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An investigation into computerized personnel management information systems : a prescriptive model.

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AN INVESTIGATION INTO COMPUTERIZED PERSONNEL
MANAGEMENT INFORMATION SYSTEMS:
A PRESCRIPTIVE MODEL

A Dissertation Presented

By

MICHAEL N. WOLFE

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

January 1977

Major Subject: Business Administration

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AN INVESTIGATION INTO COMPUTERIZED
PERSONNEL MANAGEMENT INFORMATION
SYSTEMS: A PRESCRIPTIVE MODEL

A Dissertation

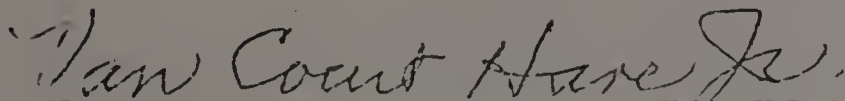
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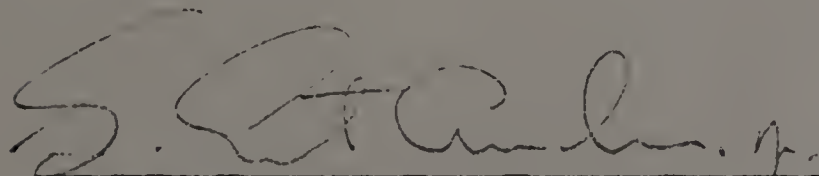
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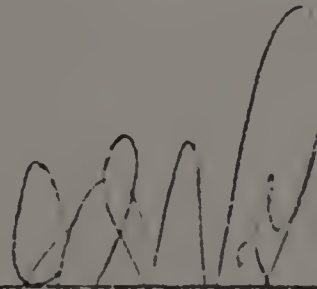
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To my beloved Wife

ACKNOWLEDGEMENTS

I want to acknowledge the patience and understanding I received from my family and teachers. To my wife, Peggy, who helped read, criticize and type the many rewrites goes my heartfelt love. Without her I could not have found the inspiration to complete this thesis.

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ABSTRACT

AN INVESTIGATION INTO COMPUTERIZED PERSONNEL
MANAGEMENT INFORMATION SYSTEMS:
A PRESCRIPTIVE MODEL

(January 1976)

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This study surveys computer usage in the personnel field and determines the best practices involved in operating a computerized personnel management information system. Two models of computerized systems are then developed and are prescribed for use in the personnel function.

The Springfield-Chicopee-Holyoke SMSA was chosen for the research area. One hundred and twenty-two organizations with over 100 employees were contacted. A 95 per cent response rate showed 67 per cent of the organizations did not use a computer for personnel work. Thirty interviews were conducted with organizations that did use a computer within the personnel function. Size and corporate division were two variables positively related to the utilization of a computer in personnel by a firm. The larger organizations were more likely to possess a computerized personnel system. Corporate divisions reported a higher use of computerization in

personnel than independent corporations. Increased accuracy of reports and reduced costs were the most frequent advantages mentioned. Input accuracy, inflexibility, and the reduction of personnel to an input station were the most common disadvantages cited.

The best practices found in the survey are incorporated into two models. Model One uses the payroll system as the foundation for the generation of several personnel reports and limited analytical work. Model Two is designed for organizations of over 1,000 employees and employs a separate employee file. A turnaround document is used and sophisticated reporting and analytical work can be performed.

TABLE OF CONTENTS

	Page
LIST OF TABLES	xii
LIST OF EXHIBITS	xiv
LIST OF ILLUSTRATIONS	xvi
CHAPTER I. INTRODUCTION	1
Background of the Research Project	2
Purposes of the Study	5
Significance of the Study	5
CHAPTER II. LITERATURE REVIEW	8
Surveys of Computer Use by Personnel Departments	8
Conversion to a Computer System	37
Company Literature	62
Skills Inventories	74
Manpower Planning	84
Evaluation of Computer Systems	89
Personnel Models	91
Textbooks	94
Summary	99
CHAPTER III. RESEARCH METHODOLOGY	101
Exploratory Questions	101
Definitions	102
Springfield-Chicopee-Holyoke SMSA	103
Survey Procedure	106
Interview Technique	108
Summary	110

	Page
CHAPTER IV. RESEARCH RESULTS	111
The Sample	111
Non-use of computer in personnel	112
Use of computer in personnel	113
Comparison of Computer Use and Non-Use	113
Payroll computerization	114
Independent corporation versus division of a larger corporation	114
Industrial type	115
Size of organization and computer usage in personnel	117
Interview Results	121
Systems knowledge	121
Advantages and Disadvantages of a Computerized Personnel System	124
Advantages of a computerized personnel system	124
Disadvantages of a computerized personnel system	126
Personnel computer systems	128
Group A--under 500 employees	129
Group B--500-999 employees	132
Group C--1000-1999 employees	141
Group D--over 2000 employees	145
Large companies outside of Springfield- Chicopee-Holyoke SMSA--over 5000 employees	147
CHAPTER V. PERSONNEL MANAGEMENT INFORMATION SYSTEMS	159
Model One--A Personnel System For Small Organizations Under 1000 Employees	160
Model Two--A Personnel System For Organizations of Over 1000 Employees	165
Human resources planning	169
Compensation administration	171
Employee services	172
Labor relations	175
Summary	175

	Page
CHAPTER VI. CONCLUSION AND FUTURE RESEARCH AREAS . . .	185
Research Purpose and Importance	185
Methodology	186
Summary of Research Results	187
Implications for Personnel and Human Resources . . .	190
Future Research Areas	191
BIBLIOGRAPHY	198
APPENDIX A. BUESCHEL QUESTIONNAIRE AND COMBINED RESPONSES	204
APPENDIX B. EXAMPLES OF GENERAL ELECTRIC'S SOFTWARE LANGUAGE (GEDAN) CONTROL CARDS AND OUTPUT	207
APPENDIX C. INFORMATION CODED IN IBM LINEAR PROGRAMMING RECRUITMENT OFFICE EVALUATION MODEL, BY CARD COLUMN	209
APPENDIX D.1 SURVEY ORGANIZATIONS	211
APPENDIX D.2 SURVEY LETTER	213
APPENDIX D.3 SURVEY POSTCARD	214
APPENDIX D.4 SURVEY COST	215
APPENDIX D.5 SURVEY TIME TABLE	216
APPENDIX E. PAYROLL FILE INFORMATION	217
APPENDIX F. PAYROLL--PERSONNEL DATA SHEET INPUT FORM	219
APPENDIX G. PAYROLL--DEDUCTION AND ADJUSTMENT FORM . .	220
APPENDIX H. EMPLOYMENT NOTICE FORM AND EMPLOYEE STATUS CHANGE NOTICE FORM	221
APPENDIX I. PAYROLL DEDUCTION AUTHORIZATION FORM AND TERMINATION NOTICE FORM	223
APPENDIX J. WEEKLY TIME CARD USED WITH APPENDICES H AND I	225
APPENDIX K. PAYROLL AND PERSONNEL INFORMATION INPUT FORM	226

	Page
APPENDIX L. PAYROLL AND PERSONNEL MASTER FILE CHANGE NOTICE FORM	227
APPENDIX M. PERSONNEL ADDITION NOTICE	228
APPENDIX N. EMPLOYEE CHANGE FORM	229
APPENDIX O. EMPLOYEE CHANGE OF STATUS RECORD	230
APPENDIX P. FILE INFORMATION CONTAINED IN EMPLOYEE FILES	231
APPENDIX Q. EMPLOYEE PROFILE FORM	233
APPENDIX R. CHANGE OF STATUS FORM USED WITH EMPLOYEE PROFILE	234
APPENDIX S. PERSONNEL EMPLOYEE PROFILE HISTORICAL LISTING FORM	235

LIST OF TABLES

Table		Page
II.1	Specific Uses of EDP in Personnel	10
II.2	EDP Knowledge Required by Personnel People to Operate a Personnel Computer System	12
II.3	Size of Firms in Bueschel Survey	13
II.4	Present Computer Usage and Future Usage	26
II.5	Computerized Record System Implementation	28
II.6	Types of Data Utilized Within the Compensation Function	29
II.7	Percentage of Manpower Development Data Implemented in Computer Data Bases	30
II.8	Percentage of Employment Data Uses Found and Not Found in Computer Systems	31
II.9	Degree of Labor Relations Data Implemented in Computer Systems	32
II.10	Variables That Affect Computer Acceptance	33
II.11	Status of Computer Applications in the Personnel Department	35
II.12	Mathematical Model Used for Manpower Planning	36
II.13	Personnel Systems Task Force Training Schedule	44
II.14	Data Groups That Can Be Included in a Personnel Base	56
II.15	Example of Skills Information Retrieval System Field Index	76
II.16	Example of Skills Information Retrieval System Specialty Index	77
II.17	Example of Employee Search Parameters and Population Frequency	80
IV.1	Response Received in a Study of Personnel Management Information Systems in the Springfield SMSA, June, 1975	112

Table		Page
IV.2	Computer Use in Personnel, Springfield SMSA, June, 1975	113
IV.3	Payroll Handling Methods of Non-Computerized Personnel Organizations, Springfield SMSA, June, 1975	114
IV.4	Personnel Computer Use in Relationship to Independent Corporation or Corporate Division, Springfield SMSA, June, 1975	115
IV.5	Industrial Type and Personnel Computer Usage, Springfield SMSA, June, 1975	116
IV.6	Computer Usage in Personnel by Industrial Type (percentages), Springfield SMSA, June, 1975	117
IV.7	Organizational Size and Personnel Computer Usage, Springfield SMSA, June, 1975	118
IV.8	Organizational Size and Usage in Per Cent, Springfield SMSA, June, 1975	119
IV.9	Organizational Size and Computer Usage in Per Cent, Springfield SMSA, June, 1975	120

LIST OF EXHIBITS

Exhibit	Page
II.1 GRAD Applicant and Employer Search Sequence . . .	19
II.2 Degree of Full Computer Implementation by Functional Area	27
II.3 Personnel Systems Stages	39
II.4 Data-Element Collection Sheet	50
II.5 Data-Element Identification and Definition Sheet	52
II.6 Partial File Listing of G.E. Personnel Records	55
II.7 Installation Work Outline for Personnel System Conversion	63
II.8 Computer Output From Variable Parameter Employee Search Program	82
II.9 Lejk and Wortham Probabilistic Manpower Forecasting Model	86
II.10 Milkovich-Nystrom Manpower Forecasting Model	88
II.11 Teach-Thompson Flow Chart of IBM Linear Programming Recruitment Evaluation Model	92
II.12 Integrated Personnel Systems Developed by Rolf E. Rogers	93
II.13 Tomeski and Lazarus Personnel Integrated Information System	95
III.1 Springfield-Chicopee-Holyoke SMSA Map	104
IV.1 Payroll Change Notice	130
IV.2 Payroll-Personnel Information Action Form	134
IV.3 Personnel-Payroll Hard Copy Record Form	136
IV.4 Absentee Report Example	139
IV.5 Payroll-Personnel Report Example	140
IV.6 Personnel Skills Inventory Input	142

Exhibit		Page
IV.7	Personnel Skills Inventory Educational Input Document	143
IV.8	Job Posting and Bidding Form	149
IV.9	Example of Personnel Computer Printout-- Current Employee Status Listing	150
IV.10	New Employee Notice	155

LIST OF ILLUSTRATIONS

Figure		Page
II.1	PERT/CPM Illustration of a Generalized Plan for Developing and Installing an MIS	40
II.2	Payroll System Information Flow of XYZ Petrochemicals, Ltd.	46
II.3	Combined Information Flow of Payroll-- Personnel System of XYZ Petrochemicals, Ltd.	47
II.4	System Development Stages	49
II.5	Flow Chart of Employment Applicant Cycle	57
II.6	Application Flow Chart	58
II.7	Use of Data Files by Corporate Staff and Decentralized Units	65
II.8	Graphic Examples of Salary Conditions Using Variance and Skewness Measures	67
II.9	A Flexible Approach to File Searching	81
V.1	Model of PMIS in Organizations Under 1000 Employees	166
V.2	Personnel Evaluation Ratios	176
V.3	Model of PMIS in Organizations Over 1000 Employees	178

C H A P T E R I

INTRODUCTION

We live in a world of sudden and often surprising changes. One example of sudden change is the reversal of Richard Nixon's popularity. Another is pointed out in books like Future Shock, by Alvin Toffler. Citing a United States Department of Labor survey, Toffler states that the average tenure of jobs for the entire U.S. labor force is 4.2 years.¹ The effect on turnover of short job tenure is staggering. In a large company or federal agency with thousands of job positions, turnover analysis would be impossible from a time standpoint alone, without the aid of a computer. Personnel departments, thus, have not been immune from the shock waves of change.

Perhaps the biggest and most sweeping of all changes has been the introduction of the computer in the personnel department. The surprise of finding a computer being used by personnel people is shown by the surveys that seem to announce to the world that, "Yes, it is possible to use computers in Personnel." In addition to surveys, there are the practitioners who write in their professional journals of the wonderful things that their organization has done using a computer. (See Chapter Two for examples.) Thus,

¹Alvin Toffler, Future Shock (New York: Random House, 1970), p. 109.

the major sources of information about personnel departments that have had any experience with the utilization of a computer are either sources which are too broad or success stories of organizations which are too narrow and, perhaps, not completely truthful.

Therefore, the need for a study that would investigate current usage, attempt to determine the best practices involved in operating a computerized Personnel Management Information System, and formulate a model that could be employed by academics, students, and practitioners is crucial and timely.

Background of the Research Project

Twenty years ago, Drucker's opinion of the personnel function was that it was "certainly insolvent, certainly unable to honor with the ready cash of performance the promises of managing worker and work it so liberally makes."² Robert Townsend satirically implied the need to abolish the personnel department.³ These two are not the only persons to find fault with the personnel function, as shown by the criticisms that follow:

The personnel function is not management oriented. It is so absorbed with such fragmented,

²Peter F. Drucker, The Practice of Management (New York: Harper and Row, 1954), p. 287.

³Robert Townsend, Up the Organization (Greenwich, Connecticut: Fawcett Publications, 1970), p. 126.

immediate problems as hiring employees on a crisis basis that it does not have the planning horizon needed at the management level.

The personnel function is not adaptable to change. It is prone to accept conditions as it finds them; consequently the personnel function often appears to be antiquated and unresponsive to organizational needs.

The personnel system is absorbed in relatively unimportant tasks like record-keeping. It cannot adequately provide for its central mission of planning for and developing the human resources of the organization.

In general, administrative offices function at low levels of productivity and are measured against inappropriate standards. This suggests poor management and a lack of motivation on the part of the employees. Unfortunately, personnel departments have done little to improve managers' leadership techniques and to stimulate employees' need for achievement.⁴

The above reference to the personnel function's irrelevance, inflexibility, and low productivity stresses the need for personnel departments to change; hopefully this research will show that the addition of the computer to the personnel function is useful and viable. If personnel departments are to improve, they must re-examine themselves. The use of a computer can solve some of the above problems.

The literature on personnel management and computers indicates a need for computers. As late as 1969, Martino's⁵ first objective was to convince the reader that

⁴Edward A. Tomeski and Harold Lazarus, "The Computer and the Personnel Department," Business Horizons, Vol. XVI, No. 3 (June, 1973); p. 62.

⁵R. L. Martino, PMS--Personnel Management Systems (Wayne, Pennsylvania: Management Development Institute Publications, 1969), p. 51.

a computer is needed for making personnel decisions. Since this study, government pressure, in the form of Equal Employment Opportunity regulations and Occupational Safety and Health Administration rules in particular, have forced personnel departments to spend up to 40 per cent of their time on paperwork.⁶ If there ever was a doubt of the necessity of computerizing the personnel function, it surely no longer exists today.

The human problems involved in the introduction of a computer to a company, a division or department, and the effects of an existing computer on employees, is an important area of study,⁷ but is often an academic one to many personnel departments. For many organizations, there is little or no choice of whether to computerize or not to computerize when faced with today's problems; a company must use the computer to survive. Computer users' attitudes and preferences can be changed. The weekly payroll must be met, EEO regulations must be followed, requests for data on discrimination must be given. A computer with its ability to generate fast and accurate

⁶Bulletin To Management. ASPA-BNA Survey No. 18 (Washington, D.C.: Bureau of National Affairs, June 7, 1973), p. 7.

⁷See: Charles Schewe, The Impact of Marketing Information Systems on Systems Users' Attitudes and System Usage (unpublished Ph.D. dissertation, Northwestern University, 1972).

reports can be of assistance in meeting these and other problems.

Purposes of the Study

The purposes of this study are (1) to survey computerized personnel management information systems currently being employed by a representative sample drawn from a Standard Statistical Metropolitan Area; (2) to identify the best practices of existing personnel systems; (3) to determine the actual advancement of computerization within personnel departments; and, (4) to develop a model of a comprehensive computerized personnel management information system which is useful and viable for practitioners, faculties and students in Industrial Relations.

Significance of the Study

The significance of this study arises from the union of computers with the personnel function. The ideas presented in this study should make a significant contribution to the personnel field by illuminating the progress information systems have made to the people function called personnel. Academics and students should benefit from the survey results which will examine the extent of computerization within personnel. By studying these advances students will be better able to understand

the direction of the personnel field and thus be better prepared for entering the field.

Practitioners should benefit by the examination of the activities of their peers and the comparison of their own experience with those in other organizations. The models presented will serve as a guide to those who wish to investigate the feasibility of converting to a computer-based personnel management information system. The discussion of advantages and disadvantages associated with personnel systems will also facilitate a feasibility study.

In relation to field of Industrial Relations, nothing can be so vital as using the most powerful tool available for areas such as manpower planning, recruitment and selection, training and development, compensation and benefits, and labor relations.

An example of the use of information from a computerized personnel management information system is turnover analysis. A good exit interview contains many pieces of data but, due to time and other pressures, an analysis may never be done or, if it is done, it may be cursory. With a computer, a thorough turnover analysis can be done for not just one but for all positions by departments and divisions in the organization. The analysis may point out reasons why employees leave, demographic characteristics (male or female, young or old, skilled or unskilled, white-black-Spanish surnamed), or what type of

companies the employees prefer. These types of analyses would be hopeless without the aid of a computer.

Furthermore, once the analyses are done, they can be used in manpower planning.⁸ Perhaps for the first time, the personnel department will have this type of information. In every personnel subfunction there are hundreds of possible uses of computers. Part of this report's significance for the Industrial Relations field will be the discovery of some of the best uses for the computer in solving some of the problems of Industrial Relations.

⁸Glenn A. Bassett and Harvard Y. Weatherbee, Personnel Systems and Data Management (American Management Association, 1971), pp. 196-197.

C H A P T E R II

LITERATURE REVIEW

This chapter reviews literature that deals with various aspects of computerized personnel systems. The first topic covered includes surveys that examine the areas of personnel which are computerized and the extent to which this computerization has progressed. Literature dealing with procedures for converting from a manual to computerized system is then reviewed. Secondary sources illustrating examples of company personnel systems, skills inventories, and manpower planning are then examined. The next section reveals the relative cost and benefits of operating a computerized personnel system as well as models of systems proposed by several researchers. Finally, a survey of textbooks is included to ascertain the extent to which academics have been able to report latest advances in personnel computer usage.

Surveys of Computer Use by Personnel Departments

The first important signs that personnel departments were beginning to discover and use computers arose in 1966. Surveys of actual and planned usage, from 1966 to 1973 will be discussed. Through this discussion, a sense of the

progress personnel has made in both applying and realizing the need for computers will be provided.

Cassidy survey. Cassidy asserted that there were three waves of computer applications. Accounting was the first discipline to employ electronic data processing, followed by manufacturing, purchasing, inventory control and engineering, and finally, personnel.¹ He sent a questionnaire to 100 randomly selected companies from a Fortune 500 listing, in order to investigate personnel usage of electronic data processing. Seventy responses were received that can be grouped into four general areas.²

The first area was Present Use and Value. The results showed an 89 per cent usage rate, with 77 per cent claiming EDP to be "very useful" and 23 per cent claiming it to be "of some use". No respondents said EDP was not useful.³

The second general category was the specific uses of electronic data processing in personnel. No actual uses were actually elicited, but the personnel sub-functions which were using an electronic data processor were found. The study also asked for the preferred location of EDP.

¹Charles E. J. Cassidy, "Electronic Data Processing and the Personnel Function: The Present and the Future," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Robert D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), p. 5.

²Ibid., p. 6.

³Ibid., p. 6.

The findings of this part of the survey are tabulated in Table II.1.

TABLE II.1

SPECIFIC USES OF EDP IN PERSONNEL
(per cent of respondents)

	EDP is now used.	The use of EDP is planned for the future.	EDP may be useful but don't plan on using it.	Don't believe EDP useful.	No Comment.
Employment and Recruiting	25	25	30	10	10
Wage and Salary	78	12	3	6	1
Fringe Benefits	69	10	11	3	7
Safety	8	20	44	17	11
Records	75	20	3	1	1
Labor Relations	27	20	22	17	14
Medical	24	20	38	13	5
Appraisal	24	27	21	18	10
Promotion	32	35	23	7	3
Skills Inventory	39	49	9	2	1
Management Development	27	39	20	6	8
Training	20	24	38	11	7
Manpower Planning	28	48	17	4	3
Applied Research	35	23	25	4	13

Source: Charles E. J. Cassidy, "Electronic Data Processing and the Personnel Function: The Present and the Future," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Robert D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), p. 6.

By adding present and future categories, the priority personnel departments that had their personnel functions computerized were: (1) Records, (2) Wage and Salary (including payroll), (3) Skills Inventory, (4) Fringe Benefits, (5) Manpower Planning. Note that Skills Inventory and Manpower Planning areas were still not widely computerized. The lowest priority was in training, safety, and medical categories.⁴ Section three of the survey asked if personnel people felt the use of data processing would increase; over 90 per cent answered positively.⁵ When asked the last question, whether personnel practitioners would actually need to have a hands-on knowledge of data processing, almost three-quarters of the respondents felt that this would not be required. Table II.2 points out that personnel people desire the computerization of records and payroll but do not desire the necessary knowledge of actual implementation.

⁴Ibid., p. 7.

⁵Ibid., p. 7.

TABLE II.2

EDP KNOWLEDGE REQUIRED BY PERSONNEL PEOPLE
TO OPERATE A PERSONNEL COMPUTER SYSTEM

	(per cent)			No Comment
	Yes	No	Can't Estimate	
A. A general knowledge of data processing?	92	4	3	1
B. A specific knowledge of data processing (e.g., an ability to program, knowledge of running machines)?	7	74	6	13

Source: Charles E. J. Cassidy, "Electronic Data Processing and the Personnel Function: The Present and the Future," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Robert D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), p. 7.

Bueschel Survey. In 1966, Bueschel's survey had two parts. One queried current and future uses of electronic data processing in personnel departments, the other attempted to uncover present and future applications of real-time systems in personnel.

Two hundred and two diverse organizations were contacted, including government agencies, non-profit institutions and industrial corporations. Eighty-nine organizations completed the questionnaire for a response rate of 44 per cent. Bueschel also talked with several users or potential users of real-time systems. The

questionnaires and real-time participants is reported in Appendix A.

The size of the firms that participated averaged between 2,000 to 10,000 employees.⁶ Table II.3 gives the actual breakdown.

TABLE II.3
SIZE OF FIRMS IN BUESCHEL SURVEY

Size of Firm	Number	Per Cent
Fewer than 500 employees	6	6
500-1,000 employees	6	6
1,000-5,000 employees	24	28
5,000-10,000 employees	26	30
10,000-25,000 employees	17	20
More than 25,000 employees	10	10

Source: Richard T. Bueschel, "EDP and Personnel," AMA Management Bulletin No. 86 (New York: American Management Association, Inc., 1966), p. 17.

