

# ADAPTING LIBRARY BIBLIOGRAPHIC UTILITIES AND LOCAL SYSTEM SOFTWARE FOR USE IN ARCHIVAL INFORMATION SYSTEMS —THE CASE OF NOTIS 5.0

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**ABSTRACT:** The USMARC AMC format was developed for the control of archives and manuscripts. It is designed to organize and provide access to both bibliographic and internal collection management information. Today's USMARC AMC-supporting library bibliographic utilities and local system software focus on bibliographic aspects while support for managing internal administrative information is sorely underdeveloped. This article looks at the development of the NOTIS system as an example of one major AMC-supporting bibliographic system along with the functional requirements of archival information systems and general considerations when employing library utilities and software in archival management.

## *Introduction*

Observers of automated information systems used in archival repositories have given much attention to the public access and information exchange aspects of the USMARC AMC (Archives and Manuscripts Control) format. The advent of this MARC bibliographic format in 1983 allowed archivists to adapt the library-developed bibliographic utilities and local system software programs for use in archival information systems. Archivists have known for some time there were advantages to automation. Some of these are the same advantages familiar to public service librarians, particularly the variety of searching capabilities for on-line descriptions of materials. Users can access these descriptions anywhere in the world using large utilities such as RLIN and OCLC. USMARC AMC is the bibliographic control format that makes it possible for archivists to join in the expanded world of almost limitless information anytime, anywhere users want it.<sup>1</sup>

Equally important to archivists are the aspects of library bibliographic utilities and MARC-supporting local system software that are incongruent with archival management. Several instances exist where the benefits of library utili-

ties and software do not translate into a benefit for archival information systems. Some of the aspects are: the library systems' flat-file database structure, impeding archivists' need to link bibliographic records describing the same materials at different levels of control; the public display of all cataloged bibliographic information when there are many USMARC AMC fields supporting internal administrative data not intended for public consumption; lack of implementation for these fields such as 541 (immediate source of acquisition), 561 (provenance) and 583 (actions); standard library reports generation capabilities that do not compile or report on information contained in the fields archivists need to manage their collections; and the defraying of expenses associated with bibliographic control through shared cataloging of publications.<sup>2</sup>

Shared cataloging through networks like RLIN and OCLC is the most significant example of where archives do not profit from using library utilities and local system software. H. Thomas Hickerson states in his writings about library bibliographic utilities and archival management goals that "since their collections are unique, archivists contribute original records at minimal cost and seldom "derive" bibliographic records. Therefore, they do not benefit from the economics of shared cataloging, nor do they contribute substantially to network income." Shared cataloging is one of the driving forces behind the development of library bibliographic utilities. Because this benefit is not applicable to the control of unique materials held in archives, the archival profession will have a minimal impact on the financial well being and overall design of bibliographic utilities.<sup>3</sup>

Several archival management functions are not developed in library utilities and software and are accounted for in the USMARC AMC format. Recording and analyzing collection management information is one such area. In her article of 1989, "Beyond USMARC AMC: The Context of a Data Exchange Format," Jill Tatem poses many questions about the intended uses of USMARC AMC. In her first question she asks: "What do archivists want these (on-line) catalogs to do and who should they serve?" She follows up by asking more direct questions, one of them being "Are they (on-line catalogs) an outreach mechanism to alert potential users to the existence of collections or are they comprehensive collection management systems?"<sup>4</sup> The answer Tatem searches for in her first question is implicit in her posing of the latter question. On-line catalogs should serve all of those who use them—researchers looking for collections containing desired information as well as archivists who need to organize and manage information about the activity record of their archival collections.

