC record that has not been fully available for fifty years or so on the Library of Congress card. So what is all the fuss about? The plain fact is that it is the computer that is changing the bibliographic framework within which a library operates. MARC might be a trigger mechanism for local change but it really cannot be anything else while we limit ourselves to distributing in machine-readable form what was already produced in visual form.

In England we can perhaps enjoy the illusion of progress and

Turnover rates. Higher education. United States
Staff turnover rates. Influence of organisational size & organisational complexity 033

Typologies
Education systems 086

U.S.S.R. see Russia

Uganda
Educational development compared with Educational development in Kenya 046

Underdeveloped countries
Related headings:
Newly independent nations

Undermanning
Related headings:
Teacher undermanning

Underprivileged children see Socially disadvantaged children

Union of Soviet Socialist Republics see Russia

United Kingdom see Great Britain

United States
Related headings:
American

United States
Adolescents. Reaction to parental authority. - *Social problems perspectives* 014
Adolescents. Sub-culture formation, search for personal values, religious behaviour, delinquency - *Social problems perspectives* 014
Educational change. Role of administrators 010
Educational planning. Administrative aspects 010
Elementary schools. Role & duties *for trainee principals*
Government. Federal programmes. research 098
High school students. Student involvement in extra-curricular activities. Influence of school size & degree of teacher undermanning 056
Higher education. Prediction of organisation. Prediction models: College organisation based on transfer of

Universities. United States
Authority of administrators. Influence of university growth, demands for accountability & administrative specialisation 057
University growth. Influence on authority of administrators. Universities. United States 057
University of Bradford. *Sample population*
Engineering colleges. Sandwich course students. Deteriorating attitudes to industrial training. Influence of non-skilled routine work in firms & lack of contact with work superiors 035

University of California, Berkeley
Research workers. Attitudes to professional status - *Analysis of questionnaire* 012
Research workers. Educational background, Job conditions & Duties - *Analysis of questionnaire* 012
University organisation. Model for predicting organisation of higher education. United States
University organisation based on research compared with College organisation based on transfer of learning 088

University students
Work values. Experimental trial of Super's Work Values Inventory - *Sample population: Scottish student groups on vocational & heterogeneous courses* 017

Urban adolescents. Great Britain
Increased illegitimacy rate related *to* Cultural change & Affluence 001

Urban communities
Neighbourhoods. Social characteristics of neighbourhoods related to Planning 030

Urban communities. United States
Social improvement programmes. Effectiveness of schools. control of schools 031
mple population
Innovation research. Development & validation of indices.
Indices tested: Number of innovations adopted, Extent of adoption & Earliness of adoption - *Sample population: Urban elementary schools - Study region: Western Canada* 048

Urban origins. Influence on enrolment. Higher education. Russia

Figure 2. An Example of Indexing in Depth

change because through MARC the central system is now offering
Library of Congress class numbers and Library of Congress subject
headings and a fair number of British university libraries will find
this information very useful. This, however, is sheer illusion. What
has happened is that a government department has now accepted the
responsibility for providing this information as a part of the MARC
package. It really has nothing to do with MARC. Now that the prin-
ciple is established, we can point out that a far larger number of
libraries use UDC, and providing we describe it as part of the MARC
Project, the two or three thousand pounds needed might be forth-
coming. MARC is a trigger mechanism in more ways than one.

Since the real changes that we are witnessing in library systems
are due to the impact of automation rather than MARC, there is good
reason to pause before designing that totally automated library sys-
tem. The wind of change is or should be blowing harder at the center
than at the circumference. This is particularly true in England
where the central bibliographic organization can be entirely outward
looking. We are not part of a great national library with enormous
responsibilities to that library. In fact the link between BNB and the
Library of Congress is much stronger than our link with the British
Museum. I was forcibly reminded of this the other day when we had
to consider the position of the shared cataloging operation in BNB's
new 1971 system design. We are also, for example, already con-
sidering profound changes in our interlending and union catalog
structure which will have a significant effect in library systems.
BNB is changing the whole basis of its card service to respond to
standard book number ordering (numbers may be picked up from the
book, from publishers advertisements or from the MARC-produced
"Books of the Month and Books to Come" provided by Whitaker &
Sons). BNB is considering automatically transferring the information
on a MARC file which tells us how many tracings are needed for a
complete set of entries across to the standard book number file so
that libraries can order a set or multiple sets of cards. And BNB
has been producing the card service masters from MARC for well
over a year already.

These projects are not all associated with MARC but they are a
direct result of the British MARC Project. A small data processing
team of four people has been placed in a position where it can
make the maximum impact on the whole structure of our centralized
bibliographic services. We are at the beginning of a complete re-
alignment of the balance between central services and local systems.
I must stress that this is just the beginning; the time scale is im-
pressive, perhaps alarming. We appointed our first programmer
scarcely eighteen months ago. I do not know what will happen at the
center in the next five years, but it is certain to profoundly affect the
local use of computers in libraries. This point can be illustrated

rather aptly by describing a new MARC base project which we hope to be testing in libraries in a very few weeks time.