An examination of the totals gives the impression that personnel departments were actively engaged in computer usage; but, when the data were broken down, some interesting facts emerged. Although two-thirds of the survey participants currently used data processing for personnel functions, one-third of these were using

⁶Richard T. Bueschel, "Real-Time Data Processing for Industrial Relations," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Robert D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), p. 9.

electronic accounting machines. Most companies used tape computers with a few employing disk or drum types. Secondly, about 75 per cent used the computer for specific areas. The computer was not used throughout the personnel function.⁷

The computer was applied most frequently in the following areas: employee records, wage and salary administration, (compensation and fringe benefits), and skills inventories. Areas of limited usages were testing, attendance, personnel research, medical and safety. These results which closely parallel Cassidy's can be considered accurate for the time period.

Bueschel was able to arrive at the cost in converting from a manual to a computer system, which Cassidy failed to obtain. From the six firms that gave figures, the average was \$15.00 per employee. Nine companies gave operating costs. The average cost, which includes machine time, was \$5.50 a year for each employee.⁸

Some of the specific uses gathered from the survey were included in the report apparently to explain the mechanics of computer use and the help it could provide to those who did not understand. The examples are from different types of organizations as shown by the following

⁷Ibid., p. 5.

⁸Greenlaw and Smith, p. 10.

example. A manufacturing company collected data specifically relating to labor relations. An automobile company developed a file for its 50,000 salaried employees. The file included information such as date of hire, position, salary, and insurance data. Attendance figures were stored by a bank. The computer was used by an electronics firm to generate over thirty reports. SPARTAN (System for Personnel Automated Reports, Transactions, and Notices) was designed by the Bureau of Census to automatically prepare and address employee reports to be sent to managers. A machine shop with fewer than 800 employees rented a computer to compare its labor costs with the prevailing local market norm. The last example was from a mining company that developed a skills inventory to keep track of over 1400 professionals in its over 100 locations.⁹

The second part of the Bueschel report concentrated on real-time uses. Time-shared real-time was the use which Bueschel would like personnel departments to attain. Three prime examples were given in the study and will be described in the following sections.

Skills inventory. An aerospace division with eight plants of a large corporation employed roughly 25,000 people, many of whom were engineers and scientists. Because

⁹Bueschel, pp. 6-7.

of numerous shifts in government contracts, it was necessary to be able to identify key engineers and technicians in order to satisfy government requirements of a short profile of people who would be working on the proposed contract. Another effect of frequent changes in government contracts was the constant cutback in one plant with perhaps increases in another. The main purpose for the installation of a real-time skills inventory program was the balancing of the personnel requirements of the eight plants, depending on their need and identify key people for inclusion in a listing of profiles. A side benefit of the skills inventory was in its ability to identify promotable persons.¹⁰ Thus, the skills inventory accomplishes three tasks: (1) match the need for scientists and engineers with the supply; (2) identify key people for inclusion in government R and D contracts; and, (3) search for those people whose qualifications show them to be promotable.

The skills inventory system works as follows:

Twenty different qualifications for each employee are maintained on the computer's file. A list of terms that apply to each qualification is used. The entire list is entered onto disc files against each qualification. The employee identification number of each employee who fits the list term for each of the 20 qualifications is entered beside the term description. To use the skills inventory, the computer's files are searched by table look-up. The

¹⁰Bueschel, p. 12.

file is dumped onto tape once a week; additions, deletions, or changes are merged; and the file is reloaded. The users of the skills inventory system are at plant locations up to 3,000 miles away from the computer installation. Access to the file is gained through one of 12 teletypewriters in use in the various plants; however, the personnel departments control access to the information on the file.

The system is programed to indicate the number of candidates who meet the qualifications entered by teletypewriter by the inquiring personnel department. The identification numbers of only the first ten qualified employees will be listed. The remainder, if any, will be listed upon request. Once the employee number is located, the full resume information can be found on microfilm, from which hard copies can be produced. The microfilmed resumes are in sequence by identification number; on a weekly basis new reels of tape are sent out to each plant location. Forms for loading the information are filled out at the plant and sent to a central location for loading onto the computer file and microfilming.¹¹

Problems with the application were: (1) only employee numbers were produced from the search; (2) because of the microfilm cycle the file was always at least one week old; and, (3) the system was costly.¹²

Employment. The College Placement Council (CPC), a non-profit association with headquarters at Lehigh University, developed a system similar to a private organization's skills inventory. Their GRAD system was operational in February, 1966,¹³ and had time-sharing ability. The purpose of GRAD was the placement of alumni

¹¹Eveschel, p. 9.

¹²Ibid., p. 9.

¹³For a more recent report on the improved GRAD system, GRAD 2, see: "Computers Job Hunt for Undergrads," Business Week, February 27, 1971, p. 123.

from more than 1,000 colleges and universities. Over 5,000 industrial members of the CPC could use the system for a slight charge. The cost to the employer was 50 cents for each minute he was connected with the GRAD system plus normal telephone charges and \$2.00 for every requested resume. The charge to an applicant was a flat \$10.00.¹⁴ The steps involved for the applicant and the employer are shown in Exhibit II.1.

Bueschel pointed out the potential use of a system similar to GRAD, to the United States Employment Service, and, in fact, within two or three years of the introduction of GRAD, the first JOB BANK was operational.¹⁵ Contrary to his claims that private employment agencies would be hurt by a system like GRAD or a federal-state system like GRAD, private employment agencies jumped on the bandwagon and

¹⁴Bueschel in Greenlaw and Smith, p. 13.

¹⁵See W. Norlund, "Computerized Job Matching Systems," Labor Law Journal, Vol. 23, No. 9 (August, 1972), pp. 480-486; for a complete historical review of the federal and state efforts to develop the JOB BANKS concept. Also see, Samuel H. Cleff and Robert M. Hecht, "Computer Job/Man Matching at Blue-Collar Levels," Personnel, Vol. 48, No. 1 (January-February, 1971), pp. 16-29; and Cleff and Hecht, "Job/Man Matching in the '70's'," Datamation, Vol. 17, No. 3 (February 1, 1971), pp. 22-27; for a description of a joint federal-private industry skills inventory program.

EXHIBIT II.1

GRAD APPLICANT AND EMPLOYER
SEARCH SEQUENCE

-
1. An applicant contacts a Placement Office and obtains and completes a resume form which he forwards to CPC Headquarters along with \$10.00.
 2. The CPC staff assigns a reference control number to the resume, and upon review for completeness, using a prepared thesaurus, selects the pertinent descriptions that describe the applicant's capabilities.
 3. This data is then transmitted by teletype directly to the computer located less than 100 miles away.
 4. The resume is then microfilmed at CPC onto aperature cards and may be automatically retrieved and reproduced as hard copy.
 5. CPC and authorized employers are able to conduct a remote search of the file by means of a teletypewriter. By following prescribed format and utilizing the thesaurus, they submit the requirements of the open position.
 6. The computer searches the file of applicants, and transmits the control numbers of those applicants who possess the required qualifications.
 7. After receiving the number of applicants who meet with the position specifications and the control numbers, employers, using the teletypewriter, indicate which resumes they want to review.
 8. The message is automatically sent to CPC headquarters on a receive-only teletype.
 9. The CPC staff locates the resumes which are filed by control number, produces them for microfilm, and forwards them to the requester for his further review and action. Action taken by the employer is fed back to the Placement Office.
-

Source: Richard T. Bueschel, "Real-Time Data Processing for Industrial Relations," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Robert D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), p. 14.

several time-shared systems are used by private employment agencies.¹⁶

Manpower planning. A chemical corporation was used to demonstrate the uses of computers in manpower planning. The company bought time from a university and received its results on a real-time basis. The company used the personnel data in determining sales value added per employee, which was broken down by location, activity, and employee classification. Profit per employee, capital expenses per employee and turnover and retirement analyses were also analyzed.¹⁷

The Bueschel study was an optimistic, if not evangelical, attempt to encourage personnel departments to use computers, including time-shared real-time ones. Among the other conclusions reached, Bueschel asserted that personnel departments would become more important to companies because of these new opportunities for providing more services. There were claims that real-time computers could help by increasing employee motivation, reducing

¹⁶A description of private employment agencies' time-shared systems can be found in: J. D. Haselton, "EDP and Employment Agencies; How Are They Related?" Computers and Automation, Vol. 16, No. 10 (September, 1967), p. 23; E. Myers, "Head Hunting By Computers: The Bugs Are There But So Are The \$," Datamation, Vol. 16, No. 5 (May, 1970), p. 169; "National Job Bank for Private Industry," Personnel Journal, Vol. 50, No. 10 (October, 1971), p. 802; "Computer Matches Applicants to Job," Office, Vol. 70, No. 6 (December, 1969), pp. 50-51.

¹⁷Bueschel, p. 11.

under-utilization of employee skills, eliminating managerial obsolescence and other problems. If all of these claims had not been substantiated, certainly Bueschel's comment was true that, "By 1970, it will be hard for even the most conservative personnel department to avoid the impact of the computer."¹⁸

Lanham Survey. Three hundred and thirty-three companies, half manufacturing and half non-manufacturing, located throughout the United States with more than 250 employees were used by Lanham for her 1967 survey of current procedures and practices in the processing of personnel records and reports.¹⁹ Her results are described below.

Extent of utilization. The difference between actual and ideal uses was significant. Of 333 companies, only 35 had no plans to use EDP. But 94 said they did not intend to computerize any personnel records or reports. Ninety-seven firms stated that they had plans for electronically processing personnel records. Thus, less than half of the companies actually used EDP.²⁰

Reasons for utilization. The reasons for installing a computer system were, for the most part,

¹⁸Ibid., p. 16.

¹⁹Elizabeth Lanham, "EDP in the Personnel Department," Personnel, Vol. 44, No. 2 (March-April, 1967), p. 16.

²⁰Ibid., p. 17.

either for receiving better and faster information or to cut costs. The ten major reasons cited are listed below:

1. To expedite record and record preparation.
2. To provide facts quickly.
3. To improve quality and timeliness.
4. To provide for rapid and accurate classification and reclassification of data.
5. To establish systematic and efficient procedures.
6. To provide more comprehensive data.
7. To improve over-all control.
8. To permit cross-comparisons of inter-departmental data.
9. To reduce costs.
10. To improve long-range planning.²¹

Administrative arrangements. The personnel director in most cases was responsible for the control of the personnel EDP system, although computer center EDP specialists were given control in a few cases. EDP equipment representatives were used in some firms for planning and designing their system. Rarely was the computer actually located in the personnel department; usually it was located in the computer center unless the firm used a service center.²²

Personnel for the EDP system. The introduction of a computer rarely reduced the size of the personnel department staff, although there were cases in which it did. The personnel who were to run the computers usually came from within the personnel department, and only about

²¹Lanham, p. 17.

²²Ibid., pp. 17-18.

one-half of all companies needed extensive special training for the employees who were to work with the new EDP system.²³

Training for personnel EDP. Most training for the operation of a computer system was done in-house by company training staff. The majority of the training consisted of on-the-job-training. Only one to three months was usually required by the trainees to learn their new responsibilities.²⁴

Computerized records, reports. The reports and records that were computerized were numerous and included: employee history cards; test score analyses; male and female differentiation; skills inventories; attitude surveys; termination analyses; absenteeism and tardiness records; merit rating results; tallies of suggestions and grievances classified by individuals, departments and divisions. Education, experience and safety and health records were also kept.

However, payroll data were the most frequently mentioned use of computers. Gross income, employee personal deductions and Old Age and Survivors Insurance were most frequently listed as being on a computer program. Other records reported were:

²³Ibid., pp. 18-19.

²⁴Lanham, pp. 19-20.

Payroll registers, cumulative payroll costs, individual employee payroll records, labor cost distribution, salary payroll, overtime earnings, day or hourly payroll, pension recipient records, fringe benefits records, average wages or salaries, wage survey data analyses, profit sharing and bonus reports, commission earnings, sick leave costs, incentive earnings, and illness and accident costs.²⁵

EDP cost aspects. Lanham reported that most firms kept close cost figures and audited the computer system to gather data on four main areas of EDP costs. These are as follows: machine hours, programming, man-hours on machines, and selection and designing costs. Half of the firms reported cost savings with an EDP system. The rest reported either no cost savings or higher costs. The main area of savings was in salaries.²⁶

The major problem involved in running a computerized personnel system was the accuracy of input information. More accurate data and faster results were mentioned as the advantages of an EDP system. Like the two previous studies, Lanham noted the gap between what could be done and what was being done to computerize the personnel department.

Mayer Survey. By 1970, computers were being used by an increasing number of personnel departments. However, the same confusion relating to questions of the means, the

²⁵Lanham, p. 21.

²⁶Ibid., p. 21.

reasons, and the feasibility of computerization still existed. Mayer did a mid-1970 survey of 375 randomly selected U.S. corporations to provide some answers to these problems.²⁷

The difference between what was computerized and what was in the planning stages of computerization was again apparent. As Table II.4 illustrates, personnel did not have priority for company computerization. Not only was the priority low, but its priority did not improve, judging by the five-year projections. The emphasis within personnel was on records and compensation, as shown in Exhibit II.2. Each of the five sub-functional areas of personnel will be discussed.

²⁷Steven J. Mayer, "EDP Personnel Systems: What Areas Are Being Automated?" Personnel, Vol. 48, No. 4 (July-August, 1971), pp. 29-36.

TABLE II.4
PRESENT COMPUTER USAGE AND FUTURE USAGE

<u>Functional Areas</u>	<u>Aggregate Numerical Rankings</u>	
	<u>Today</u>	<u>5-Year Projection</u>
Controller-accounting	1.6	2.3
Production-manufacturing	3.4	3.0
Production/material control	3.6	3.1
Sales and marketing	3.7	3.3
Personnel	4.5	4.5
Engineering	4.9	5.3
Research and development	5.5	4.6

Source: Steven J. Mayer, "EDP Personnel Systems: What Areas Are Being Automated?" Personnel, Vol. 48, No. 4 (July-August, 1971), p. 32.

EXHIBIT II.2

DEGREE OF FULL COMPUTER IMPLEMENTATION
BY FUNCTIONAL AREA

Functional Area	Degree of Implementation
Records administration	High
Compensation	
Manpower development	
Employment	
Labor relations	Low

Source: Steven J. Mayer, "EDP Personnel Systems:
What Areas Are Being Automated?" Personnel, Vol. 48, No. 4
(July-August, 1971), p. 32.

Records administration. The emphasis here was on the present which means current data (wage rate, job classification), not historical data (education, work history); historical data involve more storage and retrieval problems. Thus, as pointed out in Table II.5, payroll services had the highest importance and only about one-third of the firms did salary forecasting, which requires historical information.²⁸

TABLE II.5
COMPUTERIZED RECORD SYSTEM IMPLEMENTATION

Type of System	Degree of Implementation
Payroll services	89%
Internal salary comparisons	58%
Salary action audits	41%
Salary forecasting	35%

Source: Steven J. Mayer, "EDP Personnel Systems: What Areas Are Being Automated?" Personnel, Vol. 48, No. 4 (July-August, 1971), p. 32.

²⁸Ibid., p. 31.

Compensation. Table II.6 illustrates the degree of incorporation within a data bank of compensation application. Mayer stated that there was a trend toward more integrated compensation EDP systems, but, as noted elsewhere, this integration was not in existence, but in the planning stages.

TABLE II.6

TYPES OF DATA UTILIZED WITHIN
THE COMPENSATION FUNCTION

Type of Data	Degree of Implementation
Classification mix	59%
Pension planning	51%
Labor costing	38%
Insurance claim	35%
Salary survey	29%
Job evaluation	23%

Source: Steven J. Mayer, "EDP Personnel Systems: What Areas Are Being Automated?" Personnel, Vol. 48, No. 4 (July-August, 1971), p. 32.

Manpower development. Employee data were in 84 per cent of the computerized personnel management information systems surveyed.²⁹ Almost half the respondents had implemented skills inventories or educational profiles as seen by Table II.7, but the more difficult task of manpower forecasting was accomplished in only 29 per cent of the firms.

TABLE II.7

PERCENTAGE OF MANPOWER DEVELOPMENT DATA
IMPLEMENTED IN COMPUTER DATA BASE

Type of Application	Degree of Implementation
Educational resources	49%
Skills inventory	48%
Manpower forecasting	29%
Backup/replacement charting	10%
Organization charting	5%

Source: Steven J. Mayer, "EDP Personnel Systems: What Areas Are Being Automated?" Personnel, Vol. 48, No. 4 (July-August, 1971), p. 33.

²⁹Ibid., p. 34.

Employment. Only turnover analysis was being done to any appreciable extent; not even half the respondents were doing even this type of analysis. According to Table II.8, college relations results, applicant data retention and positive openings data were not even considered to be desirable by about 40 per cent of the organizations surveyed.

TABLE II.8

PERCENTAGE OF EMPLOYMENT DATA USES FOUND
AND NOT FOUND IN COMPUTER SYSTEMS

Type of Application	Degree of Implementation	No Intention of Implementing
Turnover analysis	49%	16%
College relations results	19%	38%
Applicant data retention	16%	36%
Position openings data	14%	40%

Source: Steven J. Mayer, "EDP Personnel Systems: What Areas Are Being Automated?" Personnel, Vol. 48, No. 4 (July-August, 1971), p. 33.

Labor relations. Similar to previous surveys, labor relations had a low priority by personnel departments to be computerized. Table II.9 shows almost total agreement among reporting firms against the computerization of labor relations data.

TABLE II.9

DEGREE OF LABOR RELATIONS DATA IMPLEMENTED
IN COMPUTER SYSTEMS

Type of Application	No Intention of Implementing
Employee disciplinary record	92%
Grievance record data	84%
Suggestion program	80%
Attitude/morale survey data	63%

Source: Steven J. Mayer, "EDP Personnel Systems: What Areas Are Being Automated?" Personnel, Vol. 48, No. 4 (July-August, 1971), p. 33.

The most important variable in getting top management acceptance for computerizing the personnel department was the demonstration of a cost savings. When asked to rank the seven variables listed in Table II.10, costs vs. benefits had the highest priority. The ability to show quantitatively that there will be cost savings and top management support were the most important variables that affect the decision to attempt computerization. Mayer found employee population size and industry type did not play a large part in the decision. However, there was some

data to show life insurance more computerized than the retailing and transportation industries.³⁰ Union or employee resistance was believed to be negligible. If computerization was done with tact and understanding, there was little chance that employees would sabotage the system.

TABLE II.10
VARIABLES THAT AFFECT COMPUTER ACCEPTANCE

Variable	Rank Position
Cost vs. benefit	2.3
Top management viewpoint	2.5
Employee population size	3.5
Present computer capability	3.6
Personnel staff size	4.4
Type of industry/business	5.0
Union/employee resistance	6.8

Source: Steven J. Mayer, "EDP Personnel Systems: What Areas Are Being Automated?" Personnel, Vol. 48, No. 4 (July-August, 1971), p. 33.

Tomeski and Lazarus Survey. The purpose of the Tomeski and Lazarus study was to determine the progress made by personnel departments in applying the computer to the personnel function. The survey was finished in 1973. Questionnaires, correspondence, and field visits with 87 organizations supplied the data. Nine federal departments, 22 states, 15 counties, 22 cities, and 17 private

³⁰Ibid., p. 31.

organizations were used. Only densely populated counties and cities and Fortune 500 companies were contacted.³¹

Similar to the Lanham survey, it was found that the computer used by the personnel department was under the physical authority of another department, either financial, administrative, or computer services. However, by 1973, all organizations used a computer. There was a culmination of a trend first reported in the Cassidy survey; personnel applications still lagged behind other functional areas. Mayer reported the same findings. Therefore, it can be concluded that as late as 1973, personnel departments were still not taking advantage of the potential uses of the computer.

Another finding of the Tomeski and Lazarus survey was that the highly routinized data such as payroll benefits and other financial information, for example payroll and budgets, had been computerized. Non-standardized data exemplified by manpower planning and collective bargaining were lagging behind.³² Table II.11 indicates that, after the routine functions of payroll records and reports, employee benefit records and reports, personnel statistics and reports, and personnel budget and accounting were put

³¹Edward A. Tomeski and Harold Lazarus, "Information Systems in Personnel," in Journal of Systems Management, Vol. 24, No. 9 (September, 1973), p. 39.

³²Tomeski and Lazarus, p. 39.

into a computer program, the percentage for the other areas declined dramatically.

TABLE II.11

STATUS OF COMPUTER APPLICATIONS IN
THE PERSONNEL DEPARTMENT

Computerized Information	Private Sector
Payroll records and reports	100%
Employee benefit records and reports	76%
Personnel statistics and reports	81%
Position statistics and reports	77%
Pay statistics and reports	91%
Medical statistics and reports	29%
Recruiting lists and analysis	10%
Test scoring	10%
Skills inventory	48%
Performance evaluation	24%
Work scheduling	29%
Personnel budget and accounting	76%
Collective bargaining reports	38%
Manpower planning reports	39%

Source: Edward A. Tomeski and Harold Lazarus, "Information Systems in Personnel," Journal of Systems Management, Vol. 24, No. 9 (September, 1973), p. 40.

The use of a computer can be questioned when looking at the area of manpower planning. As Table II.12 shows, there was serious doubt in the minds of personnel administrators as to the ability of the computer to aid in the manpower planning effort. Table II.12 is especially

interesting because, according to the responses, mathematical models seemed to be ruled out of any manpower planning program.

TABLE II.12

MATHEMATICAL MODEL USED FOR MANPOWER PLANNING

	Yes	No
Federal	14%	86%
State	10%	90%
County	0	100%
City	0	100%
Private sector	14%	86%

Source: Edward A. Tomeski and Harold Lazarus, "Information Systems in Personnel," Journal of Systems Management, Vol. 24, No. 9 (September, 1973), p. 41.

When asked for their opinion of the value of the computer, personnel directors stated the following values:

1. Faster availability of reports.
2. Absorption of increasing workload without comparable increases in staff.
3. Some reduction in clerical costs.
4. Improved accuracy of reports.
5. Freedom of staff from routine work, therefore, greater availability of staff for more important duties.
6. Generates information not before available.³³

This list is consistent with all of the past surveys covering almost ten years. Yet, even after all of this

³³Ibid. p. 41.

time, the following problems were cited which were mentioned in previous surveys:

1. The long period of time it took to develop systems, produce operational computer programs and modify existing computer programs.
2. The low priority given to personnel applications (both for developing new computer applications and for obtaining output of existing applications).
3. Output reports were sometimes unreliable because input data were inaccurate.
4. Communications barriers between computer technicians and personnel staff.
5. The high cost of computerization.³⁴

Thus, despite the growth of computerized personnel systems, they not only were lagging behind other areas, they were:

(1) not completely accurate; (2) too expensive; and, (3) not utilized. The friction between the personnel and computer staff was also a serious problem. The integrated personnel information system which helped in decision-making was not evidenced in the most recent survey.

Conversion to a Computer System

Some personnel managers have become aware of the possibility of using the computer through a number of means such as journal articles, conferences, and books. The problem lies in the method of implementation of a computerized personnel information system. In this section, several articles and books on the general topic of the conversion from a manual to a computer system will

³⁴Ibid., p. 41.

be examined. Because the literature changes in approach with the passage of time, the information will be discussed as it developed in time.