Tatem points out the superficiality of the discussions regarding the goals of USMARC AMC. She states that the design of archival information systems has not yet been considered and that issues of their implementation go virtually unmentioned. Tatem calls for a more rigorous examination of the information systems in which USMARC AMC will be used. She cites that eleven years after the formation of the National Information Systems Task Force, which recommended the creation of the AMC format within USMARC, basic questions such as her own still have not been answered. Today, five years after Tatem's article appeared in print, much the same state of affairs she described still exists.<sup>5</sup>

Following Tatem's call for full scrutiny of design and implementation considerations, archivists will need to look at their institutions' existing automated

information systems and assess their potential use in the archives. Bearing in mind the costliness of building and supporting automated systems from scratch, existing systems hardware and software should strongly be considered in establishing archival information systems. Such an assessment can prove particularly useful in cases where systems already utilize USMARC-supporting software. Often, this means using the existing library utility or local system software. Archival repositories located within universities as well as other archives that have access to library utilities or software will no doubt greatly expand their use of these systems due to a separate system's prohibitive initial cost and continuing systems support and training expenses. This article looks at the development of the NOTIS system as an example of one major USMARC AMC-supporting bibliographic system with the functional requirements of archival information systems and general considerations when employing NOTIS and other library utilities and software in archival information systems.

### *NOTIS—Background*

Shortly after the USMARC AMC format was established, a quest began to discover the one software product that would fully implement it. Now a ten-year odyssey, archivists embarked on this search without being quite sure which capabilities were desired in such a software.<sup>6</sup> This journey has far too closely resembled the search for the holy grail, never reaching its intended result; but now armed with the experiences of the last ten years, archivists have a much clearer notion of what they want from their information systems.

One of the most rapidly growing software systems is the NOTIS bibliographic system. NOTIS stands for Northwestern On-line Total Integrated System. It is a library local system software program used in major research libraries that supports the USMARC AMC bibliographic format, in fact, one of the first library local-system software programs to implement it. NOTIS was developed and first used in 1970 by the Northwestern University Library. Beginning solely as an automated circulation system in 1971, the NOTIS system incorporated the automation of ordering, cataloging, and checking in of library materials. By 1977 it became a mature system including automated acquisitions, cataloging, authority control, serials control, and circulation. During 1980 NOTIS offered an on-line public access catalog (OPAC) that became available for sale to other libraries. Born of and operated by the Northwestern University Library for seventeen years, NOTIS became NOTIS Inc. in 1987, a private corporation owned by Northwestern University. It has continued to develop and refine its support of USMARC AMC throughout its versions, as of 1994 in the 5.xx stage.<sup>7</sup>

Today, NOTIS is poised to expand rapidly in the automated bibliographic system marketplace. Ameritech, which also owns the LS2000 bibliographic system typically found in smaller academic libraries, purchased NOTIS in 1992. Ameritech recently announced it is phasing out the LS2000 system and in its place is offering NOTIS products to its LS2000 customers. The use of NOTIS will become more widespread as it is deployed in many smaller, regional or general academic libraries.<sup>8</sup> Organizations like the Smithsonian Institution are purchasing NOTIS software. Thus the potential for college and university-based archival repositories as well as other cultural institutions to use NOTIS for archival cataloging continues to grow. The NOTIS system fits the profile of

existing USMARC AMC-supporting software awaiting adaptation in archival information systems. The possibilities are becoming an issue for archivists with access to it and for the larger archival profession in general.

### *NOTIS 5.0—Improvements*

So what does NOTIS do to support USMARC AMC cataloging and general archival collection management? Can it be used in a functioning archival information system? Before the release of NOTIS 5.0, cataloging in NOTIS AMC was best accomplished for retrospective cataloging of fully arranged and described collections with comprehensive finding aids. It resembled monographic cataloging, which is more two-dimensional—it is either cataloged or uncataloged. Similarly, archival collections were either cataloged or uncataloged. The system did not accommodate the typical variety of functions inherent in collection management and the different stages in the records' life-cycle at which they take place. In particular, it did not consider the use of the AMC format's internal management fields like other PC-based software programs did at the time.<sup>9</sup> It is important to recognize that the USMARC AMC format can record and organize information that will facilitate the internal management of a repository's collections. All of this information can be categorized and recorded in the USMARC AMC fields designated for administrative control activities.