"BOOKS IN ENGLISH"—A MARC DATA BASE SERVICE

One of the major problems associated with producing a national bibliography is the sheer weight of material that has to be processed. British output is now over 30,000 items per year. Because of this, printed bibliographies are getting later and later. It now takes at least six months to produce a BNB annual volume and the multi-annual volume takes two or three years. This situation can be improved by using a computer, but once the final negative is produced on the Photon or Digiset the whole process reverts to a traditional printing and binding cycle which can go on for weeks or months. The input and output technology is sadly out of phase. What we need is a fast method of transferring information from a magnetic tape to a visual form that can be quickly and cheaply reproduced. It is easy enough to get from magnetic tape to microfilm directly, and this looks like a possible solution for in-house authority files and local catalogs, but microfilm is not really convenient to handle and we cannot make 5,000 copies for distribution.

We have instead investigated the possibilities of Photo-Chromic Micro Image (PCMI). PCMI is a microfilm of a microfilm which will hold about 3,000 pages of print on a single transparency. A transparency can be produced very quickly and reproduced very cheaply. It has very definite possibilities. We were anxious to test these possibilities and at the same time to test in a real situation the compatibility of BNB and LC records. I know these records are totally machine and program compatible. Our programs run just as well on the LC file as they do on the BNB file. But can we automatically create highly organized catalogs from the joint file, or will the unpredictable nature of the headings on the Library of Congress file create bibliographic chaos? I sincerely hope not because BNB is about to experiment with a new international bibliography compiled directly from the LC and BNB MARC data bases. The transposition from magnetic tape to PCMI will be direct, without editorial intervention. This bibliography has two special features: 1) every issue— and there are six per year—is a complete cumulation of everything previously published and 2) it is only produced in PCMI form. The annual volume, if that is the right word, will consist of two 6 by 4 inch transparencies. These will hold 50,000 or so entries arranged in a classified sequence and an alphabetic sequence with entries under all tracings. It should not take more than a week or two to produce and distribute. This bibliography which we will call "Books in English" will obviously provide a magnificent visual index to the Library of Congress and BNB MARC data bases. It may also replace

a large number of library catalogs. Why should a large system that would more or less expect to obtain any English-language book that was requested start building these enormous catalogs that duplicate at a frightening cost most of the material in the national bibliography? Maybe it would be better to use an English-language bibliography as a catalog. This idea is scarcely new but it can only be applied if the bibliography contains a classified arrangement, or at least a classification number so that a shelf location is available. Also the cumulating cycle must be much better than has been achieved in the past; with PCMI it can be very good indeed.

This one new service could completely change the design and objectives of a local library automation system. Instead of worrying about updating vast catalogs in the machine system, the librarian may decide to set up an on-line interrogation unit next to a PCMI reader. This would simply contain a string of Library of Congress card numbers and SBN numbers plus locations. The catalog user would identify the book he was interested in and interrogate the on-line files by punching in the LC or SBN number. I do not have the faintest idea what total cataloging costs, including filing, storage space, etc., are like in the United States, but the possibilities of perhaps ceasing the cataloging of 90 percent or so of English-language intake and still providing a good catalog are surely worth investigating.

MARC OBJECTIVES

By carrying through these projects BNB is, by force of circumstances, adopting a general policy of achieving economic goals at the center. Money is tight and we have to exploit MARC as we go along. However in 1971 when the heavy cost of producing MARC records shifts almost entirely from the MARC Project to BNB, then increasing attention and money can be concentrated on the utilization of the exchange service by libraries. England, like the United States, has a very large number of libraries with access to computer systems, but unlike the United States there are at most half a dozen (excluding special and industrial libraries) with sufficient experience to develop automated systems for themselves. With such a small group it is not difficult to coordinate development and our British government policy has been to give special support to three or four systems to enable them to pay special attention to making sure that their development work is as generalized as possible in terms of programming and machines. There are particular machine problems as British computers are totally incompatible with IBM. This means that almost everything will have to be done twice, but at least we can try to insure that it will not be done half a dozen times.

Because of the scarcity of resources and experience, a good deal of the IBM development work will probably be done by the BNB MARC

Project team. This makes sense because we have already gotten a tremendous amount of experience in using MARC to construct catalogs and indexes, plus a sophisticated range of fully operational programs. It would be an enormous waste of time and money if these programs were not made generally available and so a conversion program has been initiated which switches a record in the communications format back into our own internal working format. We have also just finished testing a generalized input program for IBM libraries. Local input is a necessary and rather complex feature of any local system. In my experience libraries usually learn to handle MARC records long before they are able to create compatible records. The use of the generalized input program will accelerate progress and encourage a high level of MARC compatibility and standardization.