The purpose of R. L. Martino's 1969 PMS--Personnel Management Systems was summarized in his words:

My message, therefore, to Personnel Directors and Managers is simply this: given free reign to your imagination regarding the service your department can provide your company. Then create and install a Personnel MIS.³⁵

The book was devoted to winning converts to this belief. One-half of the book explained the need of the personnel manager for the computer and the other half the manager's method of implementation. The steps outlined to create a personnel system were the following:

1. Define the problem--what is to be accomplished and what is not.
2. Select the technique to be applied in the systematic solution of the problem.
3. Program the system so that the user can operate it.
4. Install the system and debug it so that everyone has confidence that the system operates as we intended.
5. Evaluate the system in terms of the existing and the expected environment to ascertain that it is sufficiently responsive and flexible to serve the purpose for which it is intended.³⁶

Exhibit II.3 gives the stages of the personnel systems project. In addition, Martino developed Figure II.1, a

³⁵R. L. Martino, PMS--Personnel Management Systems (Wayne, Pennsylvania: Management Development Institute Publications, 1969), p. 153.

³⁶Ibid., p. 72.

EXHIBIT II.3

PERSONNEL SYSTEMS STAGES

		Awareness	
		Structure to investigate (people, procedures)	
		Set of objectives	
SETTING OF REQUIREMENTS	PROBLEM DEFINITION	Establish specifics	Data gathering
		--Existing	Decision patterns
		--Projected	Volumes & frequencies
		Management (Operating System	Outputs Decisions Organizational requirements
CREATION	SYSTEM DESIGN		Frequency of actions
		Computer System	Hardware selection Runs & their I/O
		Programming or Procedures (steps to perform)	
OPERATION	IMPLEMENTATION	Testing or Checking	
		Conversion or cut-over from existing system to new	
		Maintenance	
		Evaluation	

Source: R. L. Martino, PMS--Personnel Management Systems (Wayne, Pennsylvania: Management Development Institute Publications, 1969), p. 73.

FIGURE II.1

PERT/CPM ILLUSTRATION OF A GENERALIZED PLAN FOR DEVELOPING AND INSTALLING AN MIS

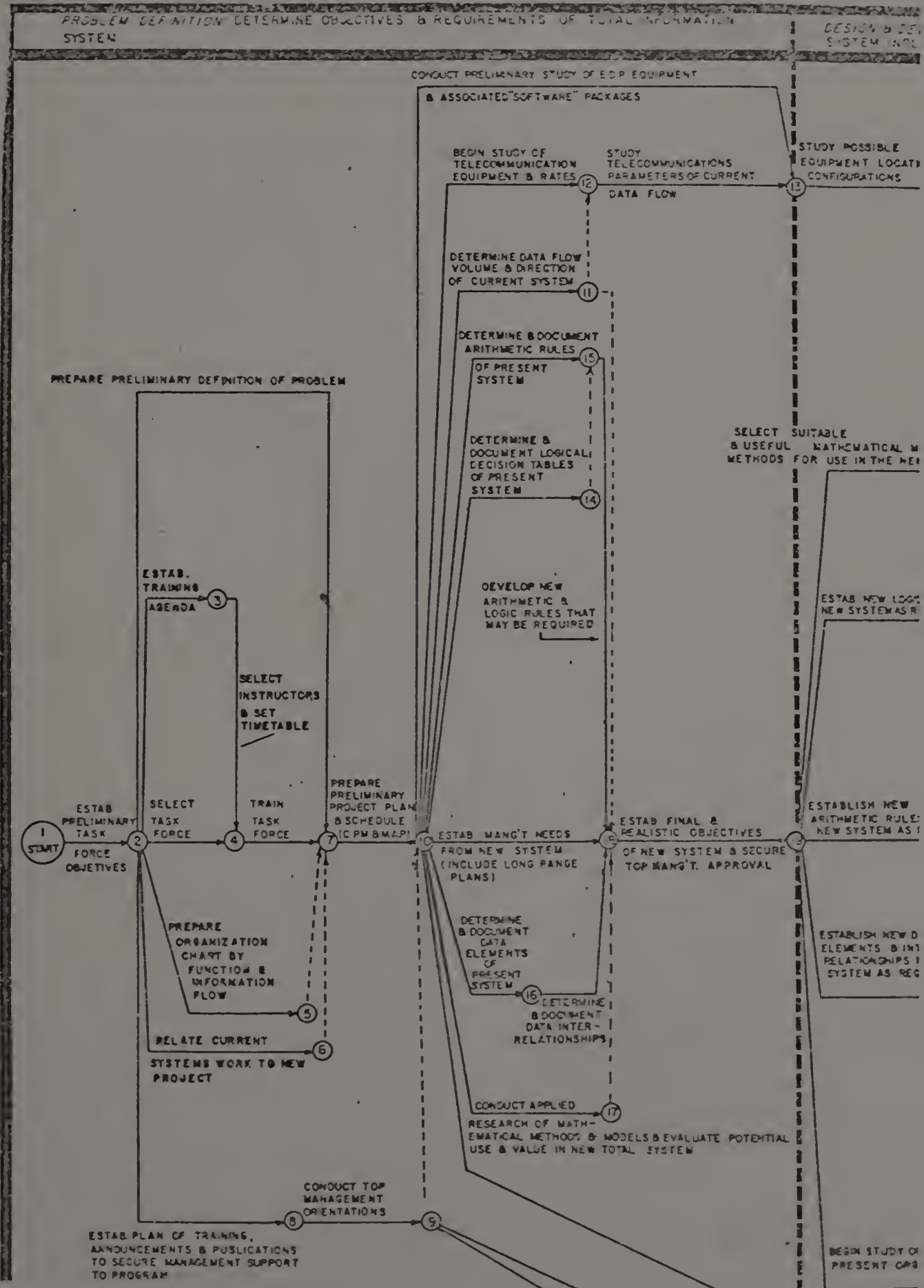


FIGURE II.1--Continued

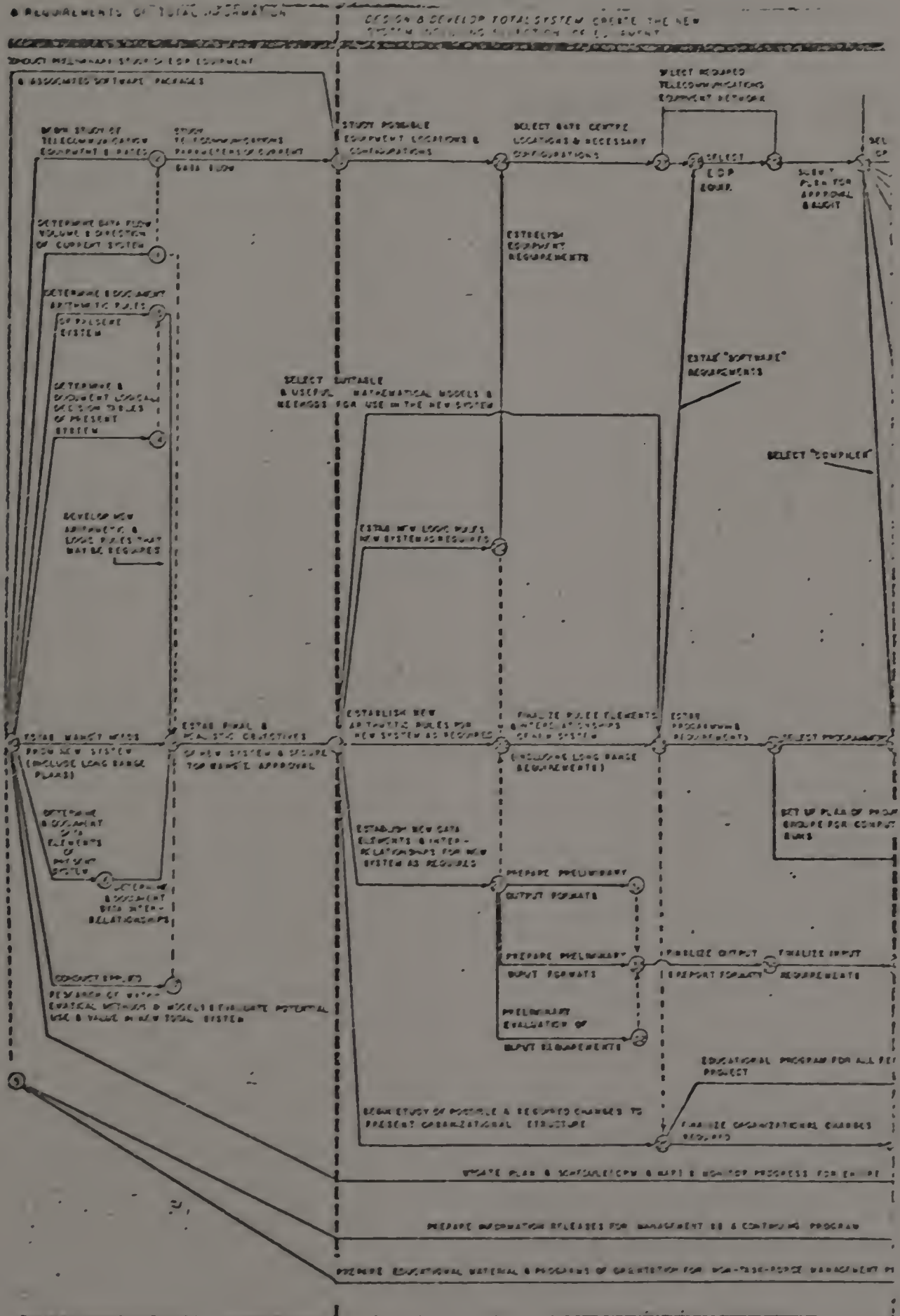
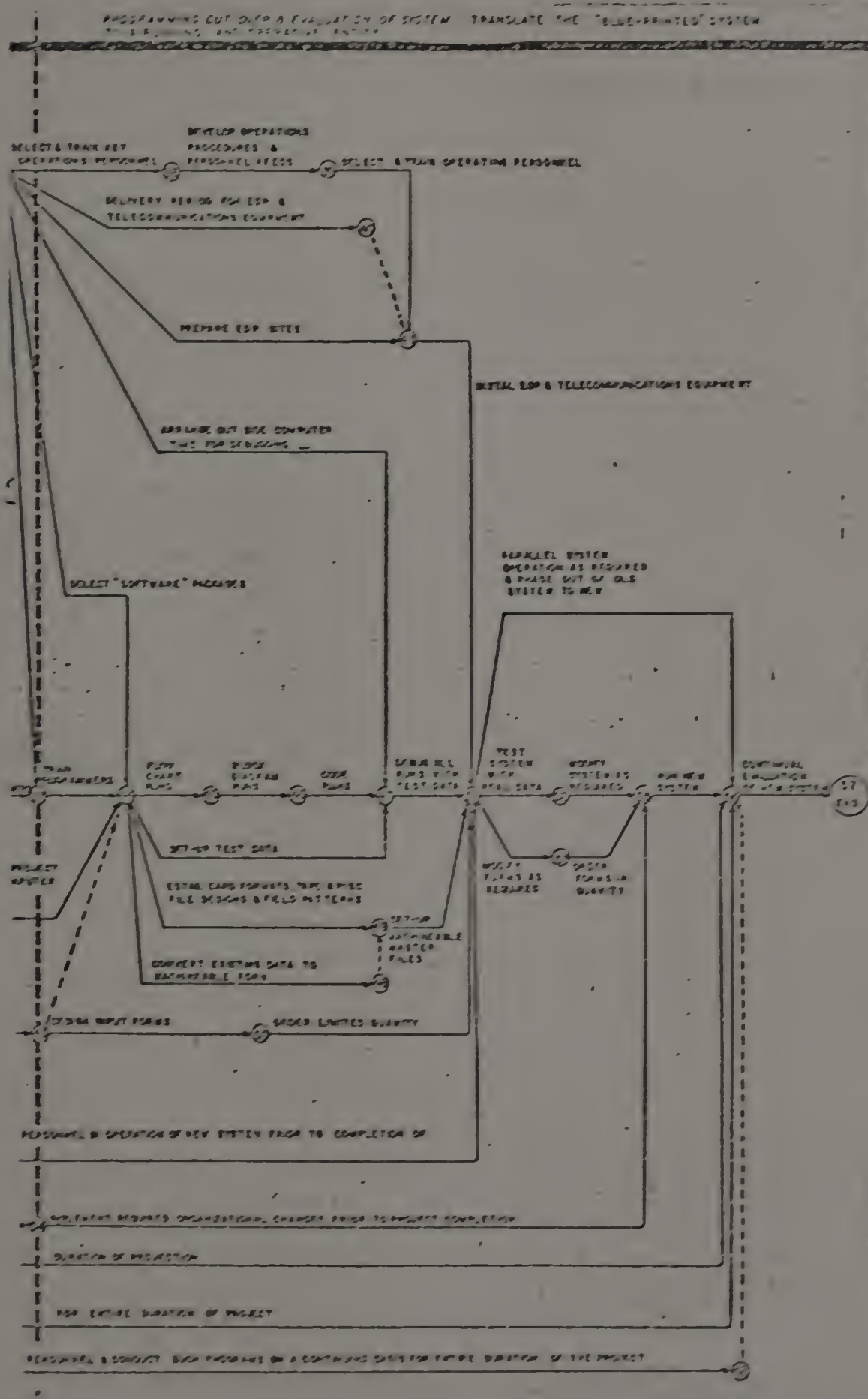


FIGURE II.1--Continued



Source: R. L. Martino, PMS--Personnel Management Systems (Wayne, Pennsylvania: Management Development Institute Publications, 1969), p. 87.

Pert/CPM diagram of a generalized plan for the installation of a personnel computer system.

Many personnel directors may have felt the need for a computerized personnel system but are not aware of the responsibility of trying to bring it into fruition. This lack of awareness could be the reason for a successful conversion. EDP experts or consultants were found wanting in Martino's opinion. The task force would include the top personnel officer, line members, and, perhaps, an outside consultant. After a period of one-and-a-half to two-and-a-half years, the system should be working.³⁷ Martino even included in his book a tentative schedule for the training of the task force members. This schedule is reproduced in Table II.13.

Howard focused on a personnel system designed for small organizations in particular.³⁸

He stated the reason for a computer system in the following manner:

The need is for a personnel system which is more than a data bank of information--one which produces reports and analyses needed to aid management in guiding and controlling the company's personnel in the short and long-term planning.³⁹

³⁷Ibid., pp. 117-118.

³⁸James G. Howard, "A Low-Cost Approach to Computerized Personnel Data Systems," Personnel Journal (September, 1969), pp. 702-706.

³⁹Ibid., p. 72.

TABLE II.13

PERSONNEL SYSTEMS TASK FORCE TRAINING SCHEDULE

WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
I	(1) Orientation and Objectives	(3) Systems Orientation, 3rd Generation and Real Time	(3) Systems Orientation and File Design	(4) Planning, Project Management and PERT/CPM	(5) Languages and Compilers
	(2) EDP review				(6) Field Trip to EDP site
II	(5) FORTRAN, COBOL and Languages	(7) Decision Tables	(7) TAS-PAC and Documentation	(8) OR Techniques Simulation and Higher Order Languages	(9) Produce Initial Mission Statement and Preliminary Planning Schedule

Source: R. L. Martino, PMS--Personnel Management Systems (Wayne, Pennsylvania: Management Development Institute Publications, 1969), p. 27.

Most personnel managers would agree with his comment, but the means of implementation seemed impossible. The answer, according to Howard, was in the payroll system. To prove it, he gave the example below in which only three forms were needed to turn a payroll system into a personnel system.

The payroll system of XYZ Petrochemicals, Ltd., is shown in Figure II.2. Job application and interview information were organized by the payroll department into the Payroll Status Sheet which was sent to data processing for payroll and a limited number of reports. Once a year, the payroll status sheet was updated with information from the annual performance review.⁴⁰

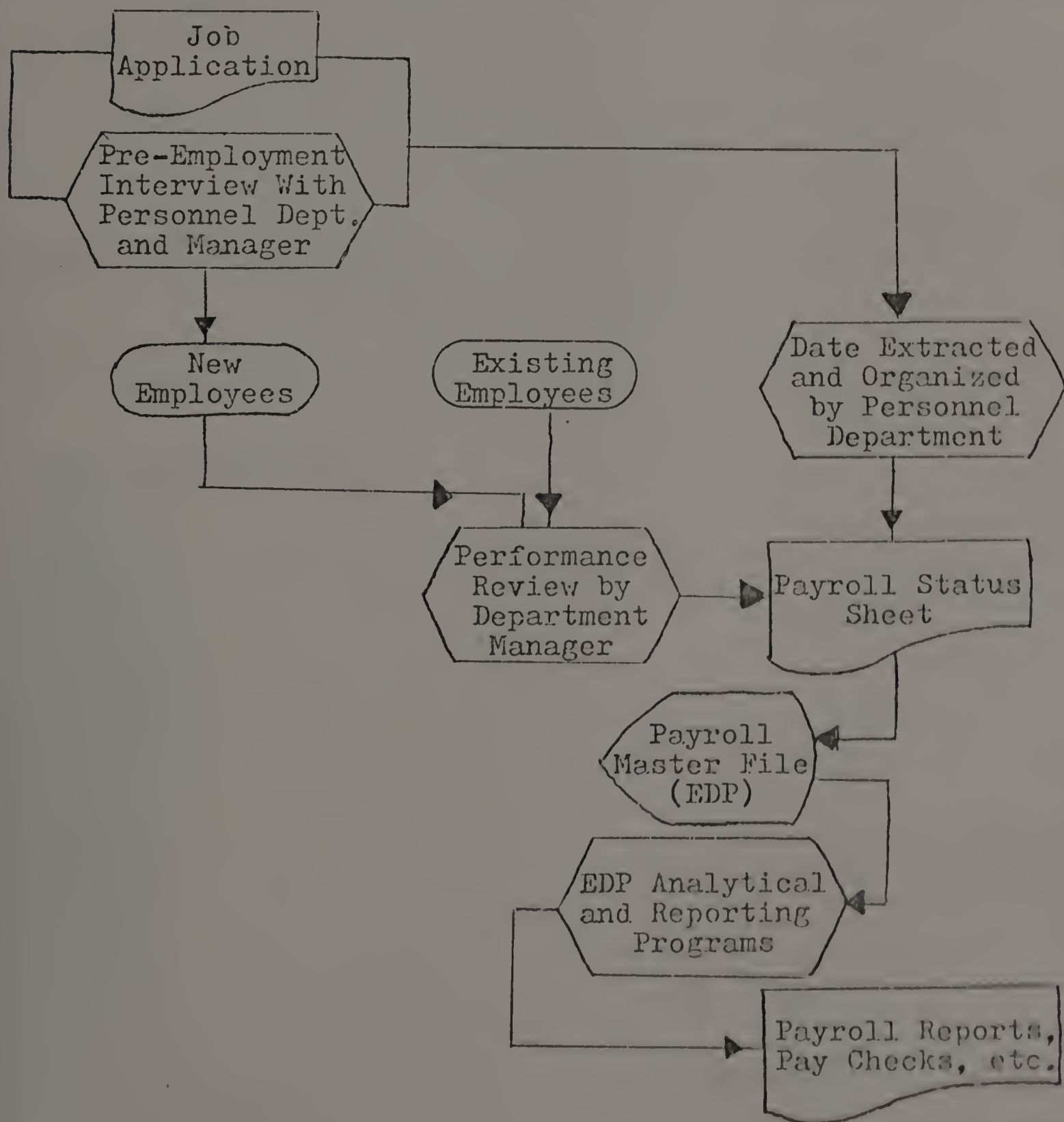
Figure II.3 is the new personnel system. No changes were done to any existing payroll forms or programs. The three new inputs were a Personnel Status Form completed by the personnel department and Employee Status Questionnaire done by the employee to generate personnel records and reports. The third form was the skills questionnaire to be used in a skills inventory.⁴¹ From these three forms, plus information gathered from the Payroll Master File, individual reports and skills inventory reports were produced whenever needed. A Salary Administration Report

⁴⁰Ibid., p. 72.

⁴¹Ibid., p. 705.

FIGURE II.2

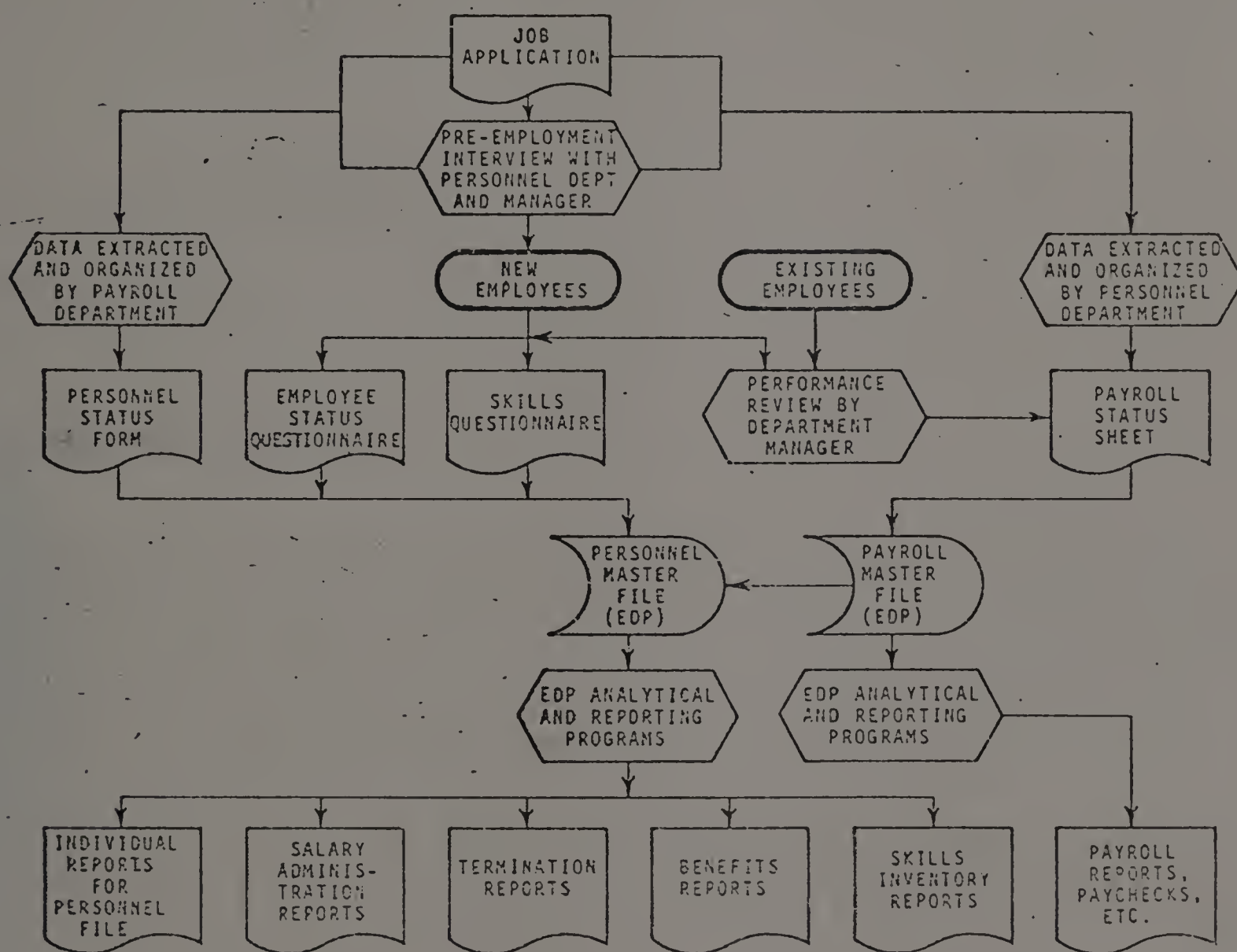
PAYROLL SYSTEM INFORMATION FLOW OF
XYZ PETROCHEMICALS, LTD.