*Administrative Information for Archival Management.* What are these collection management functions and why do archivists need to track and compile information relating to their progress? First, archivists need support from their management information systems to realize the long-term goals and ultimate mission of any archival program: establishing administrative control over the collections, ensuring timely access for their use, and preserving them for long-term availability. As a comprehensive collection management system, automated systems such as NOTIS need to support the collection management functions of appraisal, accessioning, physical arrangement, description and intellectual access, and preservation.<sup>10</sup> The information produced from performing these archival functions can apprise decisions made later about repository-wide strategic planning and the allocation of resources to maximize long-term preservation and accessibility.

A wide range of collection management information can be entered into software systems such as NOTIS. For instance, administrative control fields can accommodate information derived during accessioning relating to the donor, terms of restrictions to access, storage location, physical condition, the accession's original order, and whether or not it is an addition to an existing collection. During the arrangement and description process, information is generated about the levels of arrangement and description executed and the status of preservation actions. Archival appraisal produces information about the records' significance based on the archivist's evaluation of administrative, legal, fiscal and research values present. The range of activities archivists practice on the documentary record need to be recorded and monitored throughout the materials' life in the repository so the archives manager can make informed decisions about future collection management actions and secure effective use of the archives' resources.<sup>11</sup> Thus, archivists need information systems that enhance their ability to scrutinize collection management information and plan for the preservation and access needs of their repositories' holdings.

Before version 5.0, NOTIS did not support the first step in the collection management process, accessioning. It did not implement several fields where donor and transfer information was recorded, nor were the action fields that were used to record directions for future collections processing suppressed for internal view only. Details about a collection's physical condition or plans for its future processing were fully displayed to the public, cluttering the OPAC screen with needless information to the potential user. With the release of NOTIS 5.0, some enhancements have benefited archives managers who wish to use the system to maintain a record of the activities performed on the archival collections and continue to improve their intellectual access.

In its 5.0 version, NOTIS made two very simple, but significant enhancements. First, NOTIS incorporated fields 541 (immediate source of acquisition) and 561 (provenance) into the AMC fields supported by NOTIS. Second, NOTIS programmed its software to allow local control over which USMARC fields could be displayed in the public OPAC and which ones could be suppressed from the public's view. The ability to suppress fields even extends to all subfields within MARC. Specifically, USMARC AMC fields such as 541 (immediate source of acquisition), 561 (provenance) and 583 (actions) contain information relating to the donor, terms of the gift or transfer, and other acquisition/appraisal/processing/preservation information, which is not intended for public display. Archivists have long advocated that these fields should be used only internally.<sup>12</sup> Due to the improvements in version 5.0, archivists can record administrative information and work with their local systems staff in determining which fields shall be displayed to the public and which fields will remain suppressed from view. Supporting the use of these crucial fields and recognizing their purpose as locations for internal management information indicates that NOTIS is becoming increasingly useable for archivists.

In an environment of declining resources, archivists should streamline the management of their archives' holdings. Single or integrated software systems like NOTIS, which are moving ahead with fuller implementation of the USMARC AMC format and support both intellectual access for users as well as administrative information for archivists are efficient in terms of cost, training, and ongoing maintenance. Because full AMC implementation is missing in many integrated software systems, many archival institutions use two systems, one with USMARC AMC capabilities to communicate archival descriptions to users, and another for institutional administrative information needs.<sup>13</sup> But if enough users of systems like NOTIS continue to press for AMC implementation improvements, then these systems can become viable, low cost management information systems for archives. Specifically with NOTIS, archivists can benefit from the fact that it is in operation already and is being employed with greater frequency throughout the country, complete, in many cases, with a systems support staff residing in the local library.

*OPAC Design.* The independent design potential for the various USMARC formats in the NOTIS OPAC is also an important development. Describing large series of institutional records or private manuscripts which usually mandates lengthy fields containing narrative description is very different from describing a published monograph. Fields denoting the physical forms included in an archival collection and the potential for a multitude of subject tracings makes an AMC record appear quite differently on screen from a monographic

record. Users of integrated bibliographic systems may become confused by the differences in the display of monographic and archival records. Therefore, archivists are learning to use the NOTIS OPAC's flexibility to design user-friendly public screens that better display archival description.

