Case Study

Punch Card Records: Precursors of Electronic Records

MARGARET O'NEILL ADAMS

Abstract: Section 2 of the 1939 Federal Records Act defines the meaning of *records* to preface regulations related to records disposal and explicitly includes punch cards among the record types. The definition of *records* from the 1939 act and from its subsequent revisions have been used traditionally and statutorily as the definition of *records* applied to archives.

The appearance of punch cards in a list of types of records at such an early point in the history of the U.S. National Archives suggests enlightened consensus on the record nature of this then-new form of documentary material. Punch card records emerged as a by-product of the introduction of information technology in the U.S. federal government in the early twentieth century, yet the U.S. National Archives accessioned only a very few collections of punch card records.

The history of punch card records offers perspective on the manner in which records creators and archivists responded to the unprecedented challenge of punch cards as a form of documentary material. A review of this history provides the basis for an interpretation of the archival mission in a technologically based records environment.

This paper has its roots in a 29 October 1989 presentation at the annual meeting of the Society of American Archivists in St. Louis, Missouri.

The author wishes to thank and acknowledge a number of colleagues who have assisted her. Meyer H. Fishbein graciously gave permission for the use of his personal papers; Charles M. Dollar suggested some material; and Thomas E. Brown and Kenneth Thibodeau offered recommendations, interest, and encouragement. In addition, archivists Patricia Andrews, Jennifer Davis Heaps, Frank Heppner, and Aloha South helped by locating textual materials in the records of the National Archives, while Barbara Burger, Theodore Hull, and Michael Meier assisted with the illustrations. Linda Henry suggested a number of very useful editorial changes. The author is nevertheless solely responsible for the interpretations made herein.

About the author: *Margaret Adams is assistant chief, Archival Services Branch, Center for Electronic Records, National Archives and Records Administration. She earned an M.A. in history at the University of Wisconsin, Madison, and has held a variety of professional positions. As the first data archivist at the Social Science Data and Program Library Service (DPLS), University of Wisconsin, Madison, in the late 1960s, she managed a collection that then included data recorded on punch cards.*

A CONTEMPORARY ADVERTISEMENT for a highly miniaturized laptop computer brags: "Its mother was a mainframe." Since there have been many "generations" of mainframe computers, such hyperbole poses a genealogical challenge. Complicating the kinship line are desktop microcomputers, the more recognizable parents of the laptop. Then, too, minicomputers might be surrogate aunts and uncles.

Even allowing for the questions of lineage suggested above, the ad's theme offers some interesting possibilities. If the mother of the laptop was a mainframe—give or take a generation—then its grandmother or great-great-grandmother, or great-great-great . . . (grandfather?) would be of the precomputer generation. It might even have been an electrical punch card tabulating machine. For tabulating equipment, suggests James Cortada, "created the demand and mind set that largely motivated organizations to want what eventually became known as the computer."[1]

Conceptualizing the above lineage for the hardware that has revolutionized the twentieth century offers a useful context for considering the relationship between punch cards and computerized or electronic records. Today's electronic records are direct descendants in a family of documentary material rooted in the punch card records of the tabulating machine era. Proof of this ancestry begins with evidence that punch cards had pedigree as "records" during the era in which they were in active use. Analysis of the evidence and its practical implications suggests a historical perspective for beginning to understand the complex records management and archival challenges of all of the new offspring in the extended family of twentieth-century records, especially those in the government sector.

Hollerith and His Machines

Some background on punch cards and their use will be helpful. They were designed as the media of information storage for use with the early electromechanical tabulating machines developed by Herman Hollerith. His machines tabulated the statistical data or counts of the 1890 U.S. Census of Population, and reportedly Baltimore used them as early as 1886 or 1887 to calculate vital statistics. The Office of the Surgeon General of the Army used them routinely by 1889.[2]

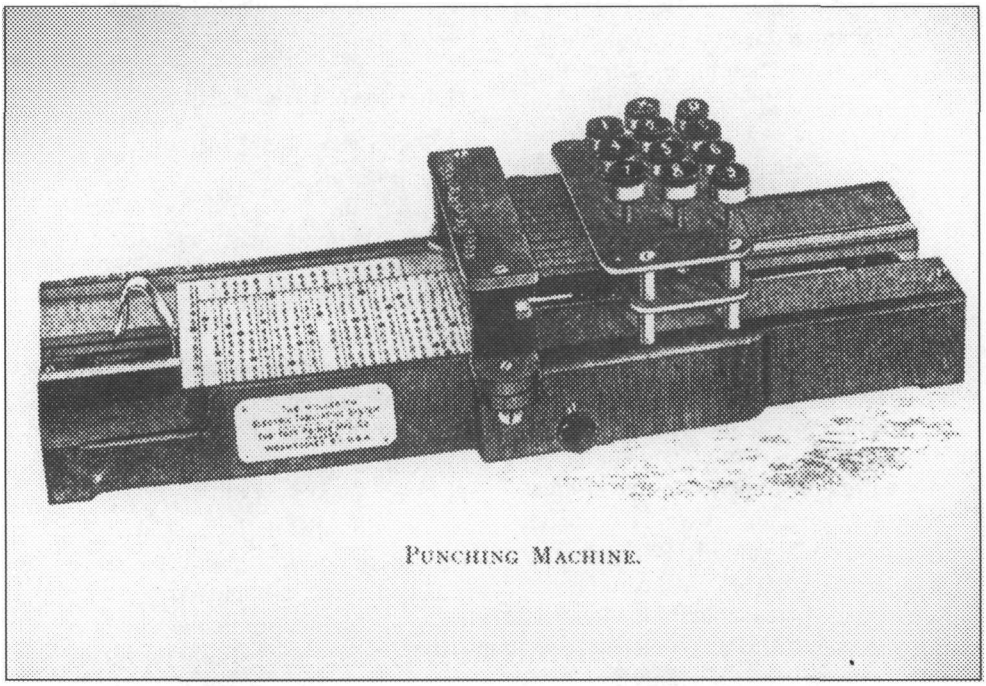
Hollerith also designed and constructed two machines that produced and sorted punched cards: a manual key punch, also known as a *pantograph punch*, and an electrical sorting box.[3] Hollerith's tabulating machines "read" or sensed holes punched in designated columns and rows on cards, and counted on the basis of the location of each hole within the column. In the example of the Office of the Surgeon General of the Army, Hollerith machines, which had been rented, recorded information on the health of soldiers. Reportedly, "types of disease, whether admitted to sick report, if illness was contracted while on duty, and other data, were recorded on cards beginning in December 1888. By July, 1889, the Army's file had grown to fifty thousand cards, making it dependent on the system to perform routine record keeping."[4]

[1]James W. Cortada, *Before the Computer: IBM, NCR, Burroughs, and Remington Rand and the Industry They Created, 1865–1956* (Princeton, N.J.: Princeton University Press 1993), 44.

[2]See Leon E. Truesdell, *The Development of Punch Card Tabulation in the Bureau of the Census 1890–1940* (Washington, D.C.: U.S. Government Printing Office, 1965).

[3]Joseph W. Duncan and William C. Shelton, *Revolution in United States Government Statistics 1926–1976* (Washington, D.C.: U.S. Department of Commerce, Office of Federal Statistical Policy and Standards, October 1978), 116–17.

[4]G. D. Austrian, *Herman Hollerith: The Forgotten Giant of Information Processing* (New York: Columbia University Press, 1982), 45–49, as cited in Cortada, *Before the Computer*, 49.



