

# Biographies

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## ADAPSO and the Service Bureau Industry, 1961–1968

The role of trade associations in the history of computing has so far received little attention. To begin to remedy that oversight, this article sketches the early years of the computer software and services industry trade association known as the Association of Data Processing Service Organizations (ADAPSO), to accompany biographies of two of its most prominent pioneer members: Bernard Goldstein and Frank Lautenberg. Established in 1961, the association initially catered to an almost forgotten breed of business: the computer service bureau. In 2002, the Software History Center organized a series of ADAPSO-related oral history interviews, and collected many of the association's records to form a unique historical resource, of which these short pieces can do little more than scratch the surface.

A trade association is essentially a society, the members of which are not individuals but business organizations within a particular industry. Though their activities are sharply constrained by antitrust law, trade associations are found in every American business from automobile parts to adult entertainment. Their conferences provide a neutral meeting place for business leaders to swap ideas, while their operations allow hundreds of smaller firms to share the costs of expensive activities

with shared benefits, such as public relations efforts, educational initiatives, legal actions, market research, and political lobbying. Recent historical work on the evolution of American business, such as Philip Scranton's influential *Endless Novelty*, has shown that associations of this kind played a vital role in industries such as jewelry, machine tools, textiles, and furniture where networks of smaller and more specialized firms predominated.<sup>1</sup>

The computer software and services industry of the 1960s and 1970s fits a similar pattern, making associations and networks similarly important. In contrast, both historians and journalists concerned with the business history of computing have looked primarily to the stories and strategies of a handful of large, influential firms such as IBM, DEC, and Apple. This approach is well suited to the study of the hardware industry, in which platforms controlled by a handful of leading suppliers have historically dominated each major market segment. However, as Martin Campbell-Kelly showed in his recent history *From Airline Reservations to Sonic the Hedgehog*, the markets for computer software and services remained highly fragmented.<sup>2</sup> No computer processing services firm, consulting or contract programming group, or (until the 1990s) mainframe software company ever came close to achieving dominance in its field. Because the software and services industry was so immature, fragmented, and fast changing its pioneers found the association a vital place to learn from each other, create workable business models, promote their industry to potential customers, and pursue shared legal and political objectives. For the historian, ADAPSO is important not just in its own right, but also as a window into the changing concerns and structure of the evolving industry.

During the 1970s and early 1980s ADAPSO was the leading trade association for the computer software and services industry, expanding its scope to include professional services firms, value-added resellers, online services, and packaged software vendors. This expansion will be the focus of a second, companion article accompanied by further biographies. ADAPSO still exists today, as the Information Technology Association of America (ITAA). Though the expansion of regional IT associations, and of specialist groups in areas such as the personal computer software industry, have made this association less central than it once was as a social networking hub for the industry, it continues to serve a valuable role in representing the IT industry as a whole to Washington and organizing events for its 500 member companies.



Figure 1. This ADAPSO logo, used during the 1960s, evoked the punched cards (top right), paper tape (lower left), and magnetic tape (center) used by service bureaus to store and process machine-readable records.

### *ADAPSO's origins*

When ADAPSO was officially inaugurated in 1961 there was no such thing as the computer software industry, or a computer software company. The association owed its existence to the desire in early 1960 of one middle-aged man, William H. Evans, to find convenient, part-time employment as the executive head of a trade association based close to his home in Abington, Pennsylvania. His background was in the office management field, and his then-current employer was the National Office Management Association, founded back in 1919 to spread the gospel of scientific management to office workers. Unsurprisingly, therefore, his initial plan was to create something called "The Office Services Institute," which according to the minutes of its first exploratory meeting would be "an association of companies rendering services to business offices." He had interested two other men sufficiently for them to attend the meeting, at which it was decided that "data processing center companies," temporary employment agencies, and independent service bureaus should definitely be part of the new association, and that other groups such as business consultants and computer manufacturers might well play a part. The founders were enthusiastic, and agreed to seek leads among their networks of professional contacts.<sup>3</sup>