A useful feature made available for OPAC design is the local control over field labels. One example of display differences between monographic and archival bibliographic records is the use of the label "creator" instead of the label "author," traditionally found with monographic records. Several OPACs containing AMC records have been found to employ this label to indicate that archival collections typically have a creator, a person or office of origin as opposed to an author which refers to someone or some corporate body who has written the material being described. Brief and long views of the MARC record can be tailored as well. Archivists are placing certain "vital information" fields in the brief view (e.g.: creator, title, dates, summary) while placing fields containing additional, more elaborate description in the long view (e.g.: history, additional summary, forms of material, subject and added entries, additional creators or offices of origin). After a user consults the brief view and decides to seek more descriptive information, the long view can be selected and read. Of course, some of the more variant OPAC designs being created by archivists will fall to the pressure of standardization during the format integration process. OPAC design will become significant for archivists as they continue to stretch the capabilities of NOTIS and the resources of their libraries' local systems offices.

*Record Expansion.* Another important development is the expansion of the record capacity, in particular the size of the 500 fields. Much of the lengthy narrative description common in archival practice is located in these fields. Upon the release of 5.0, NOTIS expanded the capacity of a MARC record to accommodate up to 7,000 characters with no length restrictions on any particular field. Prior to 5.0, a MARC record was restricted to under 5,000 characters in length and strict limits existed on the amount of characters entered in each field. These earlier restrictions posed a serious impediment to archives that created well developed archival descriptions for their holdings. With version 5.0 archivists can enter more narrative description in their AMC records. These improvements increase the user's ability to learn more about an archival collection through the on-line bibliographic database and enhances the user's keyword searching capability. However, staff from at least a few university-based archives and manuscript repositories insist that their AMC records containing nearly 7,000 characters are not being accepted into NOTIS. Whether record size is a NOTIS problem or a local systems problem has not been immediately resolved to the satisfaction of these repositories. Discouragingly, it appears the debate on adequate record length continues.<sup>14</sup>

*Additional Benefits.* There are many other features in NOTIS 5.0 that benefit AMC cataloging. The expanded number of subject tracings, for instance, greatly enhances archivists' ability to provide access to dozens of personal names that can be present in an archival collection. Also, delegating to local institutions the ability to determine which fields are keyword searchable is an important enhancement that should not go unnoticed. As mentioned above, providing users with greater keyword searching capability is of paramount importance when maximizing the use of narrative archival description existing in an on-line

environment. Archives users may take greater advantage of this capability than library users. All these improvements are a boon to archivists. NOTIS 5.0 provides the beginning of a useful descriptive and collection management utility for archivists. However, while the aforementioned upgrades in NOTIS are significant for archivists, there still remains notable shortcomings in the support for the AMC format.

### *NOTIS 5.0—Continuing Obstacles*

*Reports Generation.* Although version 5.0 improves NOTIS's ability to provide intellectual access to users and begins to support AMC's collection management functions, problems still exist that block NOTIS as the "utility of choice" among archivists. One very practical feature of many other software products is the range of reporting features available. They are required for analyzing data to comprehend and plan for the activities carried out by the archives staff. With NOTIS it is very difficult to generate the necessary statistical reports related to accessions, processing, and use that are basic to almost any archival manager's annual report. The range of PC-based programs provide for preset and user-defined reports much like RLIN AMC's Reports System (RRS). In the RRS, RLIN has provided a standard reporting package that can produce printed reports on accessions, donors, status of collections processing, and other functions.<sup>15</sup>