Key punching machine, designed by H. Hollerith and used in the 1900 Census of Agriculture. The machine was built by the Taft Pierce Manufacturing Company of Woonsocket, Rhode Island, to Hollerith's specifications. *Photograph No. 64-K-426. Records of the National Archives, Record Group 64; The National Archives at College Park, Maryland.*

The successes of the Hollerith machines in enhancing accuracy and productivity for tabulating data of the 1890 U.S. Census and other projects led to widespread use of ever-improved tabulating machines and related information-processing equipment in numerous U.S. government agencies, as well as in those of other nations. The commercial sector also adopted them widely.[5] Among the international users of Hollerith equipment for census tabulating prior to the First World War were the governments of Austria, Canada, Italy, Norway, and Russia. The biggest project was the Russian census of 1897, for which Hollerith's machines facilitated the tabulation of fourteen categories of data on 129 million citizens.[6] In the commercial arena, the New York Central Railroad began using Hollerith equipment in 1895 for processing freight waybills. A 1902 Interstate Commerce Commission requirement that railroads report more statistics stimulated rapid growth in the application of mechanical information processing in that industry.[7]

From early in the twentieth century, many federal agencies used Hollerith machines and, later, those of successor and

[5]See for example, JoAnne Yates, "Co-evolution of Information-Processing Technology and Use: Interaction Between the Life Insurance and Tabulating Industries," *Business History Review* 67 (Spring 1993): 1–51.

[6]Austrian, *Herman Hollerith*, 115–23, 142–51, as cited in Cortada, *Before the Computer*, 48–49.

[7]Austrian, *Herman Hollerith*, 115–23, 142–51, as cited in Cortada, *Before the Computer*, 48–49. Another general discussion of early twentieth-century use of tabulating machines is found in Arthur L. Norberg, "High-Technology Calculation in the Early 20th Century: Punched Card Machinery in Business and Government," *Technology and Culture* 31 (October 1990): 753–79.

The machines in this undated photograph from the Bureau of the Census appear to be examples of one type of *electrical sorting box*, referenced in text note 3. The caption that accompanied the photograph says that the "machine is a mechanical sorter which is used by the United States Census Bureau in its tabulation system. The machine sorts cards automatically into different classifications as may be required." *Photograph 29-CM-E-16. Records of the Bureau of the Census, Record Group 29; The National Archives at College Park, Maryland.*

competing firms to improve efficiency in the collection and analysis of the increasing volume of government information demanded by a growing U.S. federal bureaucracy. In fact, national government policies, through extensive New Deal legislation, boosted the use of the early data processing machines. One commentator has suggested that "New Dealers, well aware of the successful use of punchcards by the agencies that managed the economy during World War I, put punchcard machinery to wide use."[8] By the mid-1930s, even projects of the New Deal's Works Progress Administration (WPA) used electric tabulating and related machines to enhance efficiency.[9] According to another analyst, "The social policies of the New Deal would not have been implemented in as cost-effective a manner without punched card equipment to manage payroll deductions, unemployment insurance, and massive welfare programs."[10] Clearly, federal agencies recorded a significant volume of information in the form of holes on cards in the decades before the appearance of electronic media.

[8]"Steven Lubar's Remarks, Hollerith Centennial Observance, June 20, 1990, at the Census Bureau, Suitland, MD" in Frederick Bohme et al., eds., *100 Years of Data Processing: The Punchcard Century* (Washington, D.C.: U.S. Department of Commerce, Bureau of the Census, January 1991), 19.

[9]Duncan and Shelton, *Revolution in U.S. Government Statistics*, 119.

[10]Cortada, *Before the Computer*, 145.

Preprinted formats on the cards and the introduction in 1930 of interpreters[11] that typed on the top of a punched card the number or letter represented by the punches in the columns, resulted in "interpreted" punch cards that humans could read. Sorting tabulators, or *countersorters*, variations on the early machines, made it possible not only to tabulate but mechanically to organize the cards according to any of the information elements stored in them. Combined use of interpreters and countersorters enhanced the utility of the cards for subsequent conventional purposes that did not all depend on machines. Inventors introduced numerous other machines in the years preceding the Second World War to meet the demand for new capabilities. For once information was punched onto cards, subsequent users could analyze the data for any variety of purposes, well beyond the tasks that caused their creation. Machine copying or duplicating punch cards exactly was also relatively simple since by the 1930s there was a machine explicitly for that purpose called a "reproducer."[12]

The Advent of the Computer

For many years after widespread introduction of mainframe computers in the 1950s and 1960s, and in some places through the 1970s and even 1980s, organizations and individuals continued to use "basic" machines, or *unit record equipment*, as the above-described machines were known, for a variety of tabulating and information-analysis tasks. Meyer Fishbein apparently intended this context when he referred to the electric accounting machine (EAM) as "the progenitor of EDP [electronic data processing]."[13] In fact, until the full development of electronic data entry capabilities, input of data to mainframe computers generally depended on cards of punched information. During the several decades of evolution from basic machines to electronic data input and output, the family tree of machine-readable output included punched cards, punched paper tape, punched metal tape, and magnetic tape, as well as output printed on paper. Punched paper and metal tape formats never became dominant output media.[14]

To use punch cards for computer data entry, an attachment to a mainframe computer, known as a card reader, fed the cards to a computer's "memory" by electronically "sensing" the holes punched in the cards. The process was somewhat analogous to the way the electric tabulating machines "read" the holes on the cards. Among the innovations of the computer was its ability to retain data electronically in virtual "memory." Instructions or programs communicated to the computer's processing unit, either from punch cards or at a later point electronically communicated, allowed the data stored in memory to be accessed rapidly for subsequent analysis and calculation, among other processes. Gradually, magnetic tape replaced punch cards as the medium for computer-readable data storage and thus became the dominant

[11]George Jordan, "A Survey of Punched Card Development" (M.A. thesis, Massachusetts Institute of Technology, 1956), 25–44, as cited in Cortada, *Before the Computer*, 111.

[12]Cited in Cortada, *Before the Computer*, 111. See also, Duncan and Shelton, *Revolution in U.S. Government Statistics*; and Norberg, *High-Technology Calculation.*

[13]Meyer H. Fishbein, "Machine Readable Records" (Draft speech for ARMA Annual Conference, Denver, 13 October 1976, Typescript). Papers of Meyer H. Fishbein; Gift Collection, R.G. 200; National Archives, Washington, D.C. The Papers of Meyer H. Fishbein are henceforth referenced as Fishbein Papers.

[14]For further discussion of the application of punch card tabulation technology, see "Tabulating Type Punched Cards," Robert S. Casey, James W. Perry, Madeline M. Berry, and Allen Kent, eds., *Punched Cards: Their Applications to Science and Industry* (New York: Reinhold Publishing Corporation, 1958), 54–74.

input medium for data files used with mainframe computers.

From the punch card era through the first decades of the mainframe computer, information stored in a variety of formats suitable for mechanized analysis came to be known commonly as *machine-readable records*, in the data processing as well as archival professions. The term *electronic records* followed many years later and generally applies to records, as archivists define them, created and "readable" by the full range of computers, from mainframes to laptop microcomputers. Some use the term electronic records more generically for other records created or used with any type of electronic equipment. In this essay, however, electronic records are considered equivalent to computer-readable records.