Source: James G. Howard, "A Low-Cost Approach to Computerized Personnel Data Systems," Personnel Journal, Vol. 48, No. 9 (September, 1969), p. 704.

FIGURE II.3

COMBINED INFORMATION FLOW OF PAYROLL--PERSONNEL
SYSTEM OF XYZ PETROCHEMICALS, LTD.



Source: James G. Howard, "A Low Cost Approach to Computerized Personnel Data Systems," Personnel Journal, Vol. 48, No. 9 (September, 1969), p. 704.

which was generated monthly gave a salary breakdown by classification and department, a Termination Report of termination types per department, and a Benefits Report showing all benefits and insurance participation by present and past employees.⁴²

The need for personnel computer systems was still being argued in 1971 in an article by Mapp.⁴³ His article concentrated on Stage I of Figure II.4. Like Martino, Mapp argued for a task force approach using personnel systems staff, and, if necessary, an outside consultant. Also, like Martino, the need for a training period was indicated. The biggest question to be answered by the group concerned the question of whether a computer system was needed.⁴⁴

One key part of determining whether there were cost savings to be gained in computerizing was in the performance of a technique called Data-Element Explosion. This technique identified every piece of personnel data gathered by any department in the company. Every data element was coded so that a systems designer knew how many times each department used the data-element. Exhibit II.4 is the input mechanism employed to gather this information

⁴²Ibid., p. 705.

⁴³George A. Mapp, "Planning Information System Feasibility and Design Study," Personnel Journal, Vol. 50, No. 1 (January, 1971), pp. 28-34.

⁴⁴Ibid., p. 30.

FIGURE II.4

SYSTEM DEVELOPMENT STAGES

<u>Stage I</u> Study and Design		<u>Phase I</u> Understand Present System
<u>Stage II</u> Implementation		<u>Phase II</u> Determine Systems Requirements
<u>Stage III</u> Operation		<u>Phase III</u> Design New System

Source: George A. Mapp, "Planning A Personnel Information System Feasibility and Design Study," Personnel Journal, Vol. 50, No. 1 (January, 1971), p. 28.

EXHIBIT II.4

DATA-ELEMENT COLLECTION SHEET

RECORD-REPORT-FIELD DESCRIPTION SHEET				
Company Name: _____	Document Title: _____		Dept. of Origin: _____	
Type of Document: (circle one)	Record	Report	Both	
Frequency: (circle one)	Daily	Semi-monthly	Quarterly	
	Bi-weekly	As required	Semi-annually	
Obtainment: (circle one)	Manually	Computer	Keypunch	All
Time to Produce:	Clerical _____	Keypunch _____		
	Administrative _____	Machine _____		
	Managerial _____	Machine Type _____		
Total Number of Actions:	Per Year _____	Month _____	Week _____	Day _____
Elements of Data: (list)	_____			

Source: George A. Mapp, "Planning Information System Feasibility and Design Study," Personnel Journal, Vol. 50, No. 1 (January, 1971), p. 31.

which was called a Record-Report-Field Description Sheet. After the interview sheet was collected, the following analysis was done on the data element:

1. Area of origin, i.e., department, location, etc.
2. Frequency of use.
3. Type of record or report.
4. The amount of clinical time to produce the document's information.
5. Amount of machine time and machine type used to produce the document.
6. Number of times the document is used.
7. Annual cost of preparing the document.⁴⁵

The analysis performed to examine each department that had personnel information was:

1. All reports, records, and forms used by that department.
2. All data-elements or fields of data used by that department.
3. Number of times, and on which documents, each data field appears.
4. Amount of clerical time each department spends on each report.
5. Amount of machine time each department spends on each report.
6. Annual departmental cost for personnel information.⁴⁶

After the data-element-explosion had been done, the information obtained could be used in a systems design study of the proposed data base. The information about each data-element would appear in a configuration such as Exhibit II.5.

⁴⁵Ibid., p. 32.

⁴⁶Ibid., p. 32.

EXHIBIT II.5

DATA-ELEMENT IDENTIFICATION AND DEFINITION SHEET

Element Number	Element	Type Field	Field Length	Print	Definition
1.	Employee Number	N	5	yes	Employee Number will be used as FILE CONTROL NUMBER and will appear on all input cards in the system.
2.	Employee First Name	A	10	yes	First letter of first name must be in left-most position of field. For employees who use middle name as given name enter first initial and middle name in first name block, leaving middle initials blank (e.g., <u>J PHILLIP</u>)
3.	City	A	16	yes	Enter City name left-justified
4.	Home Telephone Number	A/N	10	yes	Enter Area Code and Exchange.
5.	EEO Classification	N	1	no	This code will be derived from 'JOB' Table.

EEO Compliance Group Code

1 Officials and Managers	6 Craftsmen (skilled)
2 Professionals	7 Operatives (semi-skilled)
3 Technicians	8 Laborers (unskilled)
4 Sales Workers	9 Service Workers
5 Office and Clerical	0 Trainee

Source: George A. Mapp, "Planning Information System Feasibility and Design Study," Personnel Journal, Vol. 50, No. 1 (January, 1971), p. 33.

Mapp's study is important in the development of a personnel computer study because it went beyond just explaining the need for a new system. It actually gave personnel managers a tool to use in an attempt at computerization. Contrasted to Mapp's article is one by Frank Marangell which gave no genuine clues to help in the computer design study.⁴⁷ Instead, it offered general criteria for selection of data to be included in the personnel data base. The only conclusion he reached was to act rationally; certainly more was needed than this obvious tool.

Bassett attacked traditional computer personnel systems because of their emphasis on input, not output. To improve this flaw, he recommended that personnel managers sort and list their records, perform more counts, and perform simple arithmetic-like ratios more frequently.⁴⁸ With Weatherbee, he wrote a book describing mainly General Electric's personnel computer system.⁴⁹ The book was published in 1972, but the need to convince personnel administrators of the need to computerize was

⁴⁷ Frank Marangell, "How to Establish a Human Resource Data Base," Personnel, Vol. 49, No. 1 (January-February, 1972), pp. 53-58.

⁴⁸ Glenn A. Bassett, "EDP Personnel Systems: Do's, Don'ts, and How-To's," Personnel, Vol. 48, No. 4 (July-August, 1971), p. 25.

⁴⁹ Glenn A. Bassett and Harvard Y. Weatherbee, Personnel Systems and Data Management (New York: American Management Association, Inc., 1971).

still noted. In this way, the book was similar to Martino's; however, it contained considerable detail. An example of this is seen in Exhibit II.6, which gives a partial listing of files in G.E.'s personnel office. Another is Table II.14, which lists the various types of information that can be included in a personnel system. Finally, in Appendix B are examples from the computer language the use of which they seemed to encourage, especially GEDAN (Generalized Data Analysis). The sections on the type of results that can be achieved using a computer system, including a skills inventory, are included later in the chapter.

Mapp discussed data-element-explosion technique and Bassett and Weatherbee examined flow-charting as a tool for computerizing the personnel function as shown in Figure II.5, and as shown in more detail by Figure II.6. After a thorough flow chart analysis, the personnel manager would be in a better position to know where his office needed improvement, and, thus, examine the type of data base desired. The book, Personnel Systems and Data Management showed what can be done and how to do it; it suffered from its provincial corporate viewpoint. Despite this criticism, it was one more step toward a better informed personnel manager and represented progress in personnel thinking.

EXHIBIT II.6

PARTIAL FILE LISTING OF G.E. PERSONNEL RECORDS

	Files	Drawers	Size	Location
Current employees (folders)	5 1/7	36	5 1/2 x 8	1
Hourly employee status record	2/20	2	card	2
Salary employee status record	1/20	1	card	2
Removed employees (folders)	6.4 5/7	46 1/2	5 1/2 x 8	3
Qualification cards (locator)	3/20	3	card	4
Exempt applicant active	Desk	1	8 1/2 x 11	5
Exempt applicant futures	1/2	1	8 1/2 x 11	5
Exempt applicant control cards	1	1	card	6
Exempt transmittals	Desk	1	8 1/2 x 11	6
Non-exempt transmittals	2/3	2	8 1/2 x 11	7
Exempt—active RFH	Desk	Pack	4 x 5 1/2	8
Hourly/salary active RFH	Desk	Pack	4 x 5 1/2	9
Draft deferments	1/2	1	8 1/2 x 11	10
Exempt req. log binder	Desk	1	8 1/2 x 11	10
Filled req. for help	1	1	4 x 5	11
Hourly/salary req. log binder	Desk	1	8 1/2 x 11	11
External recruiting				
Hourly/sal.—RFH/MPP binder	Desk		8 1/2 x 11	12
Applicant test results	2	2	3 x 5	12
"In Process" applications	Desk	Pack	8 1/2 x 11	13
Applications—prestart (Ex)	Desk	Pack	8 1/2 x 11	14
Applications—prestart (NE)	Desk	Pack	8 1/2 x 11	16
Pay no. assignment record	1	1	8 1/2 x 11	16
Seniority listing	Desk	Binder	11 x 8 1/2	17
L.O.W. lay-off cards	Desk	Pack	3 x 5	17
Internal recruiting				
Hourly/sal.—RFH/MPP binder	Desk	Binder	8 1/2 x 11	17
Applicant original tests	2/5	2	8 1/2 x 11	18
Placement referral suspense	Desk	1	4 1/2 x 5 1/2	19
Transfers and occup. change suspense	Desk	1	4 x 6	19
Physical exam. records	2.5/7	2 1/2	5 x 8	20
Qualification cards (physical)	.5/7	1/2	5 x 8	20
1971 occup. change forms	.5/7	1/2	4 x 6	20
1968-1970 occup. change forms	Boxes	2	4 x 6	20
Unemployment compensation	2	3	3 x 5	20
PCC cards—exit	1/20	1	card	20
1971 personnel act. cards	1/20	1	card	20
1970 personnel act. cards	2/20	2	card	20
1970 activity cards	2/20	2	card	20
1969 activity cards	2/20	2	card	20
Workmen's comp. brochure	2/20	2	card	20

RFH, Request for hire; MPP, Manpower planning procedures; Ex, Exempt; Ne, Non-exempt; L.O.W., Lack of work.

Source: Glenn A. Bassett and Harvard Y. Weatherbee, Personnel Systems and Data Management (New York: American Management Association, Inc., 1971), p. 101.

TABLE II.14

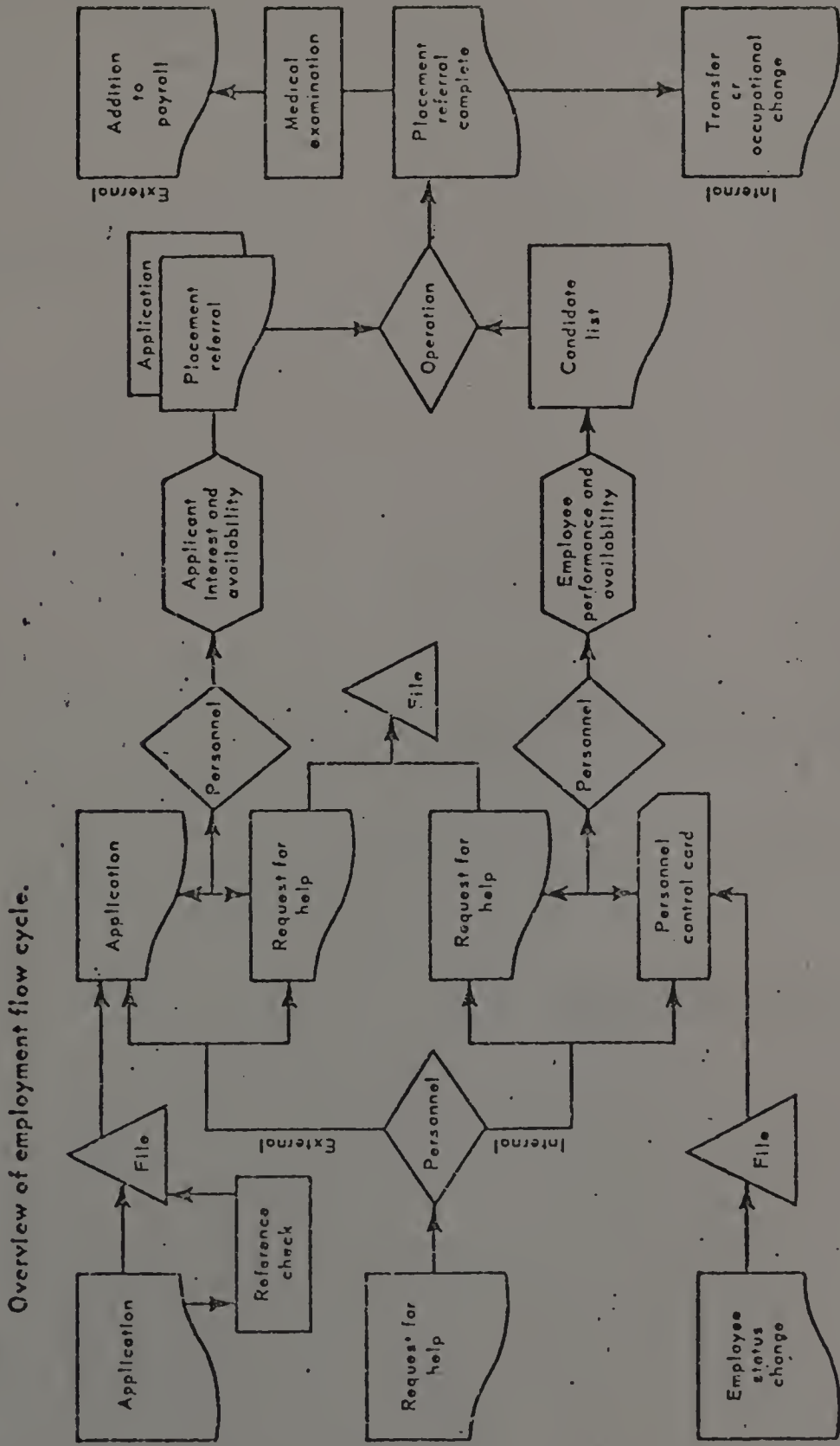
DATA GROUPS THAT CAN BE INCLUDED
IN A PERSONNEL BASE

Personal data.
Recruiting data.
Work experience data.
Educational data.
Compensation/work assignment data.
Evaluative/promotability data.
Length of service/lay-off data.
Employee attitude/morale potential data.
Union membership data.
Location/contact data.
Benefit plan data.
Separation from payroll data.
Safety/accident data.
Data on open jobs or positions to be filled.
Characteristics of the employment environment.
Characteristics of the organization or its component parts.
Position or job history.
Labor market data.

Source: Glenn A. Bassett and Harvard Y. Weatherbee, Personnel Systems and Data Management (New York: American Management Association, Inc., 1971), p. 107.

FIGURE II.5

FLOW CHART OF EMPLOYMENT APPLICANT CYCLE



Source: Glenn A. Bassett and Harvard Y. Weatherbee, Personnel Systems and Data Management (New York: American Management Association, Inc., 1971), p. 93.

FIGURE II.6
APPLICATION FLOW CHART--PART A

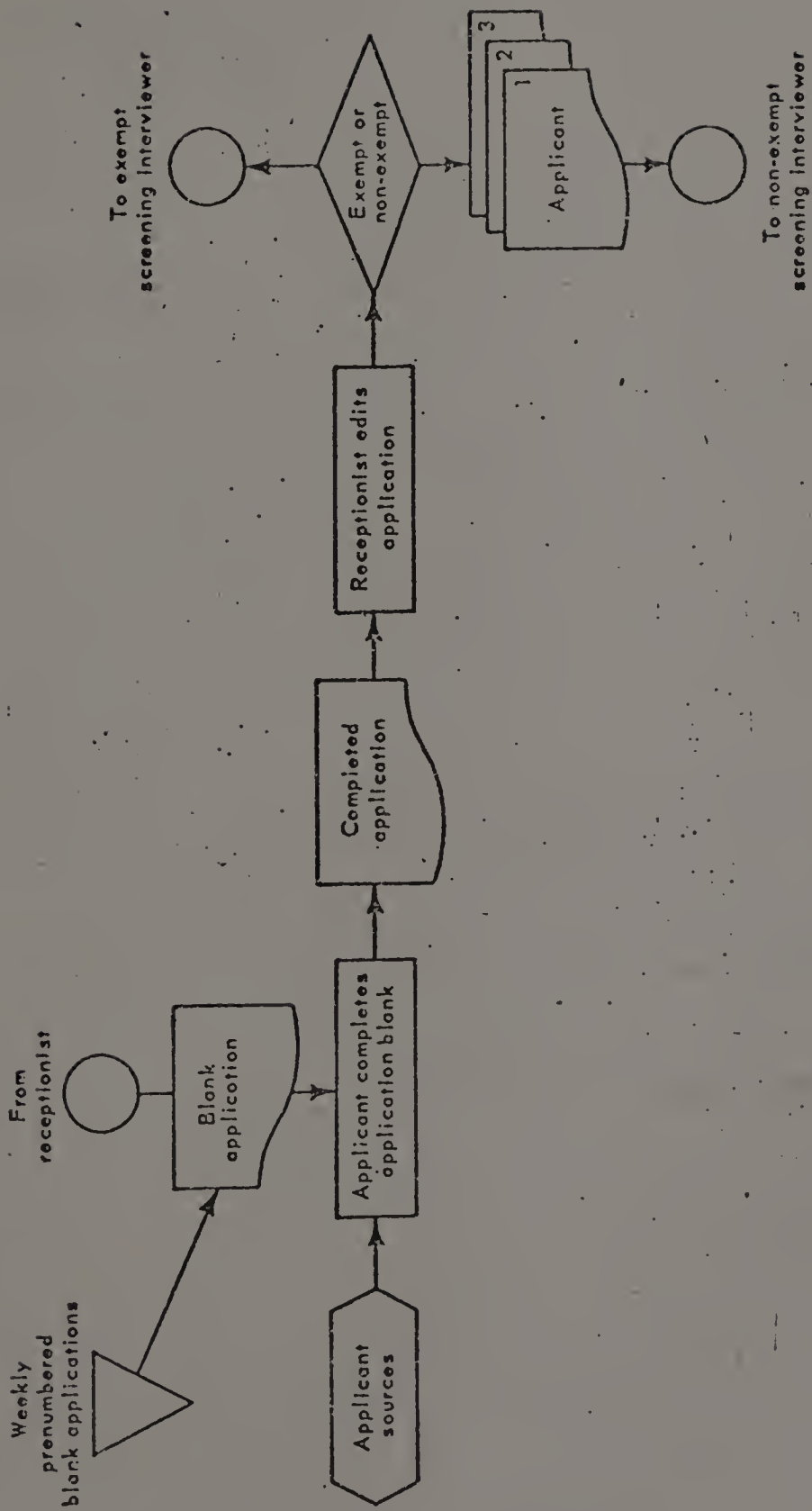


FIGURE II.6
APPLICATION FLOW CHART--PART B

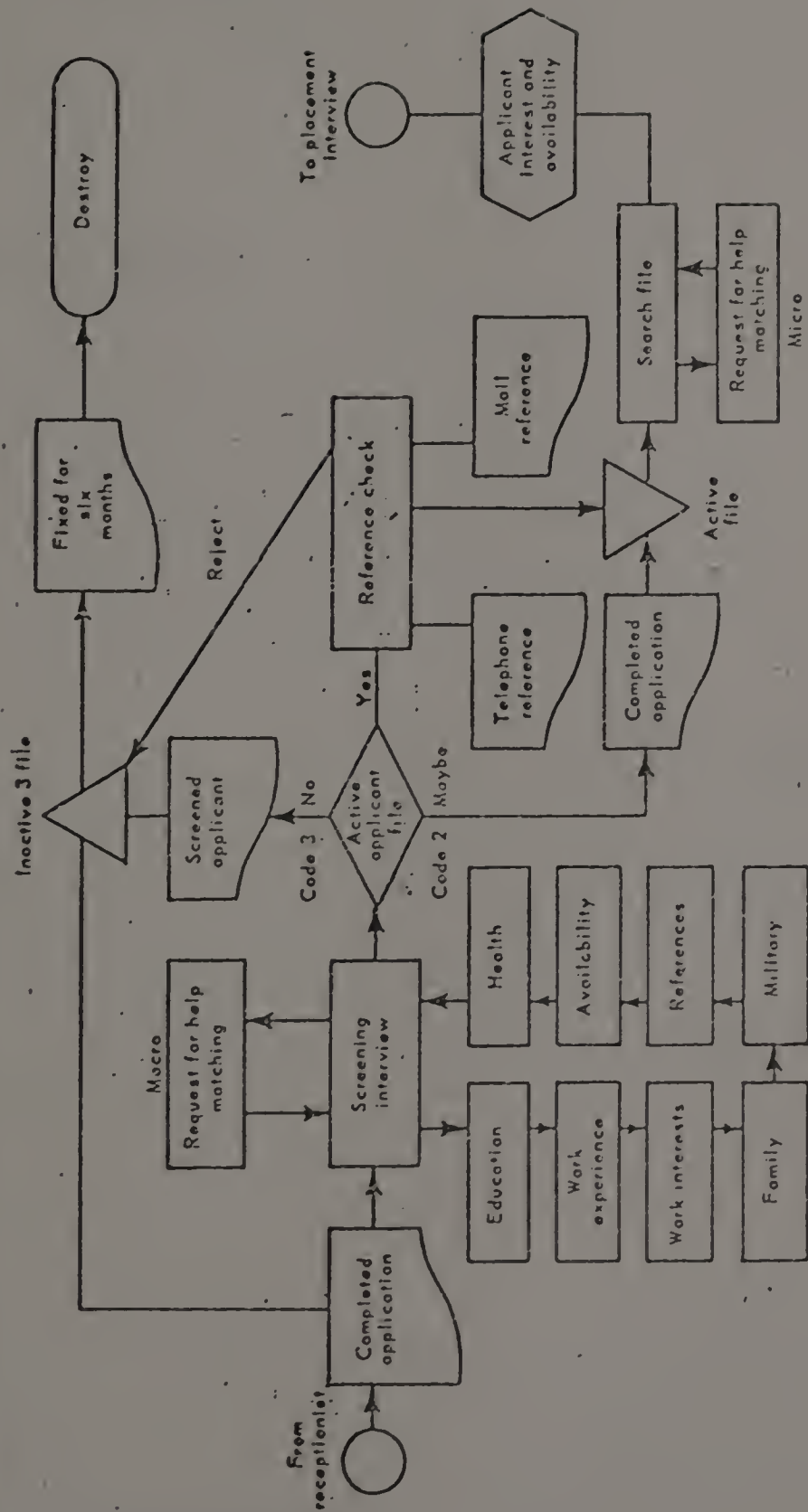
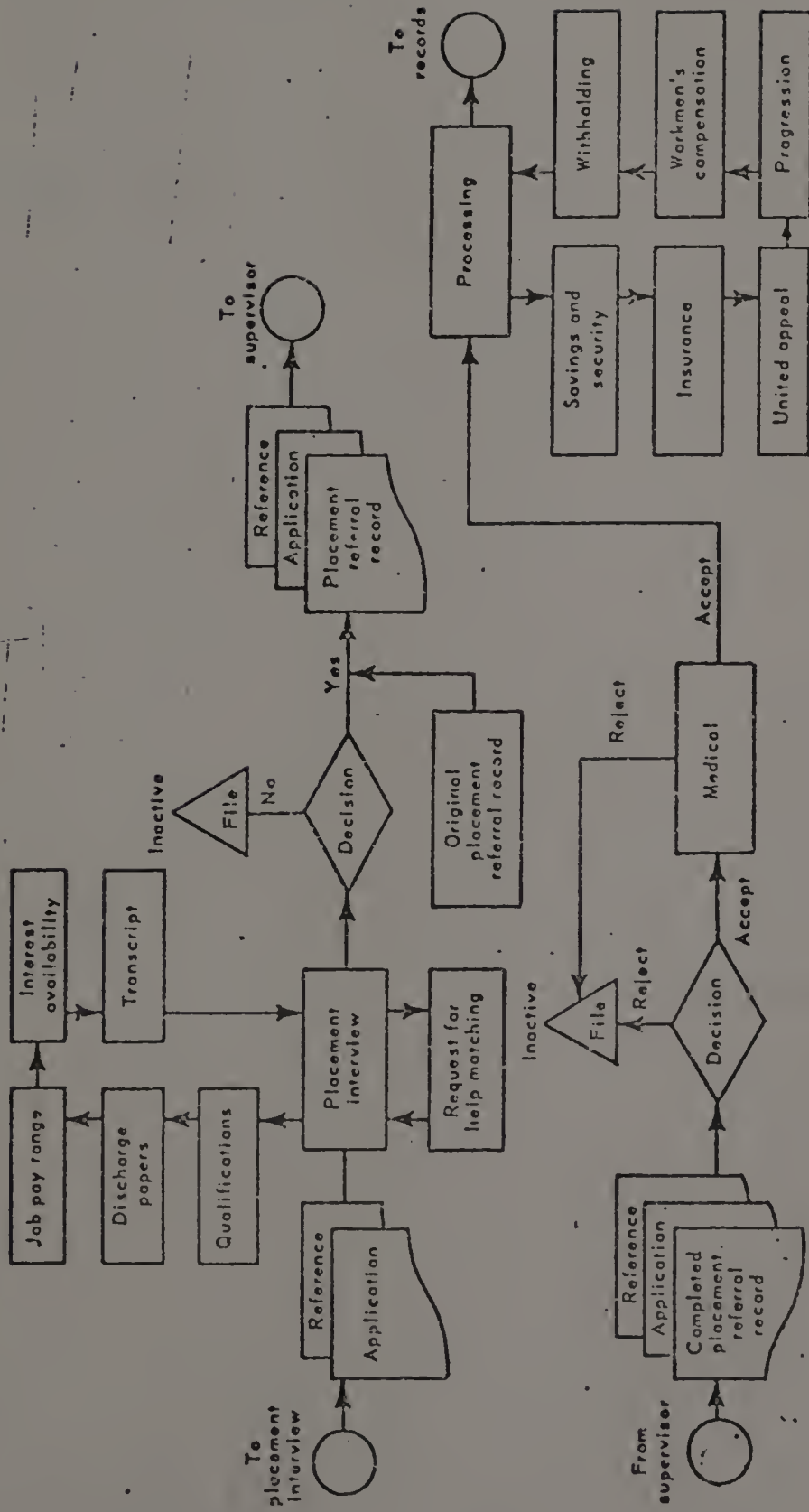


FIGURE II.6

APPLICATION FLOW CHART--PART C



Source: Glenn A. Bassett and Harvard Y. Weatherbee, Personnel Systems and Data Management (New York: American Management Association, Inc., 1971), p. 94.