The service bureau appeared, initially, as just one small part of the much broader field of office services. From this point, however, events moved in an unexpected direction. This was perhaps because both of the other organizers worked in the computer service bureau field. One—Romauld Slimak—was manager of the Univac Service Centers, while the other—C.W. Graf—was Manager of Advertising and Sales Promotion for the Service Bureau Corporation. Of the nine men who gathered in the Hotel New Yorker a few months later to pursue the creation of the new organization, all but one was directly concerned with the sale of data processing services or equipment. By the third meeting, he had dropped out "because of a change in business interest," and the organization was temporarily renamed DATA, standing unconvincingly for the Data Actuating Technical Association. Discussion of a name was "informative and inconclusive,"<sup>4</sup> though at the fourth meeting in June, "it was felt that the designation 'Association of Data Processing Service Organizations' best typified the nature of the group." This was clearly not seen as an inspired choice, since the minutes went on to note that "it is hoped that other suggestions will be

forthcoming from among the Organizers."<sup>5</sup> No superior alternative appeared, and the association was to retain this slightly cryptic name for three decades.

With the name resolved, two more substantive questions remained: the objectives of the association, and the makeup of its membership. These questions were never definitively answered. Instead, the association struggled through with a series of workable compromises between inclusivity and cohesion. The original constituency implied in its name, "Data Processing Service Organizations," was reasonably narrow, particularly when compared with the diverse group of time-sharing, professional services, and software product firms that were later to expand the ADAPSO. Commercial service bureaus were clearly going to be the core of the new association. Yet even here, the appropriate boundaries were far from obvious. After "much study," the 8 June 1960 meeting adopted the definition that

This organization is to be composed of companies whose major interest is that of serving clients through data processing centers. "Data Processing Centers" are those involving operations performed on the premises of the vendor, requiring the utilization of such equipment as punched cards, punched and magnetic cards, punched and magnetic tape, optical readers, computers, and such related pieces and activities as may from time to time be included by the board of directors.<sup>6</sup>

The same meeting recognized three classes of member organization: "independent centers" (small, one-off service bureaus), "chain centers" (larger operations with bureaus in several cities), and "manufacturers centers" (operated by computer manufacturers such as IBM and Univac).<sup>7</sup> The interests of these three classes of member did not always coincide, so a few weeks later the association's Council resolved that its board should contain at least two members from each class.<sup>6</sup>

Several issues were left unresolved. One was the status of firms with no computer on their own premises, such as those providing programming services. Despite a reluctance to admit them as members, the association officially recognized that "programming and systems analysis services are now as much a part of the total data processing service activity as is the equipment itself, or its operation."<sup>8</sup> Another was the possibility of membership for non-commercial computer centers, such as those operated by universities. These operated

much like service bureaus, and some sold computer services to the public. Also unclear was the status of companies whose internal computer centers sold their excess computer time to outside customers. A new class of associate membership was eventually created to accommodate these problematic cases. More pressing, however, was the question of how to apportion dues and voting rights between the different kinds of member. Was a chain with a dozen different locations to receive one vote or twelve? Was a leading bureau in a large market such as New York City to pay the same dues as a smaller operation based in a mid-sized city? Dues were initially set at \$100 per annum, and the decision was made that each additional location within a chain bureau would be counted as a separate member organization for dues purposes, but would receive no voting rights.<sup>9</sup>

#### *Service bureaus*

What exactly was a service bureau? At its simplest, a service bureau was an organization with a computer or punched card installation available for use by other companies. During the 1950s, computers were very expensive and were entirely unfamiliar to business administrators. Companies relied on sometimes elaborate “feasibility studies” to make an informed decision before ordering one, and even after an order was placed it might take a couple of years for the hardware to arrive. To give companies a chance to observe computer technology close up, and to gain experience in programming while waiting for delivery, computer manufacturers such as IBM created high-profile computing centers. The best known of these was the SSEC, installed in 1948 behind plate-glass windows on the ground floor of IBM’s New York Headquarters to promote IBM’s electronic computer technology several years before it launched its first commercial model.