Punch Cards and the Federal Records Act, 1939

In the United States, the 1939 Records Disposition Act provided the first public evidence that archivists considered punch cards to be a form of records:

> Sec. 2. When used in this Act, the word "records" means originals or copies of motion-picture or other photographic records in any form whatsoever, sound recordings, correspondence, papers, indexes, maps, charts, plans, drawings, punch cards, tabulation sheets, pictures, and other kinds of records belonging to the United States Government.[15]

The focus of the 1939 act, as of all the federal records acts that have followed, and of the "Useless Papers Act" of 1889[16] upon which it was loosely modeled, was the disposition of accumulations of records that were no longer needed by the U.S. government for its current business and that appeared "to have no permanent value or historical interest."[17] The definition of records served to enumerate all the types of materials that qualified as records. According to the Archives Act of 1934, the Archivist of the United States, with the approval of the National Archives Council, was to report to Congress on the ultimate disposition of federal records.[18]

Thus the 1939 legislation sought to strengthen the 1934 Archives Act, which had created the Office of Archivist of the United States and established a National Archives of the United States. It stipulated that "archives or records belonging to the Government of the United States . . . shall be under the charge . . . of the Archivist." The 1934 act gave the National Archives Council responsibility for defining the classes of materials to be transferred to the National Archives, and it created a central role for the Archivist to report to Congress regarding what the 1889 act had called "useless papers." The 1934 act referred to these materials as "papers, documents, and so forth (among the archives and records of the Government), which appear to have no permanent value or historical interest."[19] It neglected, however, to define either *archives* or *records*.

Congress approved the Archives Act on 19 June 1934, and on the following 20 October, President Franklin D. Roosevelt

[15] "An Act for the Disposition of Certain Records of the United States Government," 5 August 1939 (53 Stat. 1219–21).

[16] "An Act to Authorize and Provide for the Disposition of Useless Papers in the Executive Departments," 50th Cong., 2nd session, 16 Feb 1889.

[17] "An Act . . . ," 5 August 1939.

[18] As stipulated in Section 6 of "the Archives Act, the National Archives Council consisted of "the Secretaries of each of the executive departments of the Government. . . , the Chairman of the Senate Committee on the Library, the Chairman of the House Committee on the Library, the Librarian of Congress, the Secretary of the Smithsonian Institution, and the Archivist of the United States."

[19] "An Act to Establish a National Archives of the United States Government, and for Other Purposes," 19 June 1934 (48 Stat. 1122–24).

signed the commission for the first Archivist, Robert D. W. Connor, a historian at the University of North Carolina, Chapel Hill.[20] As early as April 1935, Archivist Connor wrote to the heads of federal agencies, asking what classes of their records were "permanently disposed of as useless papers . . . how they were disposed of, in what volume, how often, and under what authority . . . [and sought advice concerning the] best way of determining and getting rid of useless records."[21] To assist in the task of identifying "useless government records," he hired four special examiners who worked under the direction of Dorsey Hyde, whom Connor had named director of archival service. Of the four, Philip C. Brooks and Emmett J. Leahy notably influenced the later development of the U.S. archival and records management professions.

At relatively the same time, Archivist Connor also initiated a separate project, a survey of the existing archives of federal departments. He intended to use the survey's results to plan for the transfer of archives to the National Archives Building, then under construction.[22] For the survey of archives in federal departments, Connor hired a group of nine deputy examiners during May and early June 1935 and assigned each an agency. The deputy examiners worked under the direction of Thomas M. Owen, Jr., chief of the Division of Accessions; Owen reported to Dorsey Hyde. Hyde thus held overall programmatic responsibilities for both archives and their opposite, useless papers. Among the deputy examiners were Arthur H. Leavitt, assigned to the Department of Commerce; Paul Lewinson, assigned to the Department of Labor; and Theodore R. Schellenberg, assigned to the Department of Agriculture.

The minutes of staff meetings from the early years of the U.S. National Archives offer insight into the concepts and compromises that preceded the 1939 definition of records. One of the most remarkable findings is that at least a few of the pioneering U.S. archival professionals appear to have considered the potential archival value of some punch card records. Moreover, the earliest minutes reveal considerations of punch card records, including some that occurred during discussions by staff attempting to resolve the basic conundrum: identifying archivally valuable records.

The first set of minutes are from the deputy examiners' meeting of 10 June 1935. Since none of the examiners reported to work before 29 May 1935, this may have been their first staff meeting. The discussion centered on what records should be transferred to the new National Archives. One examiner had already determined that in the year since the Archives Act, some agencies had ceased recommending records for destruction to the Congress. Another reported that the Central Statistical Bureau wanted the Archivist to address the question of the destruction of statistical papers. Leavitt told of the "destruction by the Census Bureau of their cards which have been transcribed on tabulation sheets."[23] In response to a question from Owen, the division director, about whether "all information on those cards is transferred to sheets before they are destroyed," Leavitt reportedly replied "his belief that it was

[20]Donald R. McCoy, *The National Archives: America's Ministry of Documents 1934–1968* (Chapel Hill: University of North Carolina Press, 1978), 24.

[21]See for example, letter of the Archivist to the secretary of commerce, 14 May 1935, box 94, Records Accessioning and Preservation; Accessioning—Civil Service Commission and Commerce; Records of the National Archives, Record Group 64; National Archives, Washington, D.C. Hereafter, citations to records of the National Archives, Washington, D.C., are referenced solely by R.G. 64.

[22]McCoy, *The National Archives*, 59–60.

[23]Division of Accessions, Minutes of Meeting Held 10 June 1935, box 1, Office of Archival Services, Subject Files 1935–42, R.G. 64. It is likely that the tabulation sheets mentioned by Leavitt were output from electric tabulating machines.

. . . [while] Owen pointed out that [he thought] the card [*sic*] was the original."[24]

Minutes from two days later suggest a continuation of the discussion. Leavitt again described conditions at Census:

> I found certain sheets and cards, of which I spoke yesterday [*sic*], punched from the originals, they were not the originals themselves. They have about one thousand boxes of little less than one-half cubic foot, each filled with these cards, many are destroyed after they have served their purpose. Some four thousand are stored in a vault which they have never been allowed to destroy as they want them for later tabulation, tabulation in a great variety of ways.[25]

Another deputy examiner, P. M. Hamer, commented that the importance of the issue went beyond the Bureau of the Census "because in many departments there must be, in the course of business, similar action as this." Lewinson, formerly a research fellow of the Social Science Research Council, suggested that "these sheets and other partial statistical matter should be preserved." Seemingly not in agreement, Leavitt repeated, "This material is not the original. They are intermediate papers in process of working up the original information. The originals are kept, of course." Perhaps in an effort to resolve these differences, Hamer raised the key issue: "Our problem . . . is not with papers being destroyed. The question is are they Archives."[26]

A 30 November 1935 cover memo from Owen to Hyde hinted at the continuing concern of the deputy examiners. Its subject was simply *Punch Cards*: in it Owen asked Hyde to review and offer an opinion on a memorandum he had received from Deputy Examiner Lewinson. Unfortunately, the memorandum is no longer attached. It is nonetheless tempting to speculate about its message, since the Department of Labor, where Lewinson was undertaking his survey of archives, had been widely employing punch card technology since the latter part of 1931.[27]

In September 1935 Archivist Connor again wrote to each of the federal agencies and requested "a list of records that had no current or historical value, so he could report to Congress by January 1, 1936, on what should be destroyed."[28] As mentioned earlier, he assigned the task of identifying useless government records to the group of four special examiners. Solon Buck, then director of publications, and Marcus W. Price, assistant director of archival service, frequently joined their meetings. While their minutes do not explicitly refer to punch cards until spring of 1936, those from the fall and winter of 1935–36 document the variety of practical and theoretical issues under consideration.

For example, by October 1935 the minutes reveal clarity in Hyde's direction: "It is the duty and purpose of the National Archives to retain such records that are valuable but not necessarily to the intents and purposes of the department that accumulated them."[29] Special examiners' meeting minutes also expose the complexities

[24]Division of Accessions, Minutes of Meeting Held 10 June 1935.