The fact that proselytizing was still necessary was made obvious by another 1972 publication by Walker.⁵⁰ The article simply stated that there were pressures on the personnel function to change, such as the increasing mobility of the work force, and a computerized Employee Information System (EIS) could improve the personnel function.⁵¹ His main contribution was to inform personnel managers of three areas in which a computer system could be of immense value. These areas were:

1. Benefit Administration and Communication, which included pension and group insurance records, actuarial data, information for employees benefit statements.
2. Human Resource Control, which included human asset valuation, profit center comparisons, manpower planning and skills data.
3. Centralized recordkeeping, which included wage and salary records, EEO data, absentee information, and individual safety information.⁵²

There was nothing new in the article, since everything was discussed as early as the Martino book. Walker's article did not discuss the installation of computer systems, unlike Weiss.⁵³

⁵⁰ Alfred J. Walker, Jr., "Personnel Uses the Computer," Personnel Journal, Vol. 51, No. 3 (March, 1972), pp. 204-207.

⁵¹ Ibid., p. 205.

⁵² Ibid., p. 205.

⁵³ Harvey M. Weiss, "Happiness Is Installing a New Computer," Journal of Systems Management, Vol. 25, No. 2 (February, 1974), pp. 35-39.

The key to installing any computer system was systems people, according to Weiss. His major contribution was the Installation Work Outline that could be used by a personnel manager to check his progress in the conversion effort. Exhibit II.7 contains the outline. The implication of Weiss's study was that if the personnel department was to be computerized, the push would have to come from the systems staff. This reality raised doubt of the success of the effort to educate personnel managers in the uses of the computer. The Tomeski and Lazarus survey showing computers used in all personnel departments demonstrated that this article was an example of the communications problems that existed between the personnel and systems staff.

Company Literature

Much of the literature on computerized personnel systems resulted from users. The General Electric system had been discussed in the section on computer conversion. Another major contributor, International Business Machines (IBM) and several smaller organizations' experiences are reported in this section.

Northern Natural Gas Company. In an early article, Wagner wrote of his company's success in quantitatively

EXHIBIT II.7

 INSTALLATION WORK OUTLINE FOR
 PERSONNEL SYSTEM CONVERSION

Administrative Functions

- 1.0. Prepare Master EDP Schedule
 - 1.1. Prepare Systems Schedule
 - 1.2. Prepare Programming Schedule
 - 1.3. Prepare Site Preparation Schedule
- 2.0. Establish Orientation Programs
 - 2.1. Establish Orientation Programs — Management
 - 2.11. Create EDP Organization
 - 2.12. Announce EDP Program
 - 2.13. Develop Management Programs on EDP
 - 2.14. Give Seminars
 - 2.2. Establish Orientation Programs—Users
 - 2.21. Educate user in Systems Design
 - 2.22. Educate user in Programming Language
 - 2.23. Educate user in Operations
- 3.0. Personnel Selection
 - 3.1. Establish Organization Structure
 - 3.2. Select Staff—Management
 - 3.3. Select Systems/Programming People
 - 3.4. Select Operations People
- 4.0. Establish Reporting Structure
 - 4.1. Establish Reporting Procedures
 - 4.2. Establish Control Procedures
- 5.0. Set Standards
 - 5.1. Develop Systems Standards for:
 - 5.11. System Manuals and Documentation Conventions
 - 5.12. Standard Source Codes/Formats
 - 5.13. System Reviews
 - 5.14. Flowchart Conventions
 - 5.15. Output Conventions
 - 5.16. File Conventions
 - 5.17. Program Specification Conventions
 - 5.2. Develop Programming Standards for:
 - 5.21. Flowchart Conventions
 - 5.22. Coding Conventions
 - 5.23. Documentation Conventions
 - 5.3. Develop Operations Standards for:
 - 5.31. Operating Conventions
 - 5.32. Library Conventions
 - 5.33. Paper Flow Conventions
 - 5.34. Scheduling Conventions
 - 5.35. Control Conventions
 - 5.4. Develop Documentation Standards for:
 - 5.41. Form Design
 - 5.42. Documentation Needs
 - 5.43. Documentation Review
 - 5.44. Documentation Maintenance

Systems and Programming Functions

- 1.0. Design System
 - 1.1. Develop System Specifications
 - 1.11. Review Overall System Requirements
 - 1.12. Draw System Flow and Get Approval
 - 1.13. Draw System Outputs and Get Approval
 - 1.14. Draw System Master Files and Get Approval
 - 1.15. Draw System Inputs/Outputs and Get Approval

- 1.16. Draw System Control Points and Get Approval

- 1.17. Draw System Source Documents and Get Approval

- 1.18. Document System and Get Approval

- 1.19. Establish Liaisons with all Parties and Get Approval

2.0. Develop Program Specifications

- 2.1. Determine Languages

- 2.2. Write Program Specifications and Get Approvals

- 2.3. Assign Programs

3.0. Implement System

- 3.1. Code and Debug Programs

- 3.2. Systems Test and Conversion Preparation

- 3.21. Train Users in System, Manuals, Reports, Controls

- 3.22. Train EDP People in System, Schedule, Controls, Run Books

- 3.23. Prepare System Test Schedule and Check List

3.3. Systems Test

- 3.31. Order Forms

- 3.32. Develop Test Data

- 3.33. Perform Systems Test and Get Approvals

- 3.34. Review and Evaluate Test and Get Approvals

- 3.35. Parallel Run

3.4. Convert System

- 3.41. Set Date and Approve

- 3.42. Verify Availability of People, Data, Forms

- 3.43. Notify Users

- 3.44. Convert

Operations Functions

1.0. Develop Operations Procedures

- 1.1. Select Operations Manager/Personnel

- 1.2. Develop Operating Schedules and Get Approval

- 1.3. Develop Input Control Procedures

- 1.4. Develop Output Control Procedures

- 1.5. Develop File Retention Control Procedures/Schedules

- 1.6. Develop Run-to-Run/System-to-System Controls

- 1.7. Develop Manual Procedures

- 1.8. Develop Run Books

2.0. Establish Liaison with the Vendor's Field Engineers

Site Preparation Functions

1.0. Install Hardware

- 1.1. Select Site and Layout

- 1.2. Prepare Plans

- 1.3. Let Contracts

- 1.4. Order Power

- 1.5. Order Air Conditioning

- 1.6. Install Fixtures

- 1.7. Order Accessories

- 1.8. Test Facilities

- 1.9. Deliver and Install Hardware

Source: Harvey M. Weiss, "Happiness Is Installing A New Computer," Journal of Systems Management, Vol. 25, No. 2 (February, 1974), p. 36.

monitoring staff units.⁵⁴ By possessing data derived from decentralized units, a complete decentralization was avoided. Figure II.7 is a graphic picture of the workings of the system.

Tremendous company growth had affected the personnel function at Northern this way:

1. There were 18 personnel administrators,
2. They were operating at four different levels in the hierarchy,
3. The decentralized personnel staff were headed by the corporate personnel manager,
4. The corporate personnel manager had no direct supervision over any decentralized offices.⁵⁵

Thus, the classic problem of decentralized authority versus overall corporate control existed.⁵⁶ To solve this problem, the personnel manager developed two rules-- (1) quantify; and, (2) monitor. An example given in the article concerned salary administration.

After job descriptions were written, they were point rated using rating charts. From this chart came the salary range with objectives for the minimum, mid-point, and maximum included. The compa-ratio, showing an individual employee's salary relative to the mid-point of his job was then calculated. When the compa-ratios of a

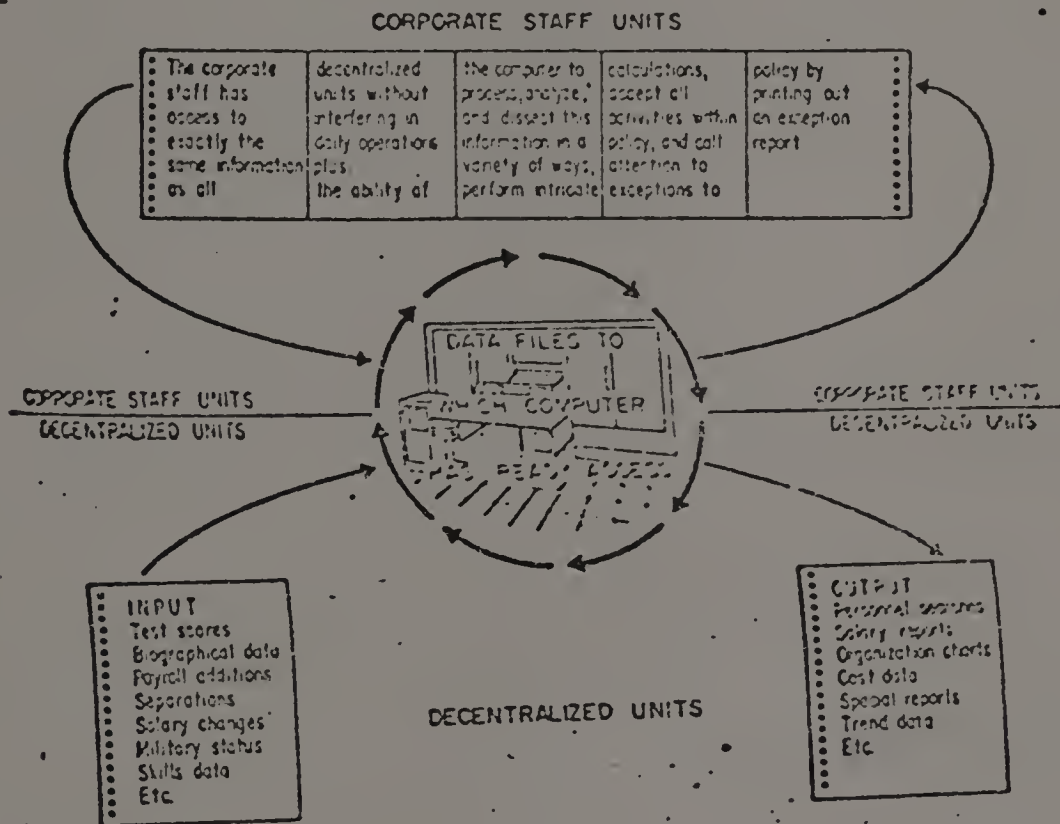
⁵⁴L. G. Wagner, "Computers, Decentralization, and Corporate Control," in The Computer in Operations Management, ed. by William F. Boore and Jerry R. Murphy (New York City: McGraw-Hill Book Co., 1968), pp. 106-118.

⁵⁵Ibid., p. 109.

⁵⁶Ibid., p. 109.

FIGURE II.7

USE OF DATA FILES BY CORPORATE STAFF
AND DECENTRALIZED UNITS



Source: L. G. Wagner, "Computers, Decentralization, and Corporate Control," in The Computer in Operations Management, ed. by William F. Boore and Jerry R. Murphy (New York City: McGraw-Hill Book Co., 1968), p. 106.

unit were computed, a misleading picture arose because the sample average equaled 1.00. When Northern added the measures of variance and skewness the computer printouts gave a much more accurate picture.⁵⁷ Figure 11.8 shows graphically that, while the compa-ratio may be 1.00, when variance and skewness are added, a difference emerged. Other indices in the computer system included: accession rate, separation rate, voluntary separations, and other separations, total mobility. In 1966, this kind of article must have caught the eye of personnel directors.

Banking. If personnel directors were frightened of the new personnel requirements of electronic data processing, then O'Brien's 1968 article came as a welcome relief.⁵⁸ He described the introduction of EDP and the resulting removal of boring jobs and the increased morale among several positions in commercial banks. Salary requirements were not appreciably raised and were in effect more than offset by the decrease in personnel required.

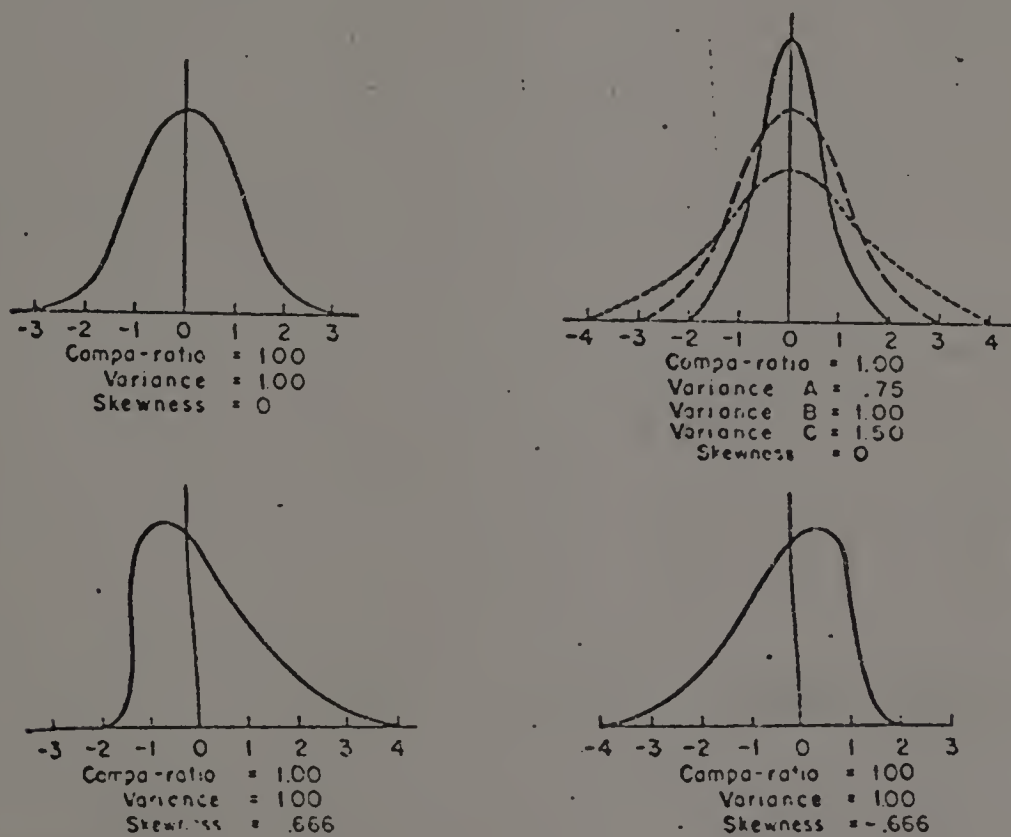
Employees did resist computerization as evidenced by the following:

⁵⁷Ibid., p. 112.

⁵⁸James A. O'Brien, "How the Computer Revolutionizes Personnel Requirements," Personnel Administration, Vol. 31, No. 5 (September-October, 1968), pp. 19-26.

FIGURE II.8

GRAPHIC EXAMPLES OF SALARY CONDITIONS USING
VARIANCE AND SKEWNESS MEASURES



Source: L. G. Wagner, "Computers, Decentralization, and Corporate Control," in The Computer in Operations Management, ed. by William F. Boore and Jerry R. Murphy (New York City: McGraw-Hill Book Co., 1968), p. 113.

A relatively simple change created such a furvor--virtually a revolt--in its accounting departments. To make the use of its computer efficient all balance sheet abbreviations had to be expressed in one letter. This change created such an uproar among the bookkeepers that it was adopted only after the chairman of the board personally intervened and ordered that the new symbols be used.⁵⁹

O'Brien noted no personnel resistance when the following was performed:

1. Provide employers with information on EDP and its benefits.
2. Reassure employees that none would be laid off.
3. Take an extended period of time to convert to a computerized system.
4. Point out how the computer will simplify their jobs.
5. Tell employees of the progressive image a computer system will give them.⁶⁰

Although this was a banking example, its implications for personnel management led to its inclusion in Personnel Administration.

Computer Corporation of America. Computer Corporation of America, a computer sciences company, developed a soft-ware program and its president described its use for personnel managers.⁶¹ The system worked according to Marill in the following manner.

⁵⁹ Ibid., pp. 23-24.

⁶⁰ Ibid., p. 24.

⁶¹ Thomas Marill, "As You Were Saying-," Personnel Journal, Vol. 49, No. 5 (May, 1970), pp. 431-432.

To find department heads who are 56, 57, or 58, the personnel user types:

FIND ALL RECORDS FOR WHICH POSITION-
DEPARTMENT HEAD AGE- 56 or 57 or 58.

For department heads not engineers or programmers, the user types:

FIND ALL RECORDS FOR WHICH
POSITION-DEPARTMENT HEAD
PREVIOUS POSITION-NOT ENGINEER
NOR PROGRAMMER.

To delete or add on-line or off-line is possible as the example below shows:

1. FIND ALL RECORDS FOR WHICH
NAME - JAMES ELLISON
2. FOR EACH RECORD IN 1 DELETE AGE
ADD INTERVIEWER - ALICE SMITH
ADD COMMENT AT INTERVIEW-
EXCELLENT EDUCATION BUT LACKS
PRACTICAL EXPERIENCE.⁶²

Thus, similar to General Electric, at this time period attention was directed at building a computer language capable of being easily interpreted by personnel departments.

Ford Motor Company. A word of caution to personnel directors was written by Denise at Ford Motor Company.⁶³ He urged that only cost can justify the utilization of a computer. This argument, in effect, meant that smaller companies should probably not attempt to computerize their personnel departments. There was limited discussion of

⁶²Ibid., p. 431.

⁶³Malcolm L. Denise, "Computerized Personnel Records," The Office, Vol. 75, No. 1 (January, 1972), pp. 89, 208-209.

the benefits of using a computer, but the discussion was largely covered by previous studies. The importance of this article was not in its paucity of specifics but in its tone. Denise felt let down by the results of computers as the following testifies, ". . . Yet one cannot help but feel that optimistic promises heard in these meetings have been slow to materialize; and perhaps fortunately so."⁶⁴ Despite the work done, the fruit certainly was lacking by 1972, if he was to be believed.

Dow Corning. Dow Corning, using their personnel staff and an outside consultant, developed what they felt was an excellent personnel system as evidenced by one of their employees, Granat.⁶⁵ He described its capabilities in the following categories: Manpower Analysis and Planning, Compensation and Benefits, Communications, Manpower Development (skills inventory), Recruiting. Granat claimed each of the above functions was improved by the new computer system.

Cowlitz County, Washington, Public Utility District. The ability to have a system that would send a form to the personnel department which could return with updated information to be reprinted, a concept called "turnaround",

⁶⁴Ibid., p. 89.

⁶⁵Kent Granat, "After Personnel System Installation, Then What?" Personnel Journal, Vol. 50, No. 11 (November, 1971), pp. 867-871.

was described by Khtaian.⁶⁶ The personnel payroll information form (PPIF) was used to accomplish this "turn-around". The advantages listed were:

1. Reduced man-hours.
2. Reduced review time.
3. Increased accuracy.
4. One simple update document.⁶⁷

The document itself was very flexible. It was legal size (8½ x 13), consisted of two parts and had a chemical-backing. The form was shown in his article. The article was impressive and would influence other personnel directors to think about the idea of computerizing their records.

International Business Machines. In terms of articles, IBM employees have published more than any other company. The main system developed by IBM was the Personnel Data Systems (PDS).

PDS. The development of IBM's integrated personnel system had taken time. A 1966 article by Pedicord discussed IBM's PDS. His article announced the progress which the company had made in the personnel field.⁶⁸ The 1970 journal article by Liebttag describing

⁶⁶George A. Khtaian, "Turnaround Concept for Personnel Records," Journal of Systems Management, Vol. 24, No. 7 (July, 1973), pp. 30-32.

⁶⁷Ibid., pp. 31-32.

⁶⁸W. J. Pedicord, "Advanced Data Systems for Personnel Planning and Placement," in Computer in Operations Management, ed. by William F. Boore and Jerry R. Murphy (McGraw-Hill Book Co., 1968), pp. 98-105.

the updated PDS was more complete and also more concrete in its accomplishments.⁶⁹ In 1970, IBM employed 150,000 people who were located throughout the United States in division headquarters, marketing regions, plants, and laboratories.⁷⁰ In order to meet their special needs, two files were created. One file was kept by every location; within this file was a "mirror image" of key information. This information comprised the PDS file kept at corporate headquarters.⁷¹ While the "mirror image" file may have contained 108 "pieces" of data, the locations file could have contained up to 400 "pieces" of data. Updating was done by divisions simultaneously with payroll. This method was 99% accurate. To retrieve data, the system had both on-line and off-line capability.⁷² One on-line data retrieval technique was handled in the following manner:

. . . Another on-line arrangement for retrieval of PDS data was a hookup between corporate headquarters and a large-scale System/360 Model 91 at the IBM Research Division in Yorktown Heights, N.Y., where a "copy" of the PDS file is maintained on magnetic disc, also under tight security. A small System/360 Model 20 at corporate headquarters serves as a terminal to the large System/360 Model 91.⁷³

⁶⁹Wesley R. Liebtag, "How an EDP Personnel Data System Works for Corporate Growth," Personnel, Vol. 47, No. 4 (July-August, 1970), pp. 15-21.