The first organizations to acquire or build computers were quick to realize that they might be able to offset the cost of their new toy by offering computing services to others. The service bureau market developed rapidly, particularly in scientific computing. In 1955, a *Harvard Business Review* article by Richard F. Clippinger listed no less than 36 centers, “offering automatic computing services and having at least one automatic computer.” Service bureau operations appeared a natural fit for scientific computation centers, such as those of universities and firms like Northrop Aircraft, because of the similarity to the normal operation of such installations: a staff of specialist operators, analysts, and programmers

tended to the machine and provided varying degrees of assistance to a constant stream of scientists and engineers with problems in need of a solution. The list was dominated by universities, and included such celebrated machines as the Cambridge University EDSAC, the Harvard Mark I, and (for governmental use only) the National Bureau of Standards’ SWAC. The machines available ran from electro-mechanical punched card calculators, through differential analyzers, to IBM’s mighty model 701. Most of the private firms listed, such as IBM, Burroughs, Engineering Research Associates, and NCR were marketing their own computers (or planning to), although a handful of specialist computer services firms such as the Telecomputing Corporation of Burbank, California were listed.<sup>10</sup>

ADAPSO, however, represented “data processing” service organizations. By the 1960s, data processing was a term applied almost entirely to the use of computers and punched card machines for the purposes of business administration.<sup>11</sup> Although administrative services firms predated electronic computers, adoption of computers by these service organizations was slower in this field than the scientific arena. This was in part because electronic data processing as a whole took a few years to catch up with scientific computing as a user of computer resources, but also because most administrative jobs were run repeatedly on a weekly or monthly basis. Whereas an engineering design calculation might be run only once, a company could be confident that its payroll process, accounts receivable, and inventory handling programs would collectively consume a significant and predictable amount of computer time for the foreseeable future. This made the in-house option more attractive.

One advantage of service bureaus was their affordability for medium-sized companies. Because of their tiny memories, slow processing speeds, voluminous printed output, and reliance on magnetic tape for storage, most early data processing computers spent a great deal of time running full speed to handle routine jobs. Most computers were operated for two, and sometimes even three, eight-hour shifts each working day. Yet the conventional wisdom of the era, codified as Grosch’s Law, held that large computers were much more efficient than small ones. Thus while a smaller company might not be able to justify the expense of a reasonably powerful computer, and would find the smallest models ill-suited to high-volume administrative tasks, it might well make economic sense for them to effec-

tively share in the cost of a larger computer by renting time on it. While small cooperatives fulfilled this role for some firms, many more turned to commercial services.

This idea was nicely captured in the title of a 1966 article in the trade magazine *Business Automation*, "The Service Bureau: Everybody's Data Processing Department." Customers would hand over paper forms, punched cards, and master tapes of their existing data and get back printed output (such as reports, bills, and checks) together with updated data tapes. The largest independent firm of this kind, Statistical Tabulating Corporation, had started in 1936 as a provider of punched card services. Thirty years later it boasted 12 separate computer centers, 31 offices, and 15,000 employees. The firm provided ADAPSO with its second president, Clifford G. Green. About 60 percent of its work came from firms without their own computers, the rest was overflow that exceeded the capacity of internal data processing groups.<sup>12</sup> The most extensive service bureau operation, however, lay within the 72 national offices of the Service Bureau Corporation, spun off by IBM into a wholly owned subsidiary in 1956. The other computer suppliers ran similar, though much smaller, networks. Although ADAPSO was later dominated by the independent firms, its first president, Romuald Slimak, worked for the Sperry Corporation (parent of computer manufacturer Univac).

Service bureaus often provided far more than the simple rental of computer time. Most reasonably large, general-purpose service bureaus offered a range of services, from assisting users with feasibility studies through systems analysis and programming. The line between service bureau, consulting firm, and programming contractor was frequently blurred. C-E-I-R, for example, claimed to be the world's largest computer services organization. In 1963 it already boasted 27 computers and offered a broad range of services, although its original core business was in operations research and economic modeling for the federal government.<sup>13</sup> The firm provided ADAPSO with its third president.

Falling hardware costs and improving performance made the installation of a computer increasingly attractive to smaller firms by the late 1960s. However, the cost of hiring and retaining a large programming staff did not fall along with the price of hardware. For this reason, many of the most successful service bureaus provided an array of specialized services, rather than just selling computer time as a commodity. Some of the most successful service bureaus specialized in particular application

areas, writing general-purpose software that could be used with little or no reprogramming by other customers in the same industry. Computer manufacturers had begun to provide skeleton application programs for particular tasks and industries, but for a specialized task such as payroll processing a service bureau could dramatically lower the cost of computerization by eliminating the need for custom programming work entirely well. One particularly important example was Frank Lautenberg's firm, Automatic Data Processing, which began as a small, low-margin business processing business payrolls but seized on computers as a way of improving efficiency and gaining an edge over competitors. In 1967, Lautenberg became the seventh president of ADAPSO.