[25]Minutes of the Meeting of the Deputy Examiners, 12 June 1935, box 1, Office of Archival Services, Subject Files 1935–42, R.G. 64.

[26]Minutes of the Meeting of the Deputy Examiners, 12 June 1935.

[27]Thomas M. Owen, Jr., Chief, Division of Accessions to Mr. Dorsey W. Hyde, Jr., Director of Archival Service, 30 November 1935, box 1, Office of Archival Service, letters sent 1935–41, Director's Memoranda (1935–36), R.G. 64. See also Ewan Clague, "Machines Speed Statistics for U.S. Department of Labor," *The Office*, June 1949, 46.

[28]Cited in McCoy, *The National Archives*, 60.

[29]Special Examiners' Conference, Friday, 11 October 1935, box 3, Office of Archival Services, Subject Files 1935–42, Procedures—Special Examiners, R.G. 64.

facing the new National Archives staffers as they tried to establish good working relationships with federal agencies. At a meeting on 3 January 1936, Brooks, chair of the special examiners that month, asked Hyde if the National Archives Council, which had met on 27 December 1935 at the White House, had made any recommendation concerning the material to be transferred from the various departments to the Archives. Hyde responded, "No . . . [but that] it is exceedingly important . . . that now we should build up good will with the departments and get rid of the papers that they want to have disposed of."[30] Before adjourning, Brooks suggested that the letters the Archivist was sending to various departments, informing them of papers that the archivists recommended for disposal, should also include the items that the National Archives was recommending for retention. At the same meeting Price indicated that he was drafting new legislation on the disposition of useless papers.

Within weeks, Hyde had concluded that "there is no such thing as useless papers and . . . all materials . . . [need to be] considered from every angle . . . statistical, legal, historical, . . . [and] a practical view concerning their possible use." Hyde was concerned that if the decision were left to the agencies, valuable historical records could be destroyed. For the benefit of the special examiners, as well as three deputy examiners (Lewinson, McAllister, and Shipman) temporarily on detail to the Office of the Special Examiners, he cited an example of records that the Bureau of the Census had listed as useless but that were "the original schedules used by scholars all over the country." When this example was brought to the attention of the Census Bureau director, he reportedly had responded that "it was obvious that some clerk who wanted additional space had gone over the heads of the departments to gain his point."[31]

The minutes from the above meeting also record discussion of a draft of the proposed revision of the "Useless Papers Act." The participants focused among other things on their "desire that a definition of archives be found." In addition, Hyde wanted "such things as motion picture films and sound recordings . . . mentioned" in the definition of records in the revised act. Brooks opposed a too-general definition of records for fear that with it some materials would probably not be listed and would be thrown away directly. He reportedly also commented upon his assessment that the "greatest danger [of destruction] occurs at the line between waste paper and records."[32]

In early March 1936, the special examiners reviewed a redraft of the "Useless Papers Act" with Price and Hyde. Price explained that he had attempted "to make the language [of Section 1] as specific as possible without actually defining an archive, since he had found that few persons in the government departments knew just what an archive was." After further discussion of the first section of the draft, "It was also suggested and agreed to that the words 'catalogs, indexes, tabulation sheets, punch cards' should be added to the kinds

[30]Conference [of the Special Examiners], Friday, 3 January 1936, box 3, Office of Archival Service, Subject Files 1935–42, Procedures—Special Examiners, R.G. 64.

[31]Conference of Mr. Hyde with the Special Examiners, 13 January 1936, annotated: *Replaced by abstract prepared by Miss Whyte—PC Brooks*; and, Abstract of Conference Notes, 13 January 1936, box 3, Office of Archival Service, Subject Files 1935–42, Procedures—Special Examiners, R.G. 64.

[32]Supplement to Notes of Conference of 13 January 1936, Additional Suggestions of the Special Examiners Concerning the New Act, 15 January 1936, unsigned. Also, Abstract of Conference Notes, 13 January 1936, box 3, Office of Archival Service, Subject Files 1935–42, Procedures—Special Examiners, R.G. 64.

of records enumerated in Section 1.''[33] Concluding, Price mentioned that he had ''deliberately left out controversial questions in order to make enactment [of the redrafted act] simpler at this time.''[34]

About the same time as the minutes record the special examiners' decision that punch cards should be among the enumerated record types in a revised ''Useless Papers Act,'' there is external evidence of debate at the Bureau of the Census on the long-term utility of punch card records. Although their dispute focused on retention of selected records for further reanalysis within the bureau, the discussion of the potential longer-term utility of the data was not so limited. In particular, Halbert L. Dunn, the bureau's chief statistician for vital statistics, wrote to the chief clerk of the bureau on 27 March 1936 in response to two memos from him:

> I feel that the death and birth punch cards for 1929, 1930, and 1931 should not be destroyed. There are many possibilities for demand of untabulated information which is obtainable from these cards. For example, there is specific need at the present time for the tabulation of these cards by one year groups as an aid to Dr. Truesdell in the [e]stimation of populations.
>
> I fully realize that there may be other factors which call for the destruction of these cards. Perhaps a limited storage space dictates the decision. . . . It is worthy of note that the original schedules of the population census are now among the Bureau's most cherished possessions. Their value was not always recognized.[35]

This memorandum not only echoed the scenario that Hyde had used as an example a few months earlier, it also reinforced the commentary of Deputy Examiner Leavitt. In an October 1935 memo to Owen, he had again mentioned punched cards: ''I know from observation . . . that the Bureau of the Census is seriously pressed for space. . . . In some cases certain divisions have lost sight of punched cards which belong to them and actually do not know where they are.''[36]

Continuing Debate About Punch Cards

The discussions with the Bureau of the Census continued into the next summer; there are two reports about a meeting in July between the bureau's chief clerk (Hirsch), Leavitt, and Herman Kahn, who was succeeding Leavitt as deputy examiner assigned to the Department of Commerce. On 29 July 1936 Leavitt sent a memorandum entitled, ''Punched Cards in the Census Bureau'' to Hyde, to whom he reported in his new position as chief, Division of Department Archives. He states that he wrote ''with reference to the possibility that we may sometime be requested by the

[33]Supplementary Notes on the Conference of 7 March 1936, discussion of the Redraft of the ''Useless Papers'' Act, box 3, Office of Archival Service, Subject Files 1935–42, Procedures—Special Examiners, R.G. 64.

[34]Supplementary Notes on the Conference of 7 March 1936.

[35]Memorandum for the Chief Clerk [Bureau of the Census] from Halbert L. Dunn, M.D., Chief Statistician for Vital Statistics, 27 March 1936, box 94, Records Accessioning and Preservation, Accessioning—Civil Service Commission and Commerce, R.G. 64. The Dr. Truesdell mentioned here appears to be the author cited in note 2.

[36]A. H. Leavitt to Thomas M. Owen, Jr., Chief, Division of Accessions, 28 October 1935, ''The Sending of the 1900 Census Schedules to St. Louis and Dr. Murphy's Position in Relation to Archives,'' box 94, Records Accessioning and Preservation, Accessioning—Civil Service Commission and Commerce, R.G. 64. According to Truesdell (*The Development of Punch Card Tabulation in the Bureau of the Census*, 89), the 1900 Census used 215 million punch cards.

Bureau of the Census to take over some of their punched cards for storage." Leavitt reported that the Census Bureau's Hirsch asked him whether there was plenty of space in the National Archives because "they might have a lot of punched cards . . . to turn over to us."