Tailoring one's own archival reports in NOTIS for gathering and interpreting data is, at best, a very cumbersome process. Archives managers cannot create their own reports; they must be programmed by the library's automated systems staff. Usually this is a huge amount of work which will not apply to the needs of any other library department. Thus, the work involved is unique and therefore expensive. In support of the decision-making process, information systems like NOTIS that can be adapted for use in archives need to include well developed reporting and data compilation features relating to the use of the archives, vital information about the incoming accessions, levels of arrangement and description, and records of preservation activities. NOTIS may wish to look at other AMC-supporting software products, in particular RLIN's archival control segment and the RRS for reporting management information. In this way, NOTIS Inc. could examine several approaches to designing software for archival functions support.<sup>16</sup>

*Collection Management.* We have established by now that USMARC AMC is designed to do more than simply communicate collection descriptions to user communities; it can provide solutions to archivists' collection management needs. However, while provisions for control over the collection management process are present in USMARC AMC, their development in NOTIS still remain dormant.<sup>17</sup> Simply put, NOTIS does not provide archivists with the application software tools necessary to carry out collection management functions efficiently. Archivists recognize AMC's potential for achieving administrative control over their collections and wish to see this function exploited in software. Instead, what archivists are presented with are just the raw AMC fields where data can be input and tagged. Using these raw AMC fields without any application software programming to simplify and provide support for collection management functions makes NOTIS quite cumbersome to use;

although, archivists can still use the appropriate fields and subfields and enter administrative information. Success in revising systems such as NOTIS will determine whether it will enjoy a long and prosperous life or a short and painful existence in the archival profession.

What can NOTIS do to enhance its improving support of USMARC AMC and archival management? It could develop software modules such as those developed for library management in NOTIS—circulation, serials control, and monographic acquisitions are just a few examples. Similar to library management needs, the world of archives could greatly use a software module for accessioning, a module to enter and maintain appraisal information, preservation assessment information, conservation treatment status, planning and collection assessment information regarding physical arrangement needs and the creation of intellectual access. Even more needs exist. For example, one would find useful a module to track the use of holdings in the archives reference room and when items are on loan for exhibition, modules to complete user registration, records management and disposition, and track storage locations<sup>18</sup> USMARC AMC fields are available to enter information in many of these areas. NOTIS needs to develop basic applications software to simplify data entry and to categorize and streamline the work flow.

*Linking Bibliographic Records.* Without a doubt, one of the largest problems facing archivists who wish to use NOTIS 5.0 is that, to date, it does not support the AMC linking fields. The inability to use these fields, numbered from 760 through 787, renders NOTIS unadaptable into a complete AMC-supporting component in archival information systems.<sup>19</sup> This is a particular problem with records created within complex organizational structures or with larger manuscript collections. The primary linking field 773 (host item entry) identifies bibliographic records for subunits of materials that belong to a larger collection. The premise of hierarchical relationships in archival theory is fundamental to the knowledge base of the profession. Their essence is captured in the principle of provenance.<sup>20</sup> To this end, the linking fields in USMARC AMC are designed to simulate the crucial intellectual links between related record series within an organization or larger collections of archival materials.<sup>21</sup>

Automation has greatly improved archivists' ability to exploit hierarchical levels of description through linking bibliographic records. For example, the bibliographic records consisting of collection-level descriptions could be hierarchically linked upward to the agency (or biographical) history and downward to multiple series-level descriptions. The agency history would describe the context in which the records of the organizational unit were created and maintained. Specific unit functions, responsibilities, history, and other background information would be described here. This approach to agency history records supports existing methods of archival description.<sup>22</sup> Lastly, the linked series descriptions would focus on the arrangement and form of material found in the records themselves.<sup>23</sup> This bibliographic record linking is of the utmost importance in effective control and access of archival records. Yet at this time, NOTIS AMC is unable to accommodate the management of information based on provenance in the integrally linked bibliographic record system described above. This situation is a critical problem for the archival profession.