MARC STANDARDS

This brief survey of MARC developments at BNB has ended with the word "standardization." Standardization lies at the heart of the MARC Project. It is the essential grammar of communications systems. Most of the ability to construct and manipulate bibliographic data in machine systems has or can be learned by those of us working in this field. Have we however given enough attention to the application and development of standards? Perhaps it all depends on what we mean by standards. I divide them into international standards, national standards and local standards. The MARC record produced by BNB and the Library of Congress contains excellent examples of all three. At the international level we have the Dewey classification number. At the national level we have the Anglo-American code (British text). At the local level we have the BNB classification number, the Library of Congress classification number and Library of Congress cataloging. This classification may seem a trifle arbitrary but I think it would be misleading to regard Library of Congress cataloging and classification standards as national standards. The Anglo-American code (American text) is a national standard but it has not been adopted by MARC. In fact there is the worst possible situation—total uncertainty as to the heading we can expect on a MARC record.

As far as the Library of Congress classification and subject headings are concerned, I would be happy to see these systems elevated to the level of national or even international standards if only they could be developed quite independently from the Library of Congress collection. Generally speaking, it is possible to handle the list of subject headings as a standard. The authority exists and the rules for creating new headings are reasonably explicit. It is however quite impossible to treat the Library of Congress classification schedules

as a standard. In attempting to do so we have had to devise a set of rules which separates the classification structure from the local system elements. They are unfortunately closely interwoven, but they can be separated. The classification scheme has such obvious merits that one of the greatest services the Library of Congress could render is the preparation of a public standard version of its own schedules and the use of it in MARC.

Quite clearly MARC has not yet acquired the essential grammar of communications systems, even between two countries with a common language and very closely aligned bibliographic practices. What then are the chances of achieving standardization and compatibility in 1971 when European MARC systems will be developed? An international MARC system should be an exchange of bibliographic data compiled according to a consistent set of principles between national agencies. We need a standard communications format, a standard set of cataloging principles and a standard means for signaling subject content. We must, at least during the first international expansion of MARC, use existing standards. Fortunately these standards are available.

THE COMMUNICATIONS STANDARD

The existing communications format used by Britain and America can be regarded as a satisfactory international standard. Some of its features make it rather more satisfactory for use at an international level than at a national level. In fact as part of a general MARC II evaluation program we are considering whether the national and international communications standards should be logically distinct. We want to receive tapes from the Library of Congress and European MARC agencies in a standard form, and we are prepared to return tapes in the same standard form, but why should it be assumed that communication between the Library of Congress and the University of Illinois, and between BNB and say, the Bodleian Library should be in exactly the same form again. As it happens we already use a special national communications format for the libraries in the British network that are using British computers. This format is much more convenient to process than the standard communications format. When we go into Europe we should only be concerned with communications at the international level.

THE CATALOGING STANDARD

National cataloging standards are embodied in detailed codes of rules. An international cataloging standard must be a set of principles. It is vitally important to the future of MARC that a common set of principles form the basis of MARC cataloging. These principles exist; they were drawn up at the Library of Congress by Seymour Lubetzky. They were presented as a "statement of principles" adopted by the International Conference on Cataloguing Principles,

Paris, October 1961. They form the basis of the Anglo-American (AA) rules, and the British text faithfully follows these principles; the American text does not. The reason is given in the preface: "It is regrettable that, because of the great size of many American card catalogs, it was necessary for the Catalog Code Revision Committee to agree to the suggestions of the Association of Research Libraries that certain incompatible American practices be continued in the present rules."[3] "Regrettable" in the national context perhaps, although "disastrous" would be a better word in the context of MARC and an international MARC network. It is perhaps fortunate that the AA code has not yet been accepted by the Library of Congress and that a change to the basic set of principles is still a practical proposition. For the international MARC network the Paris Principles are surely the only possible cataloging standard.

THE SUBJECT IDENTIFICATION STANDARD

It may seem an impossible task to reach agreement on an international standard for subject representation on a MARC record. In fact as long as we have a clear understanding of the purpose of the standard it should be much easier to achieve than a cataloging standard. National standards are not involved at all. What we need is a common means of conveying subject information in MARC. From a logical standpoint the information carrying system needs only be fairly precise in its identification of complex subjects. From a practical point of view this system should be familiar and in widespread international use. It should also be an adequate working tool for subject retrieval in a machine system. Only one existing scheme meets these requirements—the Universal Decimal Classification (UDC). UDC is capable of considerable precision in subject identification and is widely used in America, Great Britain and continental Europe. It has retrieval capabilities which are far superior to DC or LC. A sound economic case could almost certainly be made for adding UDC as a national class number together with LC and DC on both British and American records. Many libraries in both countries use UDC. Many other systems would use the UDC data for selective dissemination of information (SDI) services. In the context of an international MARC network UDC would be invaluable because the UDC number contains enough information to permit a very high level of conversion to local subject systems. In Great Britain we have neither the money nor the inclination to handle MARC as if it were a machine-readable version of the shared cataloging program. If Paris or Rome or Stockholm sends us national MARC data we would only expect to augment this data by machine intervention before adding it to our international MARC data base. This is perhaps the fundamental difference between the British and American approach to MARC and the main reason why MARC standards seem to us to be so

vitally important. BNB will not recatalog or classify any material coming over the international network but it will be prepared to convert an international standard subject representation to national system equivalents. Conversion systems depend absolutely on the built-in precision of the starter scheme. For practical purposes this precision is available in UDC.

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