Responding that the Archives was in fact pressed for space at the time, since the building was still under construction and the Archives had already taken in large accessions, Leavitt added that "it was my personal view that punched cards were not archives in the sense that ordinary papers are and he [the bureau chief clerk] agreed with this view." Leavitt also reported that he asked whether "Census would want the cards preserved for additional tabulations," only to be told that no, "when they finish the tabulations which are now in progress, the punched cards will never be wanted for use again." Hearing this, Leavitt indicated that if that was the case, there was no reason to save the cards and that the chief clerk agreed.[37]

Kahn wrote to Owen two days later in much the same vein. He reported that the Census Bureau's chief clerk was curious about whether other bureaus of the Department of Commerce had transferred records to the Archives and whether the Archives had room for Census Bureau records. He noted that Leavitt responded positively to both inquiries, while mentioning that the "Archives was now rather cramped for space." Reportedly Hirsch said that Census had some 80 million punched cards they would soon be through using, and so wanted to know if the Archives would be interested in acquiring such material. According to Kahn, Leavitt stated that it was his personal opinion "although he could not speak for The National Archives, that punched cards were not archival material." Hirsch agreed with this view, "inasmuch as all possible useable information had already been obtained from them." Echoing Leavitt, Kahn concluded by mentioning that he reported upon this conversation "for possible use when it becomes necessary for the National Archives to determine its policy in connection with the preservation of punched cards." A hand annotation indicates that a copy of Kahn's memo was sent, perhaps by Owen, to Price, then drafting what later became the 1939 Records Disposition Act.[38]

A routing slip from Price to Hyde, dated 1 September 1936, accompanied a copy of another memo from Kahn to Owen which Price noted as "highly interesting." In it Kahn reported that the Bureau of the Census was experiencing "internal division over the question of what its attitude should be in regard to preservation of certain of its records, particularly all schedules other than population schedules and [related] punched cards." Since the decennial population census schedules were viewed as "really of vital importance," the bureau had obtained an appropriation for microfilming them. For the records of all of the other bureau programs, the differences of opinion evidently centered around two issues: whether schedules and punch cards retained sufficient research value to justify preserving them after all the information

[37]Arthur H. Leavitt, Chief, Division of Department Archives to Mr. Dorsey W. Hyde, Jr., Director of Archival Service, 29 July 1936, memo 87, "Punched Cards in the Census Bureau," box 2, Office of Archival Service, Director's Memoranda (1936–37), R.G. 64. This memorandum was cited by Meyer H. Fishbein in "Appraising Information in Machine Language Form," *American Archivist* 35 (January 1972): 36; and by Charles M. Dollar in "Machine-Readable Records of the Federal Government and the National Archives," in Carolyn L. Geda et al., eds., *Archivists and Machine-Readable Records* (Chicago: Society of American Archivists, 1980), 88.

[38]Herman Kahn, Deputy Examiner, to Mr. Thomas M. Owen, Jr., Chief, Division of Accessions, 31 July 1936, "Punched Cards of the Census Bureau," box 94, Records Accessioning and Preservation, Accessioning—Civil Service Commission and Commerce, R.G. 64.

that the Census Bureau required had been taken from them and, whether it was legal and/or expedient to turn over to another agency records that Congress ordered the Census Bureau to keep strictly confidential and that were to be used expressly and solely for the purpose of obtaining statistical information. Among others, the chief geographer of the bureau, for example, had argued that "none of these records should be destroyed, because of their possible value to the historian and the economist in the future. He has been in favor of turning these records over to The National Archives." The director's primary objection to preservation of these records was their bulk. In addition, the bureau had found that after about four or five years punched cards become soft and buckle when placed in the tabulating machines.[39]

A memo from Leavitt to the Archivist, almost three years later, indicates that the issue remained unresolved. On 7 April 1939, Leavitt, then chief of the Division of Commerce Department Archives, wrote to the Archivist about recent conversations he had had with the director of the Bureau of the Census and with its chief clerk, Hirsch. The three of them had been reviewing the disposition lists of the bureau and had discussed such subjects as the "value of census schedules and punched cards." Census Bureau personnel emphasized a position iterated several years earlier: "No punched cards are ever submitted for disposition if they have any further value to the Bureau." By now, however, the storage problem for punched cards had become acute; the bureau said it had 400 million punched cards on hand. The issue of the five-year life expectancy of punched cards resurfaced, and the conversation also touched on other causes of deterioration of the cards: dampness, "in addition to loose packing and other factors."[40]

Archivist Connor apparently referred Leavitt's memorandum to the Accessions Advisory Committee for consideration. On 12 May 1939, the committee recommended to the Archivist that having reviewed the Leavitt memorandum and the Census disposition lists, "punched cards may be reported to Congress as without permanent value or historical interest when the agency reporting them has determined that they are valueless." The typed signature on this document is *Chairman*, and initialed *MWP*, undoubtedly Marcus W. Price.[41]

No documentation suggests that the Accessions Advisory Committee raised or reconsidered the 1936 decision of the special examiners that punch cards could be records and, by implication, potential archives. Presumably the committee resolved the Census Bureau punched card issue by compromise. By deciding that an agency could determine if punch card records had historic or archival value, it ceded to the records creators a responsibility it guarded for professional archivists for other record types. Yet it did this while leaving intact the earlier judgment that punch cards could be records. When Congress passed the Records Disposition Act three months later, the section defining records reflected what the special examiners had agreed upon in 1936. It explicitly included punch cards.

[39]Herman Kahn, Deputy Examiner to Mr. Thomas M. Owen, Jr., Chief, Division of Accessions, #18, 31 August 1936, box 94, Records Accessioning and Preservation, Accessioning—Civil Service Commission and Commerce, R.G. 64.

[40]Arthur H. Leavitt, Chief, Division of Commerce Department Archives, to the Archivist, 7 April 1939, "Conversations with the Director of the Census and the Chief Clerk of the Census Bureau," box 94, Records Accessioning and Preservation, Accessioning—Civil Service Commission and Commerce, R.G. 64.

[41]Accessions Advisory Committee to the Archivist, 12 May 1939, Memorandum from Chief, Division of Commerce Department Archives, to the Archivist, 7 April 1939, Subject "Conversations with the Director of the Census and the Chief Clerk of the Census Bureau," box 94, Records Accessioning and Preservation, Accessioning—Civil Service Commission and Commerce, R.G. 64.

Revisions in the Federal Records Legislation, 1939–43

By the early 1940s, the National Archives was considering revision of the 1939 Records Disposition Act, and Philip C. Brooks undertook its redrafting. Writing in late 1941, he noted the need to clarify Section 2, the section of the 1939 act that defined records. He pointed out that when the 1939 act was under discussion, agencies insufficiently understood the definition of records and so it was then necessary to enumerate record types. In practice, however, the enumeration apparently did not clarify the definition of records because archivists were finding "evidence of confusion in the minds of officials," leading to retention of materials that did not have "record character." Among the examples he chose were "certain types of punch cards, for example, which serve merely as mechanical devices for transferring information from one document to another."[42] In an April 1940 paper, Brooks nonetheless had suggested the possibility of long-term value for selected groups of punch card records if "the cards are on good paper stock and are carefully stored."[43]

Dissatisfaction with the 1939 definition of records also appears in a 1942 letter from Solon J. Buck to Judge Newman A. Townsend. Buck, who became Archivist a year earlier, sent Townsend a review copy of a new proposed records disposal statute. In his cover letter, he noted that Section 2 (of the 1939 Records Disposition Act) was "very unsatisfactory. It consists merely of an enumeration of certain types of records and includes the expression 'belonging to the United States Government' which seems . . . to confuse the concept of property with the concept of records. . . . neither the Archivist nor the National Archives has any authority to determine what are records."[44]

Congress adopted a new Records Disposal Act on 7 July 1943. It defined records as documentary materials that were

> made or received by any agency of the United States Government in pursuance of Federal law or in connection with the transaction of public business and preserved or appropriate for preservation by that agency . . . as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of the Government or because of the informational value of data contained therein.