*Indexing.* Indexing capabilities for many fields that are very useful to archival research still do not exist. Fields such as 520 and 545, which contain sum-

maries, abstracts, scope notes, historical notes, series descriptions, and biographical information are keyword searchable. However, NOTIS 5.0 does not support indexing of any field above 651. This leaves out important fields such as 655, form/genre of materials; 657, function term; 69x, local topical fields; and 755 added entry/physical characteristics. Writing about the ability to create access using the form/genre fields, Helena Zinkham, Patricia Cloud, and Hope Mayo state: "When form can be juxtaposed during retrieval with the names of originating offices or their functions, the combination of terms may substitute for specific subject indexing." This capability is so important to these three authors that they call for archivists "to act together to lobby for full system indexing and online retrieval of the terms we have so carefully devised."<sup>24</sup> Archivists need not only capabilities to manage internal administrative information but also the ability to make the most of their contextual descriptions through indexed searching of the pertinent fields.<sup>25</sup>

One solution to many of these indexing problems would be to allow for local control of indexing capabilities. This would occur in much the same way as the implementation of local control over the design of OPACs and the assignment of keyword searching to particular MARC fields.<sup>26</sup> Archivists' concerns about creating specific indexes for groups of fields in USMARC AMC could also be resolved in this way. Among the concerns are designing name indexes that include 1xx, 6xx, and 7xx fields; indexing the form of material/physical characteristics fields as previously mentioned; and creating proper indexes that differentiate between subject matter, authors, and forms of material. In the latter instance, authors will need not be cataloged in subject fields, and forms such as "diaries" will not be interpreted as the subject matter of a collection when hit upon during a subject search. Many library systems staff would favor such methods; thereby possessing as much local control over their system as possible.

### *Conclusion*

How can archivists implement the needed changes in the NOTIS software to make it an efficient archival collection management utility? Archivists alone, as represented in their NOTIS interest group, are too small to serve as an effective advocate for their needs. NOTIS is marketed toward the major university research libraries, not archives; therefore, archivists' will not drive the marketplace for NOTIS.<sup>27</sup> University-based archivists will need to rely on and collaborate with their librarian colleagues to provide vocal support for the needed enhancements in NOTIS AMC. As research libraries grow and involve the management of a more diverse nature of research materials, addressing the full implementation of USMARC AMC in NOTIS will become inevitable. Of course, archivists will need to expand the interests of the university library, and the library profession as a whole, to more actively embrace all the information management professions. Perhaps it will only be at that time when sufficient market pressure will force NOTIS to take a more proactive approach to AMC cataloging and the development of archival information systems.

The American archival profession is articulating what it requires from archival information systems. Managing and compiling information regarding the administration of collections is of paramount importance. The absence of a

software system that meets this requirement amounts to a crisis in the management of archival repositories. Archivists today are pushing beyond the boundaries inherent in AMC description. The next generation of standards for automated archival description, such as systems supporting multilevel description,<sup>28</sup> document structure and encryption standards like SGML,<sup>29</sup> improved techniques in full-text searching, a potential model for archival information systems in the proposed AIS system<sup>30</sup> under construction at the National Archives, and use of the Internet, may render the AMC format obsolete sooner than anyone cares to admit. It is likely that when archivists move forward to this next generation in automated techniques, the library utilities and software programs will have never realized the AMC format's full capabilities.