One did not need an enormous amount of capital to start such a business in the late 1950s.

Future ADAPSO President Bernie Goldstein's formed his first company, Computech, with three partners and a total capitalization of \$5,000. Service bureaus needed to be close to their potential customers, which meant being spread out across the country. Unlike firms in manufacturing industries, or the celebrated regional clusters of Silicon Valley, they had no need to situate close to suppliers or competitors. In the early days, customers were won by persistent personal selling to local businesses. Small firms, and regional operations, could therefore often hold their own against large companies with a national presence. For such fledgling businesses, ADAPSO's most valuable initial function was as what Goldstein called "an educational organization."<sup>14</sup> Increasing competition and the economies of scale needed to support application development drove an increasing number of mergers and takeovers toward the end of the 1960s.

#### *ADAPSO's evolution*

For its first five years, ADAPSO grew quite slowly. While a steady trickle of new members entered the association, this was partially counterbalanced by an equally steady stream of departures. In some cases this reflected nothing more than the departure of the one individual with an interest in ADAPSO from the company in question. By May 1966 there were 116 full members and 45 nonvoting members. The latter were mostly branches of larger operations, including seven locations of the independent services firm C-E-I-R and 11 bureaus operated by computer manufacturer CDC. The focus of the association shifted gradually toward independent service bureaus, and computer manufacturers CDC, NCR, Univac, and Philco left the association

between 1963 and 1965 (although some of these firms repeatedly departed and rejoined).

The combination of a small association, high membership turnover, and low dues payments meant that the operations of ADAPSO remained quite limited. Evans was paid according to a reasonably generous salary of \$15,000 annually, but the association could initially only afford to pay him \$2,100—representing about one day a week.<sup>15</sup> In 1963, it rented its first small office for \$690 a year, with one full-time office assistant.<sup>16</sup> The next year, review of the executive fees paid to Evans was deferred “in the light of the financial stringency imposed by the withdrawal of certain large contributors.”<sup>17</sup> By 1966, dues increases and the somewhat larger membership base allowed Evans to work half time, and supported the retention of Milton Wessel of Kaye, Scholer, Fierman, Hays, & Handler as the association’s counsel.<sup>18</sup>

The most important formal activity organized by ADAPSO in its early years was its series of “management symposia.” The first of these was held in January 1961, and featured a full program of speeches and panel discussions addressing topics of interest to service bureau managers. For the next two years, the association held four of these a year, shifting between cities and regions to raise the association’s profile and make it easier for its members to attend. Since the traditional annual meeting had been dismissed as infeasible because of “geographic spread,” these symposia were the venue in which its members mingled and conducted the kinds of informal education and discussion which many recall as the key benefit of membership.<sup>19</sup>

The early meetings each attracted only a few dozen people. From 1963 onward, only two symposia were held every year, and each meeting lasted for two full days. Proceedings, including the text of speeches, were printed for the benefit of members unable to attend and, presumably, for promotional purposes. With only one-and-a-half employees, ADAPSO relied heavily on the energies and resources of its volunteer member representatives. In its early years, it was particularly dependent on the relatively deep pockets of service bureaus owned by computer manufacturers. Firms such as Burroughs and NCR provided meeting facilities for its Management Symposia, printed the resulting proceedings, and produced ADAPSO’s first membership directories.

The proceedings of the first symposium included a list of ADAPSO services. Among those promised in the near future were a membership directory and a code of ethics. Work

continued on the code of ethics, eventually renamed “Standards of Conduct,” for several years until a suitable version was agreed. The first directory appeared in 1961, listing around 250 service centers (most of them nonmembers, who were excluded from 1965 onward). More than 8,000 copies were requested by member companies and potential customers. The initial list of planned services also noted that “soon a periodical will become a necessity.” For the first few years, this took the form of *ADAPSO News*, a basic newsletter. From around 1964, this publication was upgraded to a glossier booklet and combined with the oddly named *ADAPSO Management Guidon* to mix articles and news of interest to members.

#### *Fighting the banks*

Despite its limited resources, by the mid-1960s the association had already begun to address what became its signature policy issue: whether its members should face competition from organizations whose main business lay in legally protected and regulated fields such as auditing, banking, and telecommunications. In the 1970s and 1980s this issue became the heart of an expanded political and legal presence for ADAPSO, as Wessel advanced some novel legal principles in the area. The first skirmish came earlier, when ADAPSO defended its members’ interests against what they saw as a threat of unfair competition by banks.