In addition, it incorporated a more simplified list of record types and did not explicitly mention punch cards or some of the other types listed in the 1939 act. However, after itemizing books, papers, maps, and photographs among the defined record types, it included as records "other documentary materials, regardless of physical form or characteristics."[45] Punch card records and the other types of records previously itemized thus remained implicitly included.

[42]Philip C. Brooks, On Special Detail, to Assistant Director of Archival Service, 5 November 1941, "Objectives to Be Sought in Revision of Disposal Legislation," box 2, Office of Archival Service Subject Files, 1935–42; Disposition of Records Procedures, R.G. 64.

[43]Philip C. Brooks, "The Selection of Records for Preservation," *American Archivist* 3 (October 1940): 229.

[44]Solon J. Buck, Archivist of the United States, to Judge Newman A. Townsend, 4 August 1942, box 180, National Archives' Disposal Laws and Legislation, Central Files, Alpha Subject File L (Laws and Legislation) 1934–44, R.G. 64.

[45]"An Act to Provide for the Disposal of Certain Records of the United States Government," 7 July 1943 (57 Stat. 380-83). The current Records Act includes machine-readable materials in the itemization of record types (see 44 USC 3301), but otherwise, the basic definition of *records* remains essentially as written in 1943.

The administrative records of the National Archives preserve a typescript copy of a brief 1944 essay, "What Are Government Records?" It bears the initials *PCB* and is thus presumably the work of Philip C. Brooks. The essay begins with an assertion that "the definition of Federal records in the Disposal Act of July 7, 1943, is the most satisfactory available statement on the subject." Nevertheless, the author grants that there are still questions of interpretation. In a seeming effort to clarify, he writes, "Records cannot be recognized by physical characteristics. They have record character because of the actions that produce them or in which they are accumulated." He suggests that in order to identify records, government officials or employees should ask whether the information contained in the material is evidence of the actions in which or for which they were produced: do they "show what was done, and when, by whom, why, or how?"—the historian's traditional query. "Do they constitute data collected for use in making decisions or developing policies? Those questions are the essence of the definition." Turning to a discussion of filed materials, he posits that "the fact that papers are found in files shows that someone thought they were to be kept as records. This is by no means always true . . . [yet] the burden of proof is upon the person who sets out to prove that filed documents are not records. In case of doubt, one should err on the safe side."

Interestingly, to distinguish between record and nonrecord filed material, the author discusses how to distinguish between record and nonrecord punch cards:

> Most punch cards . . . are usually simply mechanical devices for computing or transferring data from one record to another, . . . [but] punch cards that are filed [*sic*] with codes so that information, such as the names of all persons in a given group who have certain skills, can be drawn off at any time are records of the compilation that got their names classified on the cards.[46]

By contrast, he suggests, "stenographic notebooks, calendar pads, and telephone call slips are examples of incidental devices that are not generally considered records."

Later Views of Punch Cards

A few years later, the National Archives, on behalf of the Interagency Records Administration Conference (IRAC), distributed a report of its Third Meeting, 1947–48 Season (12 December 1947). The topic of the meeting was "Punch Cards—A Technique for Creating Records."[47] A Census Bureau staff member offered the introductory—and telling—remarks of the meeting:

> It is the purpose of this meeting today to introduce you to another one of the culprits that have resulted in a large increase in the volume of records material; namely, punch card tabulating equipment.
>
> The discussion of the various forms as records is a pretty broad . . . topic which would probably not be too helpful without a knowledge of the mechanics which produced these records. . . . It is the purpose of this meeting . . . to acquaint you with the punch card techniques and devices which create records and

[46] "What Are Government Records?" The National Archives (2nd draft, PCB, 4/24/44), hand annotation: "No further draft of this proposed statement was prepared." SJB 6-10-47. Planning and Control Cases, PC-6, 144-25 thru 144-42; 144-29, Proposed Public Records Act; R.G. 64.

[47] Interagency Records Administration Conference (IRAC), *Report of the Third Meeting, 1947–48 Season, December 12, 1947*, Machine-Readable Division Origins, Fishbein Papers.

> which are very much in evidence, yet not too frequently understood.[48]

This reference fittingly concludes the overview of the thinking in the 1930s and 1940s of those who wrote the initial archives' regulations and who handled the first negotiations with federal agencies concerning their "useless papers" as well as their valuable archives. They established the policies and procedures that are the heritage of the contemporary U.S. National Archives. Clearly, they grappled with the meaning of records and archives in a manner familiar to archivists some fifty years later. Among the early archivists, some were willing, and perhaps even anxious, to consider a wide range of documentary materials as meeting the test of records. The frequent discussions regarding punch card records provide evidence that the early U.S. federal archivists were aware of the contemporary and widespread use of punch card technologies for analytical and record-keeping purposes within the government by the 1930s and 1940s. Moreover, their records confirm that even in the formative period of the U.S. archival establishment, the impact of technology on the creation, preservation, and use of records challenged archival mentalities.

An additional perspective on punch card records by none other than T. R. Schellenberg appears in his later work. As noted above, Schellenberg was one of the U.S. National Archives' original deputy examiners. Yet nothing in the minutes of the examiners' discussions suggests that Schellenberg took a position on the potential value of punch card records. Nevertheless, in his 1956 article on appraising modern public records, he describes the test of form as one criterion in appraising the informational value of records, and he posits that the reason physical form of records is a consideration is that it should be possible to use any archival records without "resort to expensive mechanical or electronic equipment." While such prohibitions might apply to any record types whose use requires the intervention of some machine, Schellenberg makes clear that he is referring to "punchcards and tape recordings."[49] In terms of records, the contents of which can be statistically summarized, "such as administrative forms and statistical questionnaires and schedules," he advises caution. "If the government agency that created the records for statistical purposes did not fully exploit them, it is hardly likely that anyone else will; for scholars outside the government do not ordinarily have the resources for the costly exploitation of such records."[50]

Perhaps he did not know it, but ten years before Schellenberg wrote this, private supporters established the Roper Center, a data (i.e., punch card data) archives. It preserves raw data from commercial public opinion polls dating from 1936.[51] Other data archives were on the horizon, primarily in the social science research community and largely independent of traditional archival institutions. The format of the machine-readable data they preserved was

[48]Morris Ullman, "Introductory Remarks," IRAC, *Report of the Third Meeting*, 1.

[49]T. R. Schellenberg, "The Appraisal of Modern Public Records," *Bulletins of the National Archives* 8 (October 1956): 25. Throughout his career Schellenberg appears to have maintained an aversion to records whose use required the intervention of a machine, for in the preface to *The Management of Archives* he states: "The [archival] records with which I am concerned fall into three major classes—textual, cartographic, and pictorial. . . . I do not discuss the management of motion picture films, aerial films, and microfilms" (New York: Columbia University Press, 1965), x.

[50]Schellenberg, "The Appraisal of Modern Public Records," 42. See also Paul Lewinson, "Toward Accessioning Standards in Research Records," *American Archivist* 23 (July 1960): 297–309.

[51]The Roper Center (later the Roper Public Opinion Research Center) was originally housed at Williams College in Williamstown, Mass. It is now at the University of Connecticut, Storrs, Conn.

punched cards. As technological capabilities evolved, so did the ways in which these institutions preserved their holdings. They migrated their files to successive generations of magnetic tape as tape became the standard medium for storing machine-readable information.