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## NOTES

1. Steven L. Hensen, "The Use of Standards in the Application of the AMC Format," *American Archivist* 49 (Summer 1986): 40.
2. These and other incompatibilities are expounded upon by Richard V. Szary in his article, "Information Systems for Libraries and Archives: Opportunity or Incompatibility?" *Journal of Library Administration* 7 (Summer/Fall 1986): 49-60.
3. H. Thomas Hickerson, "Archival Information Exchange and the Role of Bibliographic Networks," *Library Trends* 36 (Winter 1988): 553-571, in particular, p. 558.
4. Jill Tatem, "Beyond USMARC AMC: The Context of a Data Exchange Format," *Midwestern Archivist* 14:1 (1989): 43.
5. *Ibid.*: 39-47.
6. For further information on the early development of the USMARC AMC format see Richard H. Lytle, "An Analysis of the Work of the National Information Systems Task Force," *American Archivist* 47 (Fall 1984): 357-365; and David Bearman, *Towards National Information Systems for Archives and Manuscript Repositories: The National Information Systems Task Force (NISTF) Papers, 1981-1984* (Chicago: Society of American Archivists, 1987).
7. Patricia Cloud, "Fitting In: The Automation of the Archives at Northwestern University," *Provenance* (Fall 1987): 16, 17, and 22; see also James Meyer, "NOTIS: The System and Its Features," *Library Hi Tech* 10 (1985): 81-90.
8. On June 22, 1994 an Ameritech press release announced the restructuring of Ameritech's Library Services division. The result is that NOTIS software will be exclusively marketed for sales and services to academic libraries. Previous competitors in the academic library market such as Dynix, which was also recently acquired by Ameritech, will be marketed exclusively to other segments of the library market like public libraries, as is the case with Dynix.
9. USMARC AMC supporting PC-based software like MicroMARC:amc and Minaret provide some software support to manage administrative information about the handling of archives. For example, during the creation of MicroMARC:amc, providing for the control of archival collections throughout their life cycle was seen as "inherent in any combined archives/records management approach." See Frederick L. Honhart, "MicroMARC:amc: A Case Study in the Development of an Automated System," *American Archivist* 52 (Winter 1989): 82.

10. H. Thomas Hickerson in his article, "Standards for Archival Information Management Systems," *American Archivist* 53 (Winter 1990): 24-28, further defines an automated collection management system into the following components: appraisal, processing, space management, preservation management, disposal management, and reference. Portions of the reference component represent the most frequently applied capabilities of library utilities and software for archival management.
11. William H. Holmes, Jr., Edie Hedlin, and Thomas E. Weir, Jr., "MARC and Life Cycle Tracking at the National Archives: Project Final Report," *American Archivist* 49 (Summer 1986): 305-309.
12. As an example confirming archivists' desire to restrict these fields from public view, see Patricia Cloud, "Fitting In: The Automation of the Archives at Northwestern University," 23.
13. See Holmes, Jr., Hedlin, and Weir, Jr., "MARC and Life Cycle Tracking at the National Archives: Project Final Report:" 305-309.
14. Feedback on NOTIS version 5.1 indicates that AMC records with a length of 8,000 characters are being accepted into the system.
15. For a description of the RLIN archival control segment and the RRS system, see H. Thomas Hickerson, "Archival Information Exchange and the Role of Bibliographic Networks," 561.
16. See also Frederick L. Honhart, "MicroMARC:amc: A Case Study in the Development of an Automated System," 82, where Honhart discusses the importance of designing a report module to "manipulate the data and generate reports for the management of the institution's records." Honhart regards this as a critical function.
17. In 1988 H. Thomas Hickerson wrote, "The AMC format was designed to provide integrated access to bibliographic and process management data. Devising effective, cost-efficient means to support this integration is a current priority; local integrated library systems will play a major role in this area." See H. Thomas Hickerson, "Archival Information Exchange and the Role of Bibliographic Networks," 563.
18. See footnote 10 for H. Thomas Hickerson's components of an archival information management system.
19. NOTIS Inc. has announced that field 773 (host item entry) in the USMARC AMC format is scheduled to be operational in NOTIS version 5.2. See "New Linking Functionality in Release 5.2," *NOTISes* no. 95 (October/November, 1993): 10-13.
20. Provenance is defined as "the organization or individual that created, accumulated, and/or maintained and used records in the conduct of business prior to their transfer to a records center, archives, or manuscript repository." The principle of provenance refers to the principle that records of the same provenance must not be intermingled with those of any other provenance. See Terry Abraham, "Oliver W. Holmes Revisited: Five Levels of Arrangement and Description in Practice," *American Archivist* 54 (Summer 1991): 370-377. For the importance of the principle of provenance to archival description, see David Bearman, "Archives and Manuscript Control with Bibliographic Utilities: Challenges and Opportunities," *American Archivist* 52 (Winter 1989): 30.
21. See Nancy M. Shawcross, "Cataloging: A Case Study of Practices at the University of Pennsylvania," *Archival Issues*, vol. 18 no. 2 (1993): 133-144 for an approach to linking USMARC records in RLIN/AMC cataloging.
22. As David Bearman has noted, archives are described in terms of "the activity out of which they arose and the actions that have been taken on them. They are not described, in themselves." See David Bearman, "Archives and Manuscript Control with Bibliographic Utilities: Challenges and Opportunities," 30. For a description of automated agency history records as created in the RLIN Seven States Project, see pages 32-33. See also Heather MacNeil, "The Context Is All: Describing a Fonds and Its Parts in Accordance with the Rules for Archival Description," in *Treatment of the Archival Fonds: Theory, Method, and Practice* (Ottawa: Bureau of Canadian Archivists, 1992).
23. Fredric M. Miller, *Arranging and Describing Archives and Manuscripts* (Chicago: Society of American Archivists, 1990), pp. 98-104.
24. Helena Zinkham, Patricia D. Cloud, and Hope Mayo, "Providing Access by Form of Material, Genre, and Physical Characteristics: Benefits and Techniques," *American Archivist* 52 (Summer 1989): 301 and 318.
25. Among the most prominent articles on the virtues of indexing the form/genre fields are Helena Zinkham, Patricia D. Cloud, and Hope Mayo, "Providing Access by Form of Material, Genre, and Physical Characteristics: Benefits and Techniques," 300-319; David Bearman, "Archives and Manuscript Control with Bibliographic Utilities: Challenges and Opportunities," 26-39;