Following the reforms of the New Deal era, the American banking system of the 1960s was highly regulated. Unable to set their own interest rates for deposits, branch out into other area of financial services, or expand nationally the banks were left with a protected, remarkably stable, and generally profitable business. For the most part, they competed on quality of service, convenience, and free gifts such as toasters. However, to lure small business customers, some banks were attempting to use their spare computer capacity, and their existing customer relationships, to offer services such as payroll processing at little or no extra cost to the customer. ADAPSO feared that its members might be crushed as well-funded banks abused their legally protected profit margins on deposits to destroy the market for independent computer services.

The issue first surfaced before the ADAPSO board in 1962, when the House was considering a bill allowing smaller banks to set up cooperative service centers and provide service to the public. Following this, ADAPSO set up its Legislative Committee to monitor further legislation and recommend action when required.

Relations with the banking industry remained strained, as banks sought other ways to enter the data processing services market. By 1964, a special ADAPSO Bank Survey Committee had studied the problem, and in 1966 the association passed a resolution directing that "to the extent permitted by law, and within the practical limits of its resources, ADAPSO will assist and participate in judicial proceedings instituted to end the unlawful marketing of electronic data processing services by banks."<sup>20</sup> The case dragged on for many years through several trials and numerous appeals, including an appeal to the Supreme Court regarding the association's standing to sue American National Bank and the US Controller of the Currency.<sup>21</sup> This set

an important legal precedent, a startling achievement for the young association. The costs of litigation triggered a rise in dues, and required special contributions from the member firms most closely involved.

The battle against the banks was an inherently political fight, concerning as it did the legal and regulatory framework with which congress and the federal agencies bound the industry. However, ADAPSO's limited resources and low political profile made lobbying challenging. After testifying before the House Committee on Banking and Currency in 1969, Goldstein reported to his colleagues that

... it was an uphill battle to educate the Committee, in a short period of time, to the needs of the computer services industry and to the fact that an industry does exist that is being injured by the excessive appetites of the banking industry.<sup>22</sup>

Challenges notwithstanding, Goldstein later suggested that the association had "got lucky" in winning the sympathy of Wright Patman, chair of the committee and a man of old-fashioned populist sympathies for small business.<sup>23</sup> Its fortunes with the Senate were less rosy and the final legislation was much less restrictive than that favored by the House.

**Table 1. ADAPSO Presidents, 1960–1985.**

<b>Year</b>	<b>President Elected</b>	<b>Representing</b>
1960 & 1961	Romuald Slimak	Sperry Corporation
1962	Clifford G. Green	Statistical Reporting & Tabulating, Ltd.
1963	H.W. Robinson	C-E-I-R, Inc.
1964	Ray W. Johnson	Systems Data Processing Corporation
1965	Samuel J. Tesauro	S. J. Tesauro & Company
1966	Salvatore Parisi	Tabulating & Data Processing Corporation
1967	Frank Lautenberg	Automatic Data Processing, Inc.
1968	Leonard J. Palmer	Computer Servicecenters, Inc.
1969	John L. Roy	United Data Processing Services
1970 & 1971	Bernard Goldstein	United Data Centers
1972 & 1973	Thomas J. O'Rourke	Tymshare
1974 & 1975	Robert W. Olsen	Computer Services Corporation
1976	Leon Weisburgh	Anstat
1977	Louis E. Pfeiffer	A.O. Smith Corporation
1978	Richard L. Crandall	Comshare, Inc.
1979	John P. Imlay	Management Sciences America, Inc.
1980	A.S. "Buck" Blankenship	Data Processing of the South, Inc.
1981	Robert Weissman	National CSS, Inc. (then a subsidiary of Dun and Bradstreet)
1982	Lawrence J. Schoenberg	AGS Computers, Inc.
1983	Fred S. Lafer	Automatic Data Processing, Inc.
1984	Douglas C. Altenbern	Endata, Inc.
1985	Arthur M. Kramer	Mobix Partners

Unfortunately for ADAPSO, its biggest case against the national banks was undermined by newly clarified limits on regulation of so-called One-Bank Holding Companies, which made its legal argument moot. On dropping the case in 1971, the Executive Committee noted that "it was a crushing defeat and there is no way to color it into a victory."<sup>24</sup> The broader issues of competition from banks remained important to ADAPSO well into the 1980s.