The Preservation of Punch Card Records

The U.S. National Archives has accessioned only a few series of punch card records, and preservation of this type of documentary material is virtually nonexistent among other U.S. traditional archival institutions. Several reasons may explain this dearth. First, the sheer volume of punch card records was in fact overwhelming. The long-term value of most of this volume would qualify as "useless" by almost any archival standard. Scarcely any agency or archivist attempted to select and identify the most historically valuable punch card records. Then, too, there were the issues of long-term preservation and the vulnerability to deterioration that afflicted punch cards that had not been stored in low-humidity environments and under pressure to avoid warping. Such issues are recognizably legitimate to anyone who can recall admonitions not to "fold, spindle, or mutilate." Using the standard "basic machines" known as *reproducers* to preserve good copies of cards was apparently never considered, despite the simplicity of the process. Schellenberg's aversion to machines apparently was a common sentiment.

These pragmatic reasons are compelling, but hindsight suggests that they were not the only barriers to the preservation of valuable federal punch card records. Rather, the decision by the Accessions Advisory Committee in 1939, that records creators could determine for themselves when punch card records had archival value, removed archivists from appraisal of documentary material in this form. Perhaps the Accessions Advisory Committee finally compromised in 1939 because most of the punch card records that might have long-term value were statistical in nature. According to Fishbein, "Statistical records have been created since the beginning of recorded history . . . [and yet there were] no specific guidelines for [their] appraisal" until his own, proposed in 1984.[52]

In any case, ideas such as those expressed early on by Deputy Examiner Leavitt that "punched cards were not archives in the sense that ordinary papers are,"[53] seem to have had greater influence than the language of the 1939 Records Disposition Act, or later of the Records Disposition Act of 1943. This is consistent with the fact that the decision on appraisal of punch card records was in response to pressure from Leavitt. For him, and undoubtedly for others, archives were "old documents, whether written, printed, or otherwise inscribed."[54]

However one interprets the 1939 compromise, the removal of archivists from appraisal decisions regarding punch card records set a general tone of archival disinterest in machine-readable records that had its own long-term effect. Without leadership and direction from archivists, few federal agency administrators apparently felt compelled to preserve for the long term any punch card records other than those needed for ongoing agency programs. Equally significant, this attitude persisted as new forms of machine-readable records evolved from punch card records. Reportedly, the National Archives Data Archives

[52]Meyer H. Fishbein, "Reflections on Appraising Statistical Records," *American Archivist* 50 (Spring 1987): 226–34.

[53]Leavitt to Hyde, 29 July 1936, "Punched Cards in the Census Bureau."

[54]Arthur H. Leavitt, "What Are Archives?" *American Archivist*, 24 (Spring 1961): 175–78. According to the editor's note, this article was written in 1938 but had been available only in typescript form until its publication by the *American Archivist*.

staff formed in 1969 found that "virtually all agencies in the Federal Government considered the information on magnetic tapes as 'non record' and, therefore, not susceptible to the control of the Records Disposition Act of 1943 as amended."[55]

The history of punch card records should include mention of two accessions by the U.S. National Archives. One is a collection of well over 100,000 punch card records on Second World War American and Allied prisoners of war, in the Records of the Provost Marshal General (R.G. 389). The second major collection, in the Records of the War Relocation Authority (R.G. 210), is a "locator index," the Evacuee Summary Data Cards for Japanese-Americans who were interned by the War Relocation Authority during the Second World War.[56]

In the case of the punch cards on the Second World War prisoners, the army appraised the cards as permanent records while they were in their custody. The agency transferred these records to the National Archives as part of the 1959 transfer of all of the U.S. Army's Departmental Archives. The National Archives did not reappraise any of these records.

The accessioning dossier for the records of the War Relocation Authority (WRA) contains no explicit mention of the punch card records with detailed demographic data on individual internees. Nevertheless, the cards were transferred to the National Archives in 1946 with other records of the WRA's Statistical Section.[57]

Although the paperwork related to the accession of the WRA records does not identify, explicitly, the punch card version of the Individual Record (Form WRA 26 Rev 1), it strains credulity to think that the archivists who appraised and handled the transfer of the WRA collection were unaware of them. Among other things, their volume is substantial: approximately 110,000 cards. Equally significant, the ar-

[55]Data Archives Staff, National Archives and Records Service, Gerald J. Rosenkrantz, Director, *Data Archives Program, Project No: P&C 071-23*, 30 June 1971, 1-1. The revision of 44 USC 3301, to include explicit mention of machine-readable materials in the definition of records, occurred later.

[56]At least one other large collection of punch card records has been retained, but those cards were microfilmed before their transfer to the National Archives and only the microfilm version was transferred. They were individual enlistment records from the Second World War era; they are now stored on 1,600 rolls of microfilm. Given the volume of cards represented, and absent any routine practice of copying punch cards to preserve them, it is unlikely that these records would ever have been preserved had they not been microfilmed. Although the microfilm is very difficult to read, individual records are "eye-readable" because the cards were interpreted (i.e., the punched values were printed across the top of the cards).

Because these records are needed for administrative purposes at the National Military Personnel Records Center, and because of their inherent informational value, the National Archives explored options for restoring these data to a machine-readable format. The National Archives contracted with the Bureau of the Census for a project in which the bureau used a modified version of its FOSDIC (Film Optical Scanning Device for Input to Computers) II system to scan the Second World War microfilm and output the data as electronic records in ASCII format. See also Sudha U. Kumar and Rangachar Kasturi, "Text Data Extraction from Microfilm Images of Punched Cards," *Computer Engineering Technical Report, TR-92-113*, Department of Electrical and Computer Engineering, Pennsylvania State University, 1992. My thanks to Ken Thibodeau for suggesting that I mention this collection and for keeping me current on the efforts related to its restoration.

Yet another accession of punched card records was recently located in the National Archives, and the data on the cards will be transferred to magnetic tape. These records are an index to the G-2 interrogation reports of returned U.S. Korean War POWs at the time of Operations "Big Switch" and "Little Switch." The data provide each repatriated POW's name, service number, rank, and reference to the (textual, on paper) interrogation report. They are records of the Army Staff (R.G. 319). My thanks to Don McIlwaine, who shared this information.

[57]A duplicate copy of the punched cards also was deposited at the Bancroft Library Archives, University of California, Berkeley. During the late 1960s, the Berkeley cards were "read" into a computer and output to magnetic tape. The U.S. Department of Justice acquired a copy of that tape file and used it as a primary source in building the database of information about WRA internees. It used the database to implement the Civil Liberties Act of 1988. That act awarded monetary compensation to living survivors of the WRA relocation camps.