- David Bearman and Peter Sigmond, "Explorations of Form of Material Authority Files by Dutch Archivists," *American Archivist* 50 (Spring 1987): 249-253.
26. This approach to the problems associated with indexing capabilities was suggested by Bruce Bruemmer on the NOTIS-AR Archives and Manuscripts Discussion Group, March 30, 1993.
  27. See Patricia Cloud, "Fitting In: The Automation of the Archives at Northwestern University," for a case study on the trials and tribulations archivists have experienced in implementing the AMC format in library bibliographic utilities and local system software.
  28. For those who are interested in international anglo-american archival description standards and their particular emphasis on multilevel description, see Bureau of Canadian Archivists, Planning Committee on Descriptive Standards. *Rules for Archival Description*. (Ottawa: Bureau of Canadian Archivists), 1990; Kent M. Haworth, "The Development of Descriptive Standards in Canada: A Progress Report," *Archivaria* 34 (Summer 1992: 75-90; Steven L. Hensen, "RAD, MAD, and APPM: The Search for Anglo-American Standards for Archival Description," *Archives and Museum Informatics* 5 (Summer 1991): 2-5; Michael Cook and Margaret Proctor, *Manual of Archival Description*, 2nd ed. (Brookfield, VT: Gower, 1989); Hugo Stibbe, "Implementing the Concept of Fonds: Primary Access Point, Multilevel Description and Authority Control," *Archivaria* 54 (Summer 1992): 109-137.
  29. Standard Generalized Markup Language, or SGML, is "a programming language that provides a set of rules for defining document structures (called Document Type Definitions or DTDs) and related tagging schemes with which to identify individual structural components within documents." Refer to Victoria Irons Walch. *Standards for Archival Description: A Handbook*. (Chicago: The Society of American Archivists, 1994), particularly pages 97-98. Walch further describes the archival applications of SGML: "Document and tag set definition has potential application in the process of managing the components and the products of archival description, especially the components that might be outside the scope of MARC tagging. Just as important, if records creators adopted standard definition and tagging of documents in electronic form, the result could be "self-describing" records that are system independent, thus easier to manage over time."
  30. Trudy Huskamp Peterson, "National Archives Information System: A Progress Report," *National Genealogical Newsletter* 19:4 (1993).