⁷⁰Ibid., p. 16.

⁷¹Ibid., p. 16.

⁷²Ibid., p. 17.

⁷³Ibid., pp. 17-18.

A division with 15,000 employees kept five files on employees: employee profile, employment history, resume and significant achievements, educational data and skills data. Every employee received and audited annually his basic data.⁷⁴ Three uses of this information are described in the following paragraph.

A workforce simulator was programmed to estimate the workforce total using present employee data under different environmental conditions. Another use was the skills inventory. The information contained in the inventory was as follows:

1. General field of work.
2. Specific areas within that field.
3. Products which were worked on.
4. Experience with specialized instruments and machines.
5. Foreign language.
6. The type of work preferred.⁷⁵

With this information, profiles were made which were reviewed by employee and manager. Not only did these profiles aid in placement, but by knowing the skills of employees, the company was able to do better planning. The last example was the simulation possible in pension plans. Within ten minutes, the additional costs resulting from a

⁷⁴John J. Bricker, "The Personnel Systems Concept," AMA Management Bulletin, No. 62 (New York City: American Management Association, Inc., 1965), p. 18.

⁷⁵Ibid., p. 19.

change in pension requirements could be calculated.⁷⁶ These results gave the company information which was not previously available.

Skills Inventories

A skills inventory is, simply, a file containing information on company employees that is searched when promotional opportunities arise. Management can utilize the file to find the existing skills in the company to assist them in manpower planning. The IBM skills inventory system, part of their PDS, was discussed earlier; in this section, other company skills inventories are reviewed in addition to the vital considerations involved in deciding to create a skills inventory.

H. K. Feguson Company, Cleveland. The Feguson Company was faced with two problems. Their business required a wide range of technical and administrative skills, and depended on convincing customers that they possessed this technical expertise. It was difficult to solve these two problems because their plants were geographically dispersed.⁷⁷ A skills inventory program solved both problems.

⁷⁶Liebttag, p. 19.

⁷⁷James T. Wolcott, "How to Develop a Skills Inventory," Personnel, Vol. 41, No. 3 (May-June, 1964), p. 55.

Reynolds Tobacco Company. Reynolds was faced with the demand for technician trainees. It was decided to select from among their 21,000 employees. To accomplish this task, every employee was asked to complete a 36-page questionnaire. When a job position became available, the computer searched the skills inventory and delivered as many as 70 names to be examined by the personnel department.⁷⁸

Douglas Missile and Space Systems Division. Like Reynolds, Douglas developed their Skills Information Retrieval System (SIRS) to aid in their policy of internal promotion. Also, like Reynolds, the employee completed a questionnaire sheet. The computer produced four copies of the employee's biography and the employee received one. In addition to the biography, the program produced three indices. One was a field index which cross-referenced the functions, such as accounting, with the employee specialties within that field, such as cost control or budgets. The second index, the specialty index, cross-referenced fields and function. The indices would resemble Table II.15. Table II.16, a language index, produced an

⁷⁸Editor, "Skills Inventory System," Data Management, Vol. 9, No. 5 (May, 1970), p. 21.

TABLE II.15
 EXAMPLE OF SKILLS INFORMATION RETRIEVAL SYSTEM FIELD INDEX

Employee Number	Field Index		
	Field	Specialty	Function
12345	*Accounting	Cost Control	Auditing
23456	*Accounting	Acc't's payable	Supervising
34567	*Accounting	Budgets	Estimating
			Analyzing
			Coordinating
			Managing

Source: Richard A. Kaumeyer, Jr., "Automated Skills Retrieval: One Company's Program," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Richard D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), p. 67.

TABLE II.16
 EXAMPLE OF SKILLS INFORMATION RETRIEVAL SYSTEM SPECIALTY INDEX

Employee Number	Specialty Index		
	Specialty	Field	Function
23456	*Acc't's payable	Accounting	Supervising Coordinating
34567	*Budgets	Accounting	Estimating Managing
12345	*Cost Control	Accounting	Auditing Analyzing

Source: Richard A. Kaumeyer, Jr., "Automated Skills Retrieval: One Company's Program," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Robert D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), p. 67.

alphabetical search for foreign language and proficiency.⁷⁹

RCA Service Company. RCA's Employee Selection Program classified their employees according to the eight skill categories below:

1. Occupation.
2. Products and services involved in the individual's current job.
3. Fields of professional specialty.
4. Assignments in the employee's background.
5. Various equipment with which he or she has been involved.
6. Projects engaged in.
7. Educational level.
8. Language capabilities.⁸⁰

Each catalogue contained the following for every employee:

1. Social security number.
2. Educational level, with indication of major and minor subjects studied.
3. Professional licenses held.
4. Name.
5. Work location.
6. Employee number.
7. Activity number.
8. Occupation class number.⁸¹

RCA claimed to have had great success with their arrangement. In addition to searching for the right man for the right job, they used the skills inventory for

⁷⁹Richard A. Kaumeyer, Jr., "Automated Skills Retrieval: One Company's Program," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Robert D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), pp. 65-67.

⁸⁰T. I. Bradshaw, "Computerized Employee Search Program," in Greenlaw and Smith, p. 78.

⁸¹Ibid., p. 78.

performing skills profiles, education and training depth analyses, discovering scope of language capabilities, scope and range of assignment, and profiles of fields of professional specialties.⁸²

General Electric. Bassett and Weatherbee provided a convenient checklist of data usually found in a skills inventory. Their most important contribution was, not the description of G.E.'s skills inventory, but their caution that, "the best kind of skills inventory was often a simple one which was backed up with good personnel files."⁸³

An improvement on the system described by Bassett and Weatherbee was the variable parameter approach to searching personnel files outlined by Dukes.⁸⁴ Bassett and Weatherbee employed as an example the problem of finding a person with a B.S. in mechanical or civil engineering experienced in technical sales and quality control, with two or more years of service, earning \$11,000 a year or less. Table II.17 contains the hypothetical percentages of the population with these parameters. The chance of finding an exact fit with these conditions would be .007.⁸⁵

⁸²Bradshaw, p. 78.

⁸³Glenn A. Bassett and Harvard Y. Weatherbee, Personnel Systems and Data Management (New York City: American Management Association, Inc., 1971), p. 190.

⁸⁴Carlton W. Dukes, "EDP Personnel File Searching: A Variable Parameter Approach," Personnel, Vol. 49, No. 4 (July-August, 1972), pp. 20-26.

⁸⁵Dukes, p. 21.

TABLE II.17

EXAMPLE OF EMPLOYEE SEARCH PARAMETERS
AND POPULATION FREQUENCY

Parameters	Percentage of Population
B.S. in mechanical or civil engineering	20
Experience in technical sales	10
Experience in quality control	10
Two or more years of service	70
Current earnings of \$11,000 a year or less	50

Source: Carlton W. Dukes, "EDP Personnel File Searching: A Variable Parameter Approach," Personnel, Vol. 49, No. 4 (July-August, 1972), p. 21.

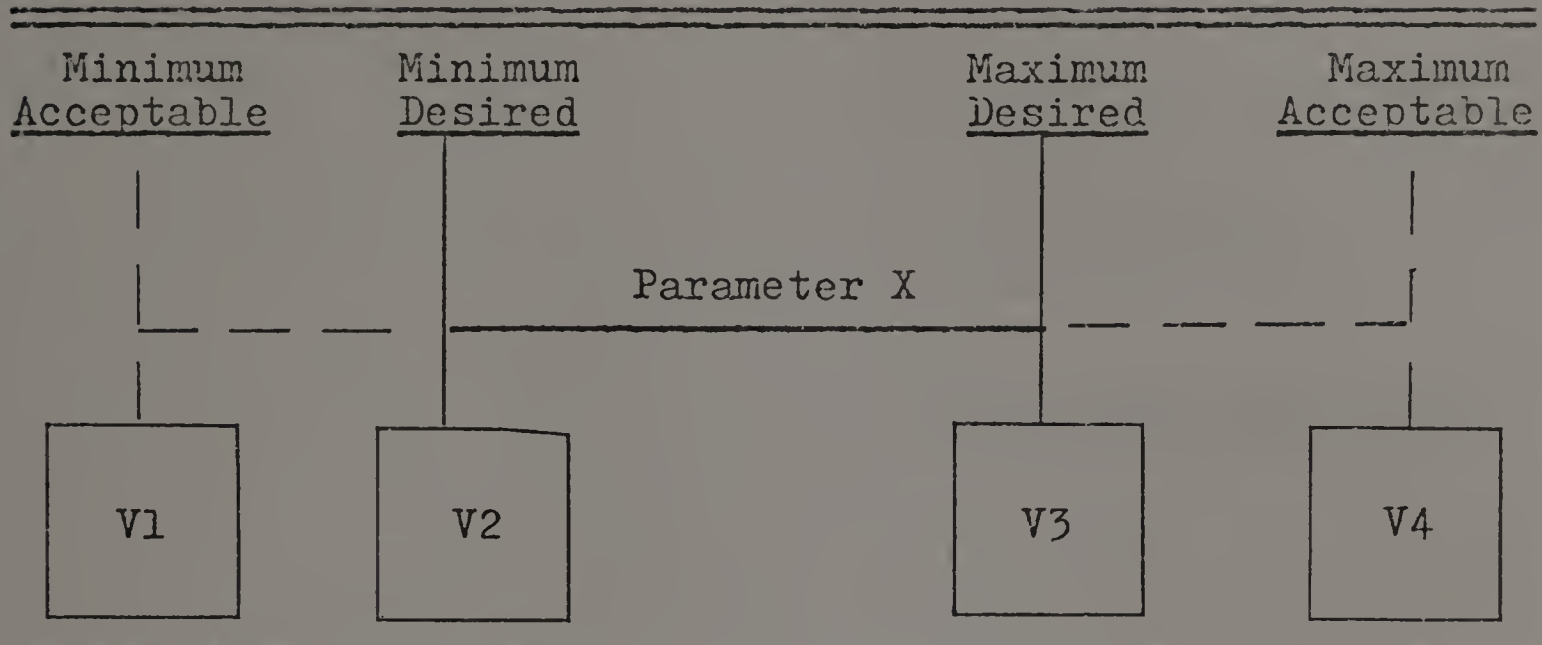
To correct for the probability search problem, Dukes explained his flexible approach shown in Figure II.9. In Figure II.9, values between V2 and V3 are ideal, but values between v1-v2 and between v3-v4 were still acceptable. Penalty weights were assigned by the user to values outside the ideal limits.⁸⁶ The actual search process operated incrementally. An example of a printout from such an incremental search is in Exhibit II.8.

With this incremental search ability, many of the skills inventories which were then not fully utilized may now be considered more favorably and useful.

⁸⁶ Ibid., p. 23.

FIGURE 11.9

A FLEXIBLE APPROACH TO FILE SEARCHING (V = Value)



Source: Carlton W. Dukes, "EDP Personnel File Searching: A Variable Parameter Approach," Personnel, Vol. 49, No. 4 (July-August, 1972), p. 23.

EXHIBIT II.8

COMPUTER OUTPUT FROM VARIABLE PARAMETER
EMPLOYEE SEARCH PROGRAM

Computer Program Output

Candidates Selected-Variable Parameter Search and Ranking Algorithm

CONTROL CARDS - #TRAITS, FIELDS, RECORD LENGTH

7 (T11,3A5,T37,F4.0,T44,F2.0,T49,F2.0,T56,F5.0,T64,F2.0,T70,F2.0,T72,F2.0,T1,19) (T1,19,T1,18A4,A2)

TRAIT #	EVALUATED NAME	ABSOLUTE MINIMUM	IDEAL MINIMUM	IDEAL MAXIMUM	ABSOLUTE MAXIMUM	X WT- IDEAL	X WT+ IDEAL	/ BY WT OVERALL	
1	YR BORN	1931.	1939.	1943.	1949.	2.5	3.5	10.	
2	ED LEVEL	12.	14.	15.	16.	2.5	1.5	20.	
3	SAL GRD	7.	9.	10.	12.	1.5	2.0	25.	
4	SAL \$	7500.	8500.	10000.	13000.	1.5	2.0	25.	
5	YRS EXP	2.	5.	8.	12.	2.5	1.0	15.	
6	SKILL A	6.	12.	30.	48.	2.5	1.0	50.	
7	SKILL B	6.	24.	42.	48.	2.0	0.5	30.	

RANK	NAME	VARIATION	YR BORN	ED LEVEL	SAL GRD	SAL \$	YRS EXP	SKILL A	SKILL B
1	NAME 6	6.7	1941.	14.	9.	8925.	5.	24.	6.
2	NAME 4	12.9	1937.	15.	9.	9095.	12.	12.	24.
3	NAME 7	19.1	1943.	16.	7.	8515.	4.	24.	36.
4	NAME 5	24.9	1939.	12.	8.	9085.	8.	6.	12.
5	NAME 2	28.8	1933.	13.	10.	11427.	8.	24.	36.
6	NAME 3	30.1	1935.	13.	9.	12333.	5.	36.	12.
7	NAME 8	32.6	1945.	15.	7.	8225.	3.	12.	18.
8	NAME 1	35.9	1931.	14.	10.	12210.	10.	24.	48.
9	NAME 9	59.2	1947.	13.	8.	7950.	2.	18.	6.
10	NAME 10	59.6	1949.	13.	7.	7555.	5.	12.	6.

Source: Carlton W. Dukes, "EDP Personnel File Searching: A Variable Parameter Approach," Personnel, Vol. 49, No. 4 (July-August, 1972), p. 25.

Bailes, an IBM analyst, in 1962 wrote of the personnel system organizational and technical considerations in developing a skills inventory.⁸⁷ The major personnel problems were in the motivation of the employees to describe their primary and secondary skills, and secondly, the sole reliance on records alone in making the selection of the persons for inclusion in the inventory.⁸⁸ The six system considerations were:

1. Skills data must be described in terms of proficiency and time relevance.
2. The system must be economically feasible.
3. Retrievability of data is a primary need.
4. A good system organizes and summarizes information, insuring its usability.
5. A maximum of valuable data on a minimum of questionable data should be included.
6. Updating must be periodically done.⁸⁹

The size of the system and the persons to be included had to be decided organizationally.⁹⁰ Finally, the most important technical problem was the insurance of fully understanding of the language by system users.⁹¹

⁸⁷ Stephen M. Bailes, "Fundamental Aspects of Establishing a Skills Inventory," Personnel Journal, Vol. 41, No. 5 (May, 1962), pp. 226-230.

⁸⁸ Ibid., p. 226.

⁸⁹ Ibid., p. 227.

⁹⁰ Ibid., p. 227.

⁹¹ Ibid., p. 228.

Manpower Planning

Vetter defined manpower planning as:

. . . Strives to have the right number and the right kinds of people, at the right places, at the right time, doing things which result in both organization and the individual receiving maximum long-run benefits.⁹²

Burack asserted that manpower programming was necessary to operationalize manpower planning.⁹³ Since this means quantification, many of the articles about manpower planning were mathematical. To handle the matrices and calculations involved when using mathematics, computers are excellent tools.⁹⁴ However, if the personnel manager did not understand mathematics, there were journal pieces that clearly explained the need for manpower planning.⁹⁵

⁹²Eric W. Vetter, Manpower Planning For High Talent Personnel (Ann Arbor, Michigan: Bureau of Industrial Relations, 1967), p. 15.

⁹³Elmer H. Burack, Strategies for Manpower Planning and Programming, The D. H. Mark Series in Management (Morristown, New Jersey: General Learning Corporation, 1972), p. 37.

⁹⁴John R. Hinrichs, "The Computer in Manpower Research," Personnel Administration, Vol. 33, No. 2 (March-April, 1970), p. 37.

⁹⁵See Mason Haire, "Managing Management Manpower," Business Horizons, Vol. 10, No. 4 (Winter, 1967), pp. 23-28; Charles A. Morrissey, "Long-Range Planning in Personnel: Impact of the Computer," Personnel Administration, Vol. 31, No. 2 (March-April, 1968), pp. 35-38; Andrall E. Pearson, "Sales Power Through Planned Careers," Harvard Business Review, Vol. 44, No. 1 (January-February, 1966), pp. 105-116; and Richard Allen Stull, "Manpower Planning At The Management Level," Personnel Journal, Vol. 46, No. 6 (June, 1967), pp. 348-351.

The techniques used to establish the criteria for hiring the best person for a job included: bounding-set method, simplex programming and many others.⁹⁶ Perhaps because personnel directors did not understand these methods, their interest in mathematical programs was low as pointed out by the Tomeski and Lazarus survey. Models proposed for manpower planning have been numerous and varied; only a few are included in this discussion.

Dill, Gaver, and Weber of the Carnegie Institute of Technology developed two models which were amenable to simulation. They mathematically compared advancement in a rigid hierarchy under conditions of: (1) promotion by seniority or experience; (2) equal opportunity selection; and, (3) two classes of recruits with a fixed number of second-level jobs against advancement in a flexible hierarchy with unlimited opportunity for advancement.⁹⁷

Two examples of forecasting models, one mathematical and the other graphic, are now shown. Lejk and Wortham worked on probabilistic forecasting of manpower needs under different conditions. Exhibit II.9 was their model.

⁹⁶Lawrence J. Clarke, "Decision Models For Personnel Selection and Assignment," Personnel Administration, Vol. 32, No. 2 (March-April, 1969), p. 53.

⁹⁷W. R. Dill, D. P. Gaver, and W. L. Weber, "Models and Modelling For Manpower Planning," Management Science, XIII (December, 1966), B-142-167.

EXHIBIT II.9

LEJK AND WORTHAM PROBABILISTIC
MANPOWER FORECASTING MODEL

$$E[i(m)_j t] = i(e_m)_j t = \sum_{t'=1}^{r^*} i(m)_j t' \cdot i P \cdot i P(t^*) = i P \sum_{t'=1}^{r^*} i(m)_j t' \cdot i P(t^*)$$

for all i , j , and t , where

- $i(m)_j t$ = unadjusted manpower requirement for the i th personnel classification, j th time period, t th project;
- $i(e_m)_j t$ = expected manpower requirement;
- $i P$ = subjective probability of the project starting;
- $i P(t^*)$ = conditional distribution of the project starting date, such that $\sum_{t^*=1}^{r^*} i P(t^*) = 1$ for all i ;
- r^* = number of time periods over which conditional distribution is spread;
- t^* = $1, 2, \dots, r^*$;
- t' = $t - t^* + 1$;
- r = number of time periods of the original forecast;
- r' = $r + r^* - 1$;

with the range of

$$t = -1, 2, \dots, r'$$

subject to

$$t' > 0, \text{ for all } t \text{ and } t^*.$$

Source: Richard A. Lejk and A. W. Wortham, "The Complete Data Model--A New Approach to the Probabilistic Forecasting of Manpower Requirements," IEEE Transactions in Engineering Management, EM-13, No. 1 (March, 1966), p. 23.

Lejk and Wortham's model was probabilistic.⁹⁸ A less mathematical model was developed by Milkovich and Nystrom. Their manpower forecasting model shown below in Figure II-10 was deterministic; whereas the former model was probabilistic.⁹⁹ Both, however, would probably not be completely understood by the director of the average personnel department.

Markovian analysis was used to predict the number of employees in different positions over the planning cycle and was given wide attention. Mason Haire's article, "Approach to an Integrated Personnel Policy," lended itself to Markovian analysis.¹⁰⁰ Vroom and MacCrimmon of Carnegie-Mellon University wrote an excellent article on using Markov-chains to do manpower forecasting.¹⁰¹ Their article explained the type of data needed, the means of organization, the mechanism and the findings. Merck had

⁹⁸Richard A. Lejk and A. W. Wortham, "The Complete Data Model--A New Approach to the Probabilistic Forecasting of Manpower Requirements," IEEE Transactions in Engineering Management, EM-15, No. 1 (March, 1968), pp. 27-29.

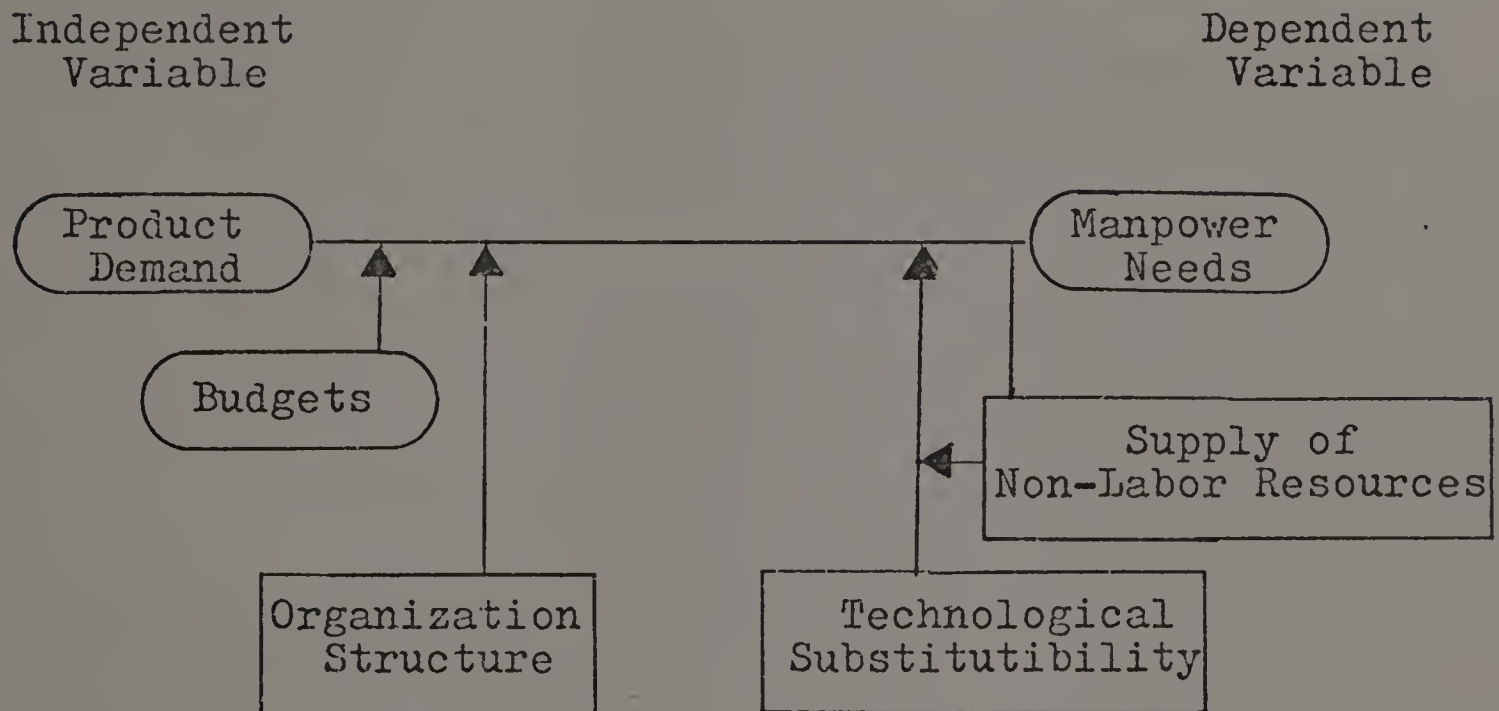
⁹⁹George Milkovich and Paul S. Nystrom, "Manpower Planning and Interdisciplinary Methodologies," Manpower and Applied Psychology, Vol. II, No. 2 (Summer, 1968), p. 19.