The association's success in political and legal action was to remain mixed, which is unsurprising given the disparity between its resources and those of its opponents. ADAPSO's greatest contributions probably came more through its informal and social roles than its formal programs. However, participants feel that its public actions were critical in raising its profile and attracting new members. Recalling his stint as a paid recruiter for the association, Goldstein characterized this work as an uphill struggle, "staying in cheap motels, driving from city to city, and getting people together at lunch or dinner to think that a trade association made sense." He found service bureau operators "very concerned" about unfair bank competition, and worried that "there was no way they would survive." By taking a stand on the matter, ADAPSO found "an issue to energize the industry as to what it could do."<sup>25</sup>

Several important changes during the late 1960s altered ADAPSO's path. One of these was a change in personnel. In 1968 the association parted ways with Evans. He and his clerical assistant retired, and closed their little office in Pennsylvania. His replacement, Jerry L. Dreyer, served briefly as Assistant to the President (then Frank Lautenberg) before taking over as Executive Vice President. With this came the establishment of a new ADAPSO headquarters on Lexington Avenue in New York City. Dreyer was to run the association until the mid-1980s, during which time the scale and scope of its activities increased enormously. The other shift was the expansion in the association's membership, to include firms in the newly emerging areas of time-sharing services and software products. This necessitated a fundamental reorganization, during which ADAPSO became a federation of specialized groups (known as *sections*), each with its own leaders and directors. These transitions, a mirror of the broader transformations underway within the emerging computer software and services market, are the subject of the second article in this series.

### Acknowledgments

This article, and its accompanying biographies, could never have been produced without the work of the Software History Center (SHC), and its current and past presidents, Burt Grad and Luanne Johnson. In 2002, the center held an ADAPSO Reunion event, including a large number of oral history interviews and a set of roundtable discussions between participants and historians. These were then edited and transcribed, with the oral histories available online from the Charles Babbage Institute of the University of Minnesota, Minneapolis and the round-table discussions published under L. Johnson (ed.), *ADAPSO Reunion Transcript, May 2–4, 2002*, iBusiness Press, 2003. My own work on this project was supported by a three-month research grant as the first SHC research fellow, using funds provided to SHC by the Charles Babbage Foundation. The center was also instrumental in saving many of ADAPSO's records from destruction, and depositing them with CBI, where they are currently being sorted and catalogued to greatly expand the ADAPSO Records collection (CBI 172). Closely related material is already processed in other CBI collections, including Martin A. Goetz Papers (CBI 159) and Milton R. Wessel Papers (CBI 120). I am most grateful to the CBI staff—

particularly archivists Beth Kaplan and Carrie Seib—for making these available to me, and for assisting me during an extended visit. Bernie Goldstein was generous in answering questions and providing further materials, and my wife worked with me every day in the archives to assist in this research.

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—Thomas Haigh

## Biography



### Bernard "Bernie" Goldstein

Goldstein has enjoyed a remarkably diverse career during his more than four decades in the computer industry. He founded and ran many software and services companies, was one of the most prominent figures in the computer industry trade association ADAPSO, and finally used his knowledge and contacts to build a new and successful business as a mergers and acquisitions advisor in the software industry.

A career in business was no surprise for him, following as it did an undergraduate degree in business from the Wharton School of the University of Pennsylvania, which he soon followed with an MS earned from Columbia's Graduate School of Business during the evenings. But while Goldstein was entrepreneurially driven, neither his formal education nor his three years in the Navy had given him the slightest knowledge of computer technology. His introduction to the computer came in 1958 as a cofounder of a service bureau called Computech. The other two founders were friends with engineering backgrounds, who had hit upon the idea of starting a firm to use a computer to solve business and scientific problems.<sup>1</sup>

The three partners had only \$5,000 of capital to invest, but that was enough to rent a small office. Like many early computer services and programming firms, Computech did not originally have its own computer. To begin with, the partners paid other bureaus for the use of the computer and punched card equipment needed to solve their clients' problems, relying particularly on IBM's Service Bureau Corporation. The newly available IBM 650, the first mass-produced computer and the first one cheap enough to replace conventional punched card equipment,



Figure 1. Goldstein after his time as ADAPSO chair.