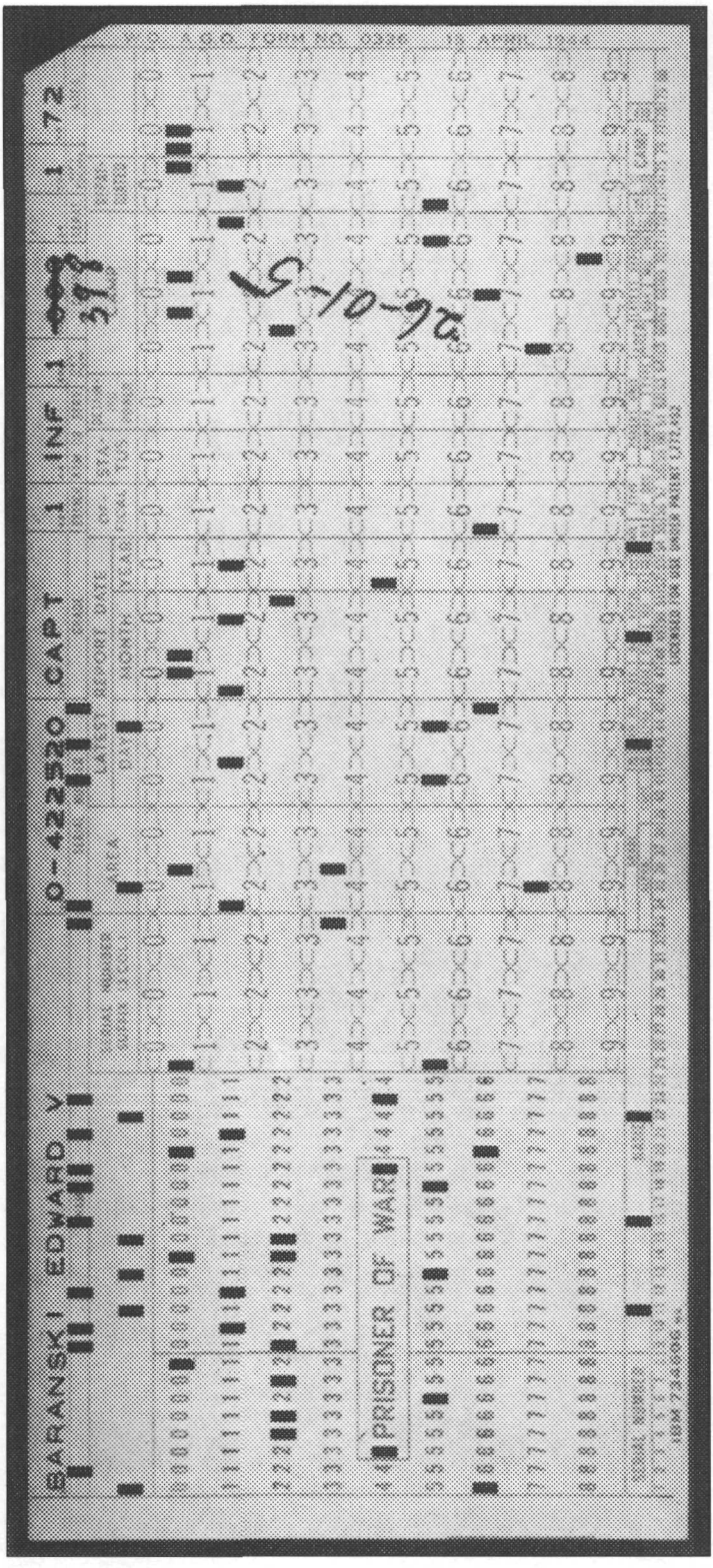


Figure 1. Punch card record for Edward V. Baranski. (War Department Adjutant General's Office [AGO] Form No. 0326, 15 April 1944) The card is filed in the category Deceased American POWs (Germany). POW Information Bureau, (12W3/7/14/E, BX 35), Records of the Office of the Provost Marshal General, RG 389; National Archives, Washington, D.C.

FIELD NAME	COLUMN NOS.	CONTENTS
Serial Number	1–8	O-422520
Name	9–32	Baranski, Edward V
Grade, Alpha	33–38	Capt (Captain)
Grade, Code	39–41	E in column 41 (this code represents Captain)
Branch	42	1 (code=Army)
Arm or Service, Alpha	43–45	Inf (Infantry)
Arm or Service, Code	46–47	10 (code=Infantry)
Date Reptd, Day	48–49	09
Date Reptd, Mo	50–51	12
Date Reptd, Yr	52	4 (1944)
Race	53	1 (code=Caucasian)
State or Res	54–55	96 (code=Utah)
Type of Org	56–58	blank
Parent Unit, Number	59–61	blank
Parent Unit, Type	63–64	blank
Area	65–66	72 (code=Germany)
Latest Report, Da—y	67–68	06
Latest Report, Mo	69–70	08
Latest Report, Yr	71	5 (1945)
Off'l	72	1 (code=reported through official sources)
Sta[tus]	73	5 (code=died as prisoner of war)
Det Power	74	1 (code=Germany)
Camp	75–77	000 (code not included in code list; however, handwritten code, 398=unstated camp, Germany)
Rep	78	blank

Figure 2. An interpretation of the punch card record for Edward V. Baranski. Codes were assembled from related textual records by William H. Cunliffe.

chivists who processed the transfer of the records of the War Relocation Authority understood the potential archival value of punched card records. Paul Lewinson prepared the inventory of the WRA Statistical Section records and recommended their transfer to the National Archives. Philip C. Brooks, as records appraisal officer, approved their transfer.[58]

Researchers have used the individual records in each of the above two accessions extensively. In both cases, the cards are interpreted, with selected fields of the punched information printed across the top

[58]Accessioning Dossier, Transaction 447–41 (under 446-C18), Department of the Interior, War Relocation Authority, Accession No. 2262, hand annotated: Statistical Section—rosters, etc., stamped *Received NA-A*, initialed *SJB, 9/20/46*, Records of the National Archives, R.G. 64. Item 23 in the National Archives' *Preliminary Inventory of the Records of the War Relocation Authority (Record Group 210)*, 17, compiled by Estelle Rebec and Martin Rogin in 1955, details the contents of "EVACUEE SUMMARY DATA CARDS ("LOCATOR INDEX"). 1942–46. 17 ft.," mentions that they are "IBM punch cards (3" × 7") . . . ," and identifies which items on the cards are "typed or written" (i.e., interpreted) and which are punched in code.

of each card. (See Figure 1.) The POW records came to the National Archives arranged (i.e., sorted) by the type of prisoner (whether U.S. or Allied); whether military or civilian; the theater of war in which held; and whether repatriated, deceased, or escaped. Within these groups, the cards are in alphabetical order by surname. Thus, if a researcher already knows a certain amount of information about a former prisoner, a manual search can yield the individual record. However, the utility of the cards is limited. Manual searching cannot be employed, for example, to respond to a researcher seeking the identities of all prisoners repatriated from a particular prisoner-of-war camp, or to respond to an inquiry about the racial composition of the repatriated POWs.

Fortunately, in the late 1970s the Veterans Administration (VA) transferred a substantial subset of this series to magnetic tape in order to use the records as primary source material in a study of repatriated U.S. military prisoners. The National Archives preserves this portion of the whole accession in electronic form and researchers can acquire a copy to undertake the types of analyses described above.

Similarly, researchers have used the WRA punch cards, sorted alphabetically by internee surname and functioning rather like index cards, for a variety of individual documentary purposes. Within recent years, the Department of Justice transferred an electronic version of these records to the National Archives and thus this series also is available in electronic format for research use.

An important lesson from these two accessions is that machine-readable records may last longer, in a purely physical sense, than the hardware on which they can be used. This emphasizes the now well-understood preservation requirement for machine-readable records. Preserving full archival value requires progressive migration of machine-readable records to media accessible by contemporary technology. In the above examples, the National Archives accessioned both punched card series before it had a preservation program for machine-readable records and has preserved both accessions with other paper records. Use spurred the migration of most of these records to an electronic format.

What about all of the other punch card records? The losses archivists should mourn are the punch card records that may have had genuine historical value but that, for all of the reasons outlined above, no archivist ever identified and no agency transferred, either to the National Archives or to any other repository. The records-creating agencies did not retain them, and the relevant regulations did not prevent their unappraised disposal. The legacy remains.