¹⁰⁰Mason Haire, "Approach to an Integrated Personnel Policy," Industrial Relations, Vol. 7, No. 2 (February, 1968), pp. 107-117.

¹⁰¹Victor H. Vroom and Kenneth R. MacCrimmon, "Towards a Stochastic Model of Managerial Careers," Administrative Science Quarterly, Vol. 13, No. 1 (June, 1968), pp. 26-46.

FIGURE II.10

MILKOVICH-NYSTROM MANPOWER FORECASTING MODEL



The variables and constraints can be converted to the form:

$$K^* = f(X_i, Y_j) \quad \text{Subj. to } Z_k$$

where:

K^* represents the expected manpower resource needs in the period under consideration.

X_i represents the independent variables; in this model this is product demand.

Y_j the moderator variables are represented by organization structure and technological substitutibility.

Z_k represents the constraints; budget and the supply of manpower substitutes.

Source: George Milkovich and Paul S. Nystrom, "Manpower Planning and Interdisciplinary Methodologies," Manpower and Applied Psychology, II, No. 2 (Summer, 1968), p. 19.

written two articles similar to the above mentioned studies which followed the process in sequence.¹⁰² These two articles, with an accompanying article by Greenlaw and Smith, enabled the reader to teach himself the uses of Markov analysis in the personnel department.

Evaluation of Computer Systems

Tetz considered an evaluation of an organization's computer personnel system of vital importance. The most important function of the evaluation was a costs-vs.-benefits analysis. He claimed to have found these specific savings:

1. processing new employees--as much as 1/3 less time.
2. providing routine information--reported savings of 55%-90%.
3. meeting increased EEO information needs--averaged 80% less effort.
4. routine monthly reporting--60% less effort.
5. handling seniority recordkeeping--up to 90% less effort.
6. furnishing data to payroll--50% less effort.
7. special reports (one plant reported \$27,000 in savings per year . . .).¹⁰³

¹⁰²John W. Merck, "Retention of First Enlistment Airmen: Analysis of Results of a Mathematical Simulation," and "A Markovian Model for Projecting Movements of Personnel," in Personnel Management: A Management Science Approach, ed. by Paul S. Greenlaw and Robert D. Smith (Scranton, Pennsylvania: International Textbook Company, 1970), pp. 87-99, 100-116.

¹⁰³Frank F. Tetz, "Evaluating Computer-Based Human Resource Information Systems: Costs vs. Benefits," Personnel Journal, Vol. 52, No. 6 (June, 1973), p. 453.

Walker was more systems orientated, and proposed these areas for evaluation of the personnel system:

1. Modularity--Can new programs be added without destroying the system?
2. Internal Efficiency--Can the system do internal calculations?
3. Retrievability--Can the system allow for easy access?
4. Benefits Applicability--Does the system contain employee benefits data?
5. Readability--Can the system output be easily understood?¹⁰⁴

There were other questions the personnel director could ask about his system; if these questions were asked, the system was on its way to implementation and the delivery of the benefits promised at the time of its installation.

The computer could also be used to evaluate personnel functions. IEM had a program that accomplished this task for its recruitment area. The United States was divided into four geographic areas with a recruiting headquarters in each region. This division resulted in the creation of the National Recruiting Organization. Each NRO area's requirements were checked against their results and an allocation report was generated.¹⁰⁵ Output and feedback

¹⁰⁴ Alfred J. Walker, Jr., "Evaluating Existing Computerized Personnel Data Systems," Personnel Journal, Vol. 49, No. 9 (September, 1970), pp. 742-745.

¹⁰⁵ Leon Teach and John D. Thompson, "Simulation in Recruitment Planning," Personnel Journal, Vol. 48, No. 4 (April, 1969), p. 290.

are seen in Figure II.11. The data typed into each area card are reproduced in Appendix C.

These examples of evaluation are important because, in order to justify the expense and effort of converting to a computer system, personnel managers had to be able to dollar justify or quantitatively prove the value of their system.

Personnel Models

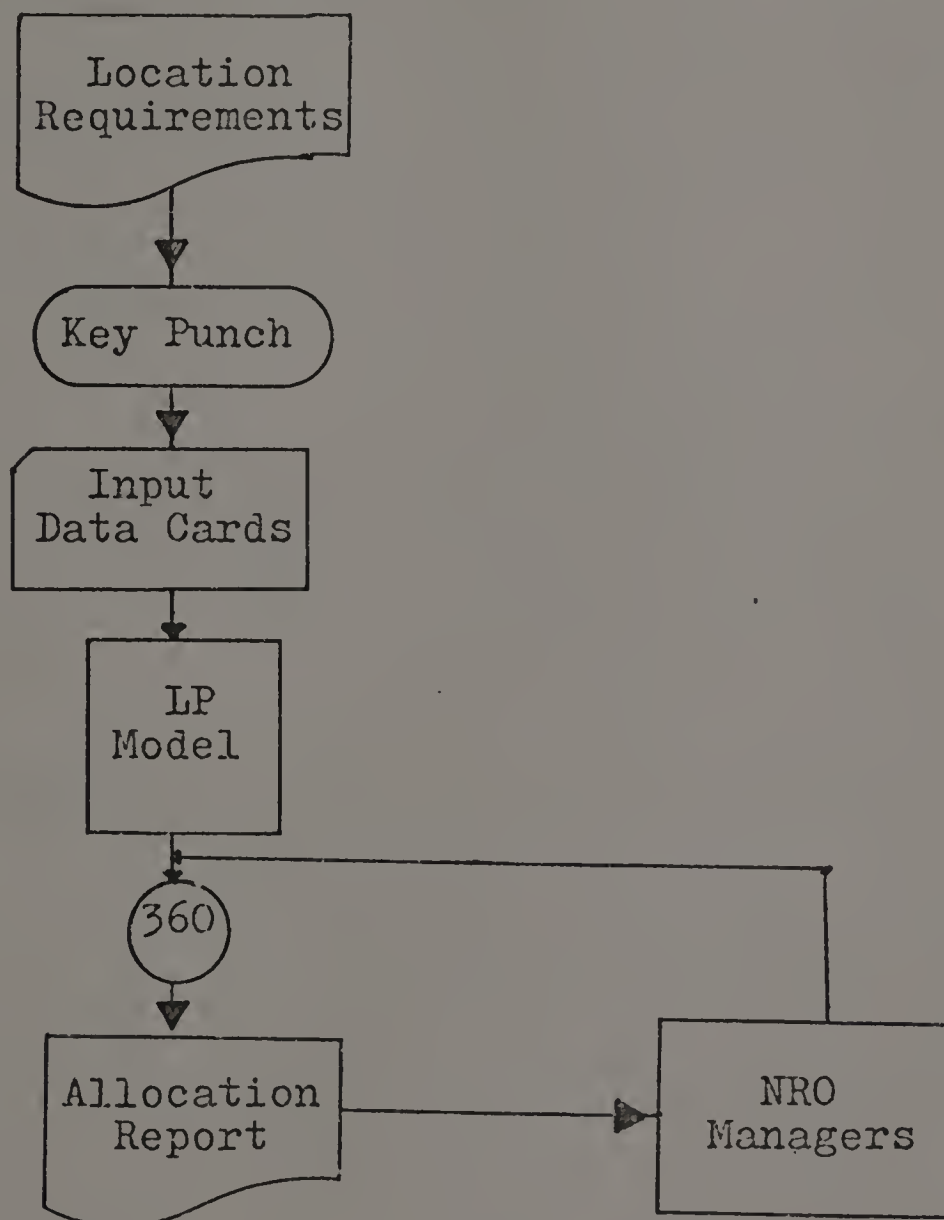
There were two basic approaches to designing an integrated personnel information system. One was modular and contained a central file and was called the "Data Bank Concept" by Rogers.¹⁰⁶ Rogers felt that, with the advent of what was called "third-generation" computers (RCA-Spectra series, GE-600 series and IBM 360 series) that had on-line real-time capability, only one central file was needed.¹⁰⁷ Rogers' concept of the appearance of the integrated personnel system is seen in Figure II.12. Tomeski and Lazarus agreed with Rogers findings as shown by their concept of the integrated personnel system.¹⁰⁸

¹⁰⁶Rolf E. Rogers, "An Integrated Personnel System," Personnel Administration, Vol. 33, No. 2 (March-April, 1970), p. 23.

¹⁰⁷Ibid., p. 23.

¹⁰⁸Edward A. Tomeski and Harold Lazarus, "The Computer and the Personnel Department," Business Horizons, Vol. 16, No. 3 (June, 1973).

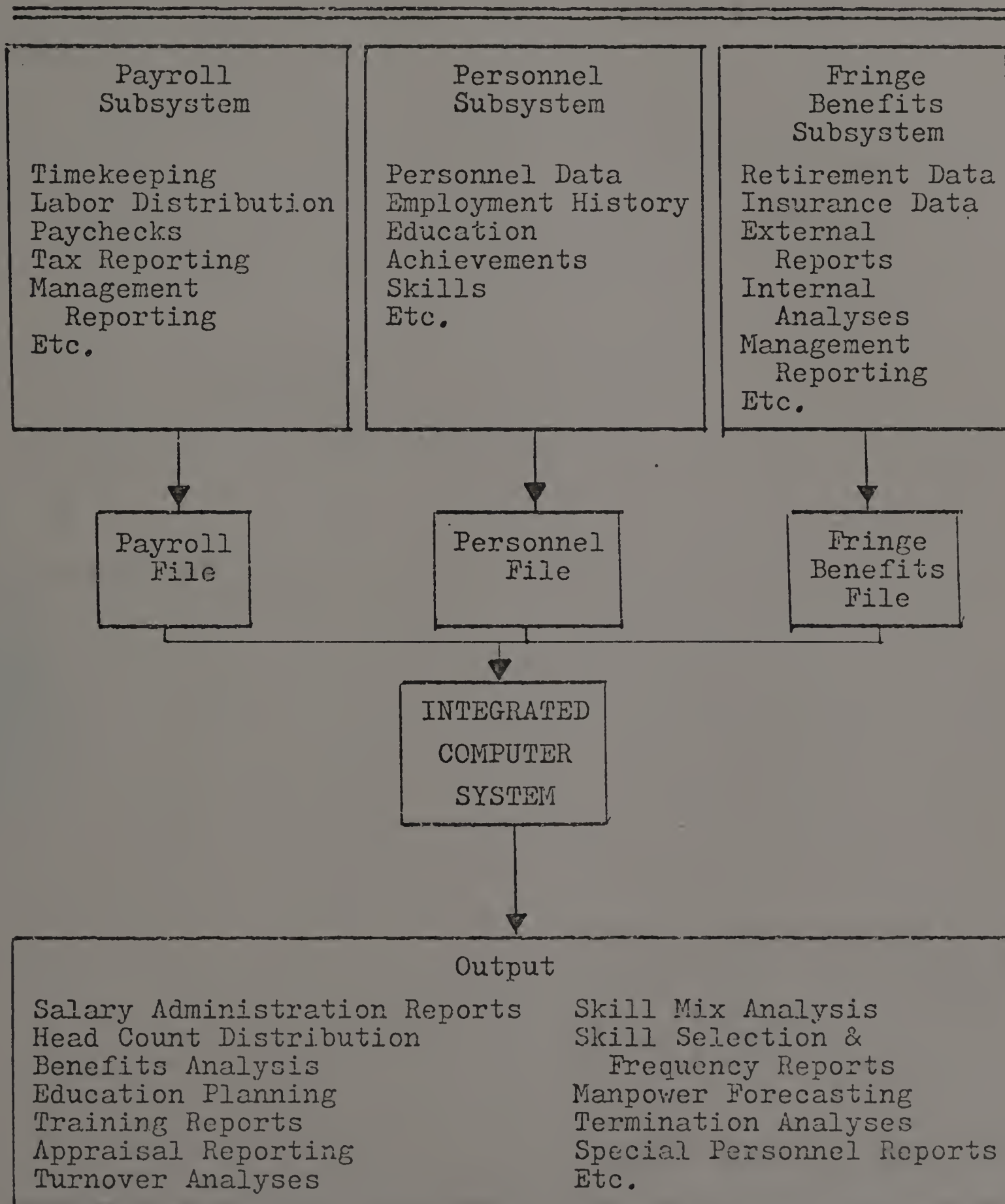
FIGURE II.11

TEACH-THOMPSON FLOW CHART OF IBM LINEAR PROGRAMMING
RECRUITMENT EVALUATION MODEL

Source: Leon Teach and John D. Thompson, "Simulation in Recruitment Planning," Personnel Journal, Vol. 48, No. 4 (April, 1969), p. 290.

FIGURE II.12

INTEGRATED PERSONNEL SYSTEM DEVELOPED BY ROLF E. ROGERS



Source: Rolf E. Rogers, "An Integrated Personnel System," Personnel Administration, Vol. 33, No. 2 (March-April, 1970), p. 25.

Figure II.13 has the various personnel data bases linked together for rapid inquiry and retrieval in addition to clearly established communication routes to other systems.

Textbooks

No survey of the literature on computer usage in the personnel function would be complete without an analysis of academic textbooks and source books.

A superior sourcebook on manpower planning and manpower information systems is Manpower Planning and Programming by Burack and Walker.¹⁰⁹ Their selection of articles and related references makes the book essential reading. An earlier sourcebook is Personnel Management: A Management Science Approach by Greenlaw and Smith.¹¹⁰ Although much of its material is management science orientated and many of its articles are dated, it remains a classic book for those who wish to know more about the possible computer uses in personnel management.

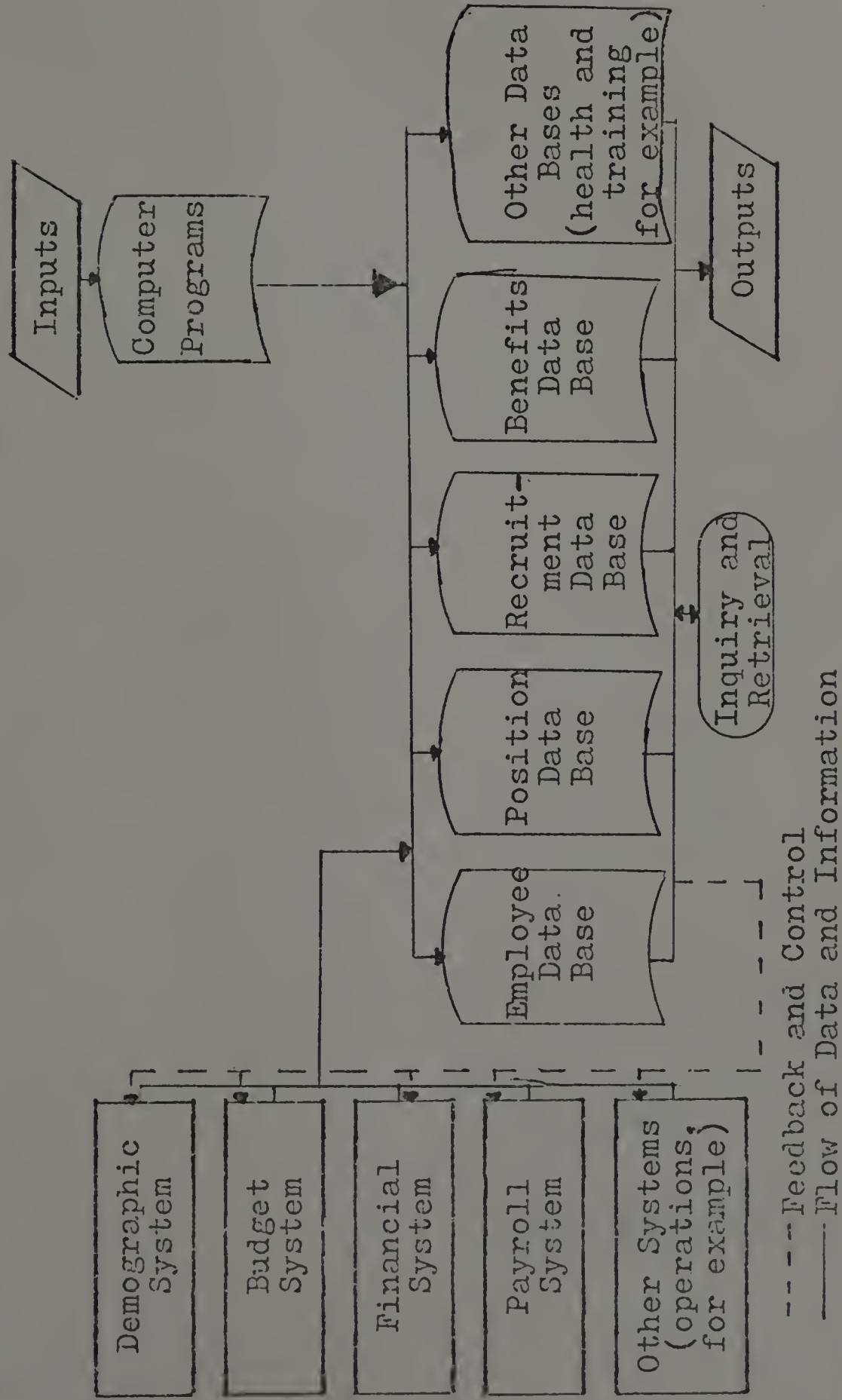
Two personnel management readings books also must be mentioned. The first, a 1967 reader compiled by Wortman,

¹⁰⁹ Elmer H. Burack and James W. Walker, eds., Manpower Planning and Programming (Boston: Allyn and Bacon, Inc., 1970).

¹¹⁰ Paul S. Greenlaw and Robert D. Smith, eds., Personnel Management: A Management Science Approach (Scranton, Pennsylvania: International Textbook Company, 1970).

EXHIBIT II.13

TOMESKI AND LAZARUS PERSONNEL INTEGRATED INFORMATION SYSTEM



Source: Edward A. Tomeski and Harold Lazarus, "The Computer and the Personnel Department," Business Horizons, XVI, No. 3 (July, 1973), p. 63.

contains an outstanding article by Austin which discusses the evolution the computer took in personnel departments, the means of computerization of the personnel function, and the direction of EDP in personnel.¹¹¹ Matteson, Blakeney and Domm are responsible for a second book of readings.¹¹² Their book is more systems orientated and contains a few articles specifically on computers in the personnel area. However, the quality of the articles does not match those of the Burack and Walker book, especially since there were many good articles to choose for inclusion at the time of its publication in 1972.

The knowledge the student of personnel management possesses in the area of the personnel EDP system depends largely on the textbook he uses. Below is a short survey of selected standard personnel texts, beginning in 1968.

While Beach's Personnel has no mention of the computer,¹¹³ McFarland's Personnel Management examines the impact of computers on organizations. He briefly explains the Federal Aviation Agency's Executive Selection and Inventory System for selecting Grade GS-13 and above

¹¹¹Barrie Austin, "The Role of EDP in Personnel," in Creative Personnel Management: Readings in Industrial Relations, ed. by Max S. Wortman, Jr. (Boston: Allyn and Bacon, Inc., 1967), pp. 500-513.

¹¹²Michael T. Matteson, Roger N. Blakeney and Donald R. Domm, eds., Contemporary Personnel Management (San Francisco: Canfield Press, 1972).

¹¹³Dale S. Beach, Personnel, second edition (New York City: MacMillan Company, 1968).

employees for position openings.¹¹⁴ Personnel Management and Industrial Relations by Yoder describes IBM's IRIS (recruiting program), CPC's GRAD and one private employment agency's search program.¹¹⁵ Lockheed's skills inventory is mentioned by Sokolik and he includes a chapter on personnel information systems.¹¹⁶

Management inventories are given a passing comment in Strauss and Sayles' classic text, Personnel--The Human Problems of Management.¹¹⁷ Megginson does a more thorough job in his book Personnel--A Behavioral Approach to Administration, explaining the use of EDP in the recruiting function. He explains programs of private companies, private employment agencies, and the public employment agency.¹¹⁸ Personnel computer systems and skills

¹¹⁴Dalton E. McFarland, Personnel Management Theory and Practice (New York: MacMillan Company, 1968), p. 418.

¹¹⁵Dale Yoder, Personnel Management and Industrial Relations, sixth edition (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1970), p. 287.

¹¹⁶Stanley L. Sokolic, The Personnel Process: Line and Staff Dimensions in Managing (Scranton, Pennsylvania: International Textbook Company, 1970), p. 166.

¹¹⁷George Strauss and Leonard R. Sayles, Personnel: The Human Problems of Management, third edition (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1972), p. 376.

¹¹⁸Leon C. Megginson, Personnel: A Behavioral Approach to Administration, revised edition (Homewood, Illinois: Richard D. Irwin, Inc., 1972), pp. 251-254.

inventories are discussed by Miner and Miner in their 1973 edition of Personnel and Industrial Relations.¹¹⁹

Despite all the information concerning the emergence of EDP in personnel, there is no mention of this information in The Personnel Management Process by French.¹²⁰ The opposite is true of Glueck's Personnel: A Diagnostic Approach. He explains several personnel systems and skills inventories.¹²¹ These findings support the conclusion that, despite the growth of computer information systems and their growing importance as seen by personnel managers, the academic community has not acknowledged the same importance.

Summary

The results of surveys of organizations showed the growth of computerization in the personnel area. The greatest use of a computer was in payroll and related areas with little analysis done in almost all other areas. All of the surveys pointed to a failure of utilization within

¹¹⁹John B. Miner and Mary Green Miner, Personnel and Industrial Relations: A Managerial Approach, second edition (New York: MacMillan Company, 1973), pp. 164-167.

¹²⁰Wendell French, The Personnel Management Process, third edition (Boston: Houghton Mifflin Company, 1974).

¹²¹William F. Glueck, Personnel: A Diagnostic Approach (Dallas: Business Publications, Inc., 1974), pp. 21-23.

the personnel function based on the gap between the potential and actual utilization.

There have been several excellent books and articles examining the systems procedures for converting to a computer system. These included both hardware and the personnel. Included in this literature were many examples of what can be put into a personnel management data base. Examples of actual personnel systems were very numerous.

Skills inventories and manpower planning were two favorite areas of the authors. Little was written about the failures encountered by organizations, but there were some indications that not all companies have been happy with their system. The evaluation of personnel systems was in the embryonic stage. The personnel information systems suggested by researchers tended to be of the elaborate type with little realization of possible limitations.

In conclusion, the research showed a mixed response to the extent of computerization within the personnel function. The surveys showed some progress in developing computerized personnel systems. There were notable examples of sophisticated systems, but most organizations did not use or intend to use computers within personnel. Although it seemed that conversion to a computer system was within the ability of any organization, the benefits were

not always worth the costs judging by the reluctance of many personnel officers to consider conversion. Finally, academic textbooks have not adequately covered advances in computer use as noted by the general lack of coverage given to computerized personnel systems. In the next chapter, the research methodology is outlined and discussed.

C H A P T E R I I I

R E S E A R C H M E T H O D O L O G Y

The purpose of this chapter is to describe the research methodology employed in this study. The methodology outlined below has been set up to provide a framework for the following areas of investigation: the number of organizations with a computerized personnel department, the specific areas of computerization, the types of computer systems which have proven successful, and the amount of systems knowledge possessed by personnel managers. In addition, the research procedures as delineated in this chapter will facilitate the development of a generalized personnel management information system.

This chapter is divided into six parts: (1) major exploratory questions pertinent to this study are listed; (2) key definitions used in this study are presented; (3) the Standard Metropolitan Statistical Area (SMSA) used is outlined; (4) the step-by-step survey procedure is described; (5) the interviewing technique used is discussed; and, (6) a summary of the chapter is presented.

Exploratory Questions

This exploratory study arose from the need for definitive information regarding the computerization of

the personnel function: How much systems knowledge of their particular organizations did personnel managers possess? What advantages have arisen from the transfer from a manual to a computerized personnel system? What disadvantages have resulted from computerizing the personnel department? What were the specific areas of concern relating to inputting data and receiving information from the computer? How did practitioners perceive their system's abilities?

Based upon the information obtained from the answers to these questions, models of the utilization of the computer in the personnel function were developed.

Definitions

The first two definitions listed below have been defined by the American National Standards Institute and Subcommittee 1 (SC1). The American National Standards Institute, an organization sponsored by the Business Equipment Manufacturers' Institute, established voluntary industry standards.¹ The SC1, a subcommittee of the International Organization for Standardization, Technical

¹IBM Data Processing Glossary (Poughkeepsie, New York: IBM Corporation, Programming Systems Publications, 1972), p. 8.

Committee 197, was designed for the development of an international vocabulary for the field of data processing.²

Management Information System. Management performed with the aid of automatic data processing. Abbreviated MIS. It is an information system designed to aid in the performance of management functions.³

System. An assembly of methods, procedures, or techniques united by regulated interaction to form an organized whole. Also, an organized collection of men, machines, and methods required to accomplish a set of specific functions.⁴

Personnel Management Information System. Previous surveys of organizations investigating the link between computers and personnel departments included all types of data processing machines as part of a computerized personnel system. This included Electronic Accounting Machines to the more advanced real-time disk-drum type machines. This report also defined a personnel management information system in the broadest terms. A PMIS would then include any combination of human and computer-based resources that would result in the collection, storage, retrieval, communication, and use of data for the purpose of efficient personnel management.⁵

Springfield-Chicopee-Holyoke SMSA

The first Step in conducting this survey was the selection of the Greater Springfield, Massachusetts, area. Exhibit III.1 is a map of this SMSA. The Springfield area was selected for several reasons: its population size--

²Ibid., p. 99.

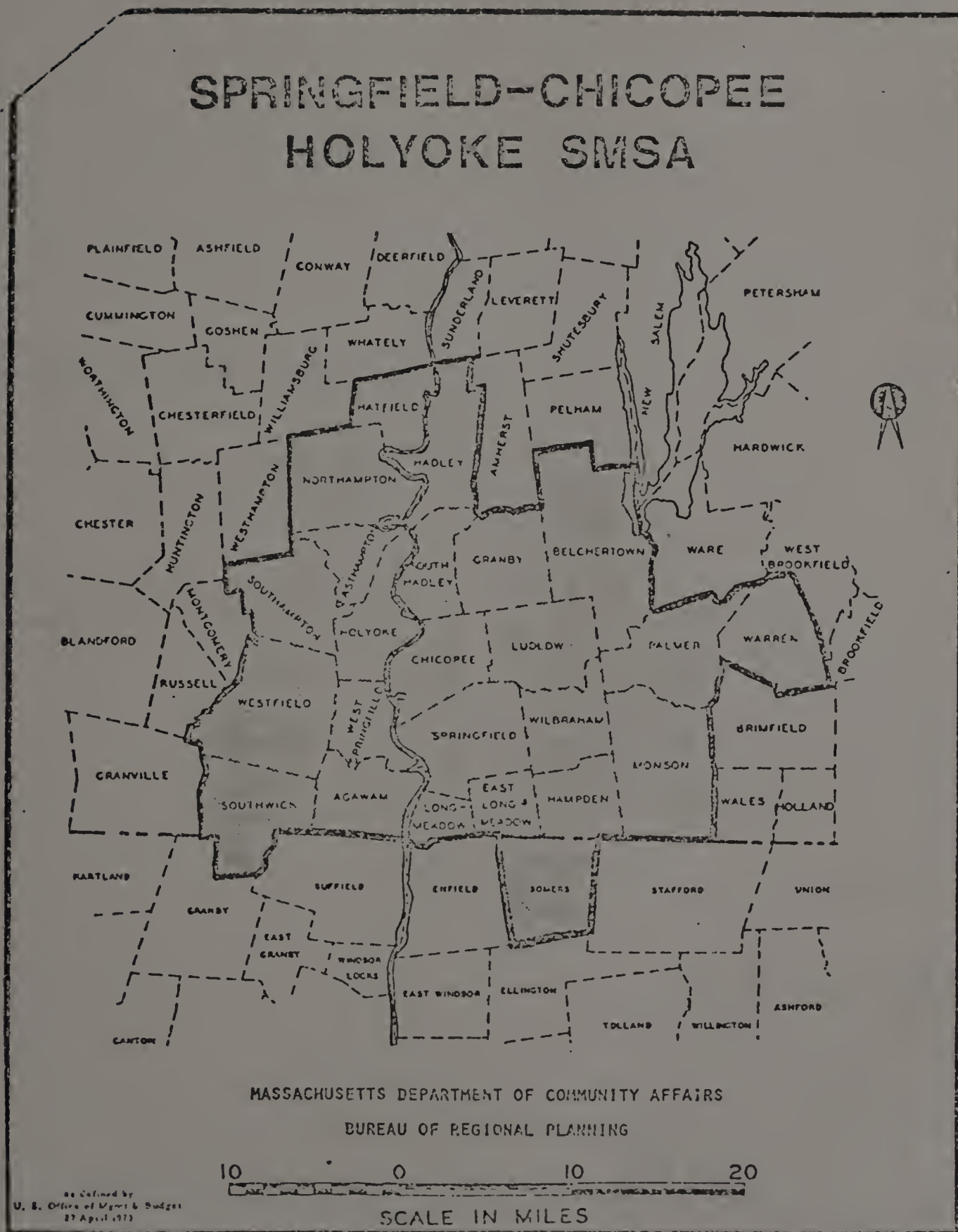
³Ibid., p. 70.

⁴IBM, p. 111.

⁵Joseph F. Kelly, Computerized Management Information Systems (New York: The MacMillan Company, 1970), p. 5.

EXHIBIT III.1

SPRINGFIELD-CHICOPEE-HOLYOKE SMSA MAP



Source: Massachusetts Department of Commerce and Development, Springfield-Chicopee-Holyoke SMSA (Boston, Massachusetts: Commonwealth of Massachusetts, 1974).

Metropolitan Area (SMSA), 529,891; its geographic location--100 miles equidistant from Boston, New York City, and Albany, New York; and its wide diversity of industry. Among the Springfield products "known the world over include American Bosch fuel-injection systems, Breck hair preparations, Buxton billfolds, Chapman valves, Milton Bradley games and toys, Monsanto plastics, Moore hand tools, Package Machinery Company, and Smith and Wesson small arms."⁶ The total extent of this survey also included organizations as far north as Northampton, Massachusetts, and as far south as Hartford, Connecticut. The survey area extended east to Sturbridge, Massachusetts, and west to Pittsfield, Massachusetts.

According to the Massachusetts Division of Employment Security, the Springfield-Chicopee-Holyoke SMSA was second only to Boston's SMSA in sustaining the state's economy. With 8,986 firms and an average covered employment figure of 160,058, this SMSA⁷ was deemed to contain a good source of firms with adequate diversity to find out the current state of computerization in the personnel field.

⁶Greater Springfield Chamber of Commerce: Membership Directory and Euyer's Guide 1973 (Woodland Hills, California: Windsor Publications, 1973), p. 4.

⁷Massachusetts Department of Commerce and Development. Springfield-Chicopee-Holyoke SMSA (Boston, Massachusetts: Commonwealth of Massachusetts, 1974).

Survey Procedure

In this section, the step-by-step approach used to gather information about computerized personnel systems in the Springfield-Chicopee-Holyoke SMSA is outlined.

Step 1. After the Springfield Area SMSA was chosen for the above reasons, a membership directory of the Greater Springfield Chamber of Commerce was obtained, along with a Manufacturers' Directory of the Greater Springfield Area. These two source documents supplied the name, address, Zip Code number, approximate number of employees, type of product manufactured or service rendered, telephone number, and president or manager of the organization. Both publications also gave the population of the SMSA being investigated.

To cover those cities and towns not included, a listing of all firms with employees attending, or who had attended Western New England College, was used. A directory of personnel offices in the Springfield area was also obtained from the University of Massachusetts.

Step 2. To make the sample more significant, firms with fewer than 100 employees were not included due to their lack of a personnel department. The number of employees in an organization was difficult to determine in all cases, resulting in approximately a dozen firms with under 100 employees being included in the survey. Because

no firm or organization included had more than 2500 employees, nine large firms outside the SMSA were added in the survey to establish a comparison point. The final sample size totaled 122, with 113 being in the SMSA sample. A listing of surveyed organizations is included in Appendix D.1.

Step 3. A letter was sent to the sample participants during June, 1975 (see Appendix D.2). This letter explained the purpose of the survey and asked for their cooperation. A self-addressed, stamped post card was included with the letter (see Appendix D.3). A post card was chosen over a detailed questionnaire instrument due to an expected better response. The post card consisted of three basic parts. The company size and type of business were asked in order to check the accuracy of the Chamber of Commerce data. The respondent was asked if the organization was using a computer in the payroll area. It was assumed if the organization did not have a basic payroll system, it was very unlikely a personnel system existed. The survey recipient was asked to sign his or her name and include a telephone number if the organization had a personnel system and wished to help in the research project.

Step 4. The next part of the survey consisted of the researcher contacting those individuals who returned the

postcard to set up appointment times for discussing their personnel systems.

Step 5. Step 5 consisted of checking by telephone those members of the survey who had not responded and asking for their assistance.

Interview Technique

All personnel managers that responded affirmatively to the question regarding the utilization of a computer in their work were interviewed. Interviews have been conducted from June 30-August 30, 1975.

The first part of the interview consisted of the interviewer reviewing the purpose of the study to establish both rapport with the respondent and to review their memory of the interview's purpose. The open-ended questions employed were those noted in the exploratory question section. The value of this type of questioning was discussed by Kerlinger:

Open-ended questions are flexible; they have possibilities of depth; they enable the interviewer to clear up misunderstandings (through probing); they enable the interviewer to ascertain a respondent's lack of knowledge, to detect ambiguity, to encourage cooperation and achieve rapport, and to make better estimates of respondents' true intentions, beliefs, and attitudes. Their use also has another advantage: the responses to open-end questions can suggest possibilities of relations and hypotheses. Respondents will sometimes give unexpected answers

that may indicate the existence of relations not originally anticipated.⁸

The respondent was encouraged to describe his or her organization's system. Interviewees usually volunteered the types of data in their system, the means of achievement of output, the types of output received, and the amount of computer knowledge they had and were expected to have to operate the system. If the answers to the above questions were not received, the interviewer employed open-ended questions to obtain the desired information.

After gaining the above information about the system, the interviewer then turned to questions designed to elicit personal opinions. The respondent was asked to discuss present or past problems with the system. Questions were also asked pertaining to the advantages they saw their computerized system providing. An overall appraisal of their system was then sought.

This informal, open-ended interviewing method was necessary for several reasons. As the personnel manager explained his or her system, it became apparent very early whether or not they had any real knowledge of the system or simply were receiving a few computer listings. Not only did the interviewer gain answers to specific questions asked, but obtained information in other areas which would

⁸Fred N. Kerlinger, Foundations of Behavioral Research: Educational and Psychological Inquiry (New York: Holt, Rinehart, and Winston, Inc., 1964), p. 471.

not have been gained in a direct interview. Good rapport was achieved which enabled the interviewer to ask the personnel officer for further help. This took the following two forms: a tour of the computer facilities and a meeting with the systems manager. The follow-up discussion with data processing people helped establish the credibility of the personnel interview.

Summary

This chapter contained a list of the major exploratory questions on which this study was based, a list of the key definitions of terms utilized, the methodology used, and survey technique employed in this project. The results of the study are discussed in the next chapter. (See Appendix D.4 for the survey cost and Appendix D.5 for the survey time table.)

C H A P T E R I V

RESEARCH RESULTS

This chapter discusses the results of the research study. After discussing the sample, a comparison of computer usage and non-usage is presented. The four variables used to investigate computer use are: the presence of payroll computerization, independent organization versus corporation division, industrial type, size of organization measured by number of employees.

The Sample

A total of 122 survey letters were mailed. Nine of these were sent to large organizations located outside the Springfield-Chicopee-Holyoke SMSA. These firms were included to establish a comparison to the smaller sized organizations of the survey SMSA. Of these nine, four did not respond to the initial letter or telephone follow-up. One firm gave answers to the post card and elaborated on the post card during the telephone follow-up. The remaining four companies indicated a willingness to assist in the research project and, thus, were interviewed. The survey response from the firms outside the SMSA is considered later in the chapter.

In the sample area, five organizations had either closed or moved out of the state. An additional five companies did not respond to the survey letter or to the follow-up telephone call. From a total sample size of 108 organizations, a 95 per cent response rate was achieved. The high response rate was attributed to the response entailed in the stamped self-addressed post card and the telephone follow-up. These results are summarized in Table IV.1.

TABLE IV.1

RESPONSE RECEIVED IN A STUDY OF PERSONNEL MANAGEMENT
INFORMATION SYSTEMS IN THE SPRINGFIELD SMSA
JUNE, 1975

Total Survey Size	122
Less organizations outside survey SMSA	<u>9</u>
Total SMSA Sample	113
Adjustments:	
Organizations no longer in operation or moved	5
Organizations that did not respond	<u>5</u>
	<u>10</u>
Net Sample Size	103

Non-use of computer in personnel. Thirty-three organizations returned the post card indicating they did not use a computer within the personnel area. As a result of the telephone follow-up, 36 organizations reported they were not employing a computer in personnel. These two

figures resulted in a 67% rate of non-use in the personnel field in the Springfield SMSA.

Use of computer in personnel. Of the total sample, 34 organizations (33%) responded affirmatively that they used a computer in some aspect of their personnel work. Thirty of these respondents were contacted, 26 in person and 4 by telephone. Two companies replied that they used a computer in their personnel work but would not help in this report; two said they were unable to help because they were too busy. In Table IV.2, the totals of use and non-use in the SMSA as reported in the survey are summarized. All firms that responded outside the SMSA reported usage of computers for personnel work.

TABLE IV.2

COMPUTER USE IN PERSONNEL SPRINGFIELD SMSA
JUNE, 1975

Computer Use in Personnel	Number of Respondents	Per Cent of Total
Yes	34	33
No	<u>69</u>	<u>67</u>
Total	103	100

Comparison of Computer Use and Non-Use

The results of the post card information for both users and non-users is described below in four sections:

the extent of computerization of the payroll employed by the organizations, the differences between individual organizations and corporate divisions, the type of business, and the size of the organization.

Payroll computerization. Generally, organizations that used a computer in personnel also used it for payroll. The results from the respondents not using a computer in personnel are divided into two categories: those who have a computer and those that do not (see Table IV.3). Respondents having access to a computer used it in 97% of payroll operations.

TABLE IV.3

PAYROLL HANDLING METHODS OF NON-COMPUTERIZED PERSONNEL ORGANIZATIONS, SPRINGFIELD SMSA, JUNE, 1975

Method of Handling Payroll	Use of Computer			Per Cent of Total
	Yes	No	Total	
Payroll Not Computerized	1	11	12	18
Use Service Bureau	4	14	18	26
Corporate Headquarters Does Payroll	8	3	11	16
Accounting Machine	--	3	3	4
Use Own Computer for Payroll	<u>25</u>	<u>--</u>	<u>25</u>	<u>36</u>
Total	38	31	69	100

Independent corporations versus division of a larger corporation. Breaking down the sample by the classification of division or independent, 50 organizations

(49%) were found to be divisions of larger entities and 53 (51%) were independent companies (see Table IV.4).

TABLE IV.4

PERSONNEL COMPUTER USE IN RELATION TO INDEPENDENT CORPORATION OR CORPORATE DIVISION, SPRINGFIELD SMSA, JUNE, 1975

Corporate Structure	Computer Usage				Total
	Yes		No		
	No.	%	No.	%	
Independent Company	12	23	41	77	53
Division	22	44	28	56	50
Total	34		69		103

Of the 50 divisions, 22 (44%) were using a computer for personnel work. The independent corporations (53) had 12 (23%) with personnel usage. These data indicated higher personnel usage by divisions. When only those companies that used computers were considered, divisions accounted for 65% of computer usage. Of the non-personnel system users, 69 organizations were non-divisional companies and accounted for 60% of such cases. Both of these sets of statistics indicated divisions of a larger organization were more likely to use a computer for personnel work.

Industrial type. Various types of manufacturing companies, food producers and distributors, wholesale and retail firms, governmental and quasi-governmental agencies, banks, publishers, insurers and other types of service

firms were contacted. This section examines the nature of the response and its relation to use of a computer system for the Personnel Department (see Table IV.5).

TABLE IV.5

INDUSTRIAL TYPE AND PERSONNEL COMPUTER USAGE
SPRINGFIELD SMSA, JUNE, 1975

Industrial Type	Personnel System		Total
	Yes	No	
Manufacturing	25	44	69
Utility	2	1	3
Retail	1	2	3
Government	1	2	3
Bank	1	4	5
Insurer	1	1	2
Publisher	1	2	3
Printer	1	1	2
Food Processing-Distributor	1	7	8
Rental	--	1	1
Hotel	--	1	1
Transportation	--	2	2
Employment Agency	--	<u>1</u>	<u>1</u>
Total	34	69	103

For comparison purposes, the last nine categories were combined into a service category with a total population of 20. This combination left five major classifications (see Table IV.6). First, the total sample size usage of 33 per cent and non-usage of 67 per cent were used to compare

the industrial types. Table IV.6 indicates that only in the food category did computer usage vary greatly, 12 per cent against the more common statistic of 33 per cent.

TABLE IV.6

COMPUTER USAGE IN PERSONNEL BY INDUSTRIAL TYPE (percentages)
SPRINGFIELD SMSA, JUNE, 1975

Industrial Classification	Personnel System		Total
	Use	Non-Use	
Manufacturing	36	64	100
Food Processing	12	88	100
Retail	33	67	100
Government	33	67	100
Service	30	70	100

Size of Organization and Computer Usage in Personnel.

The surveyed organizations were divided into four categories depending on the number of employees. Group one consisted of those organizations with less than 100 employees.

Because the number of employees was not listed in all cases in the source data used for choosing this sample and also because of layoffs, this category had to be included. The second group ranged from 100 to 499; group three ranged from 500 to 999. The last category consisted of those organizations of over 1000 employees. Table IV.7 is a breakdown by size of use and non-use of computers within the personnel departments studied.

TABLE IV.7

ORGANIZATIONAL SIZE AND PERSONNEL COMPUTER USAGE
SPRINGFIELD SMSA, JUNE, 1975

Organizational Size	Computer Usage		Total
	Use	Non-Use	
Under 100	1	12	13
100 - 199	--	19	19
200 - 299	4	12	16
300 - 399	2	4	6
400 - 499	5	6	11
500 - 599	3	2	5
600 - 699	2	5	7
700 - 799	2	--	2
800 - 899	1	--	1
900 - 999	--	1	1
1000 - 1499	4	3	7
1500 - 1999	3	1	4
2000 and over	5	3	8
No Response	<u>2</u>	<u>1</u>	<u>3</u>
Total	34	69	103

Using the categories discussed earlier, there were 13 organizations with under 100 employees and 52 between 100 and 499. Sixteen respondents had 500 to 999 employees and, finally, in the over 1000 category there were 19. When the data in Table IV.8 are examined, a misleading conclusion could be drawn about the size of the company and computer usage in personnel because of the small number of

respondents in some categories. A more accurate picture was gained by using the four group sizes outlined in Table IV.9.

TABLE IV.8

ORGANIZATIONAL SIZE AND USAGE IN PER CENT
SPRINGFIELD SMSA, JUNE, 1975

Organizational Size	Computer Usage in Personnel	Non-Computer Usage in Personnel	Total
Under 100	8	92	100
100 - 199	--	100	100
200 - 299	25	75	100
300 - 399	35	65	100
400 - 499	45	55	100
500 - 599	60	40	100
600 - 699	29	71	100
700 - 799	100	--	100
800 - 899	100	--	100
900 - 999	--	100	100
1000 - 1499	57	43	100
1500 - 1999	75	25	100
2000 and over	62	38	100

TABLE IV.9

ORGANIZATIONAL SIZE AND COMPUTER USAGE IN PER CENT
 SPRINGFIELD SMSA, JUNE, 1975

Organizational Size	Computer		Total
	Use	Non-Use	
Under 100	8	92	13
100 - 499	21	79	52
500 - 999	50	50	16
1000 and over	63	37	19

Table IV.9 showed a steady growth of computer usage in personnel as the size of the organization increased. Surprisingly, 37 per cent of the firms over 1000 did not use the computer for their personnel work.

In summary, in comparing computer users in personnel against non-users, one out of three organizations were users. Except for one isolated case, all of the users used their computer facilities for payroll, while only 12 firms in the survey did their payroll by hand. Whether or not an organization was a division of a larger entity had little impact on use; but this was not the case in those organizations that were not divisions. Almost 80 per cent of non-divisions had not computerized some of their personnel work. Manufacturing companies had the highest computer use in personnel, while food processors and distributors had the lowest usage rate. Approximately

one-third of the retail stores, government units and service firms used a computer in personnel. Finally, the data indicated that as an organization's size increased, it was more likely to use a computer in the personnel field.

Interview Results

In this section, the results of the 30 interviews conducted with personnel managers are discussed. Thirty interviews were conducted. Twelve were with firms of under 500 employees, eight with organizations of 500 to 1000 employees, five with companies between 1000 to 2000 employees, and five with organizations of over 2000 employees. The results of interviews with four organizations outside the survey area are included later in the chapter.

Systems knowledge. A series of questions dealing with the amount of knowledge required by the personnel officer to use the capabilities of their personnel system were asked. This section gives these results.

Group A--under 500 employees. Except for one individual who was previously in data processing, none of the personnel officers knew a great deal about what their system could accomplish. Sixteen per cent relied entirely upon data processing in order to obtain necessary information. This attitude was summarized by a personnel

manager who said, "I don't need to know very much about Data Processing, just what they can do." To varying degrees this comment summarized the attitude of this group. Personnel managers of corporate divisions with under 500 employees exhibited the least amount of systems knowledge. Their operation was simply an input station to corporate headquarters. Because their use of the system was limited, they took little interest in learning more about their system.

Group B--500 to 999 employees. The following are some of the comments given by the personnel officers of this group:

"I have zero technical knowledge."

". . . little knowledge of Data Processing."

". . . a superficial knowledge of computers."

". . . no knowledge of computers, I don't need to know."

"Knowledge of limitations is important."

"Little knowledge is necessary, we work together well with our systems people here and in headquarters."

This group showed more knowledge of their systems, but had little desire to become involved in their systems. They relied on programmers assigned to the payroll-personnel area, corporate headquarters, or the data processing manager for doing their work or telling them

the capabilities of the system and the means of obtaining information.

Group C--1000 to 1999 employees. Group C had more interest in using their personnel system. Only one personnel manager was not interested in expanding his or her usage. At this level the importance of good interface with the systems people became apparent. There was still the response that, "No knowledge is necessary," and, "We have little interface with data processing." But there also was the feeling that, "Every manager needs to know about computers," and, "Personnel has to understand the systems capabilities as well as limitations."

Group D--2000 employees and over. The results for this group reversed the trend shown by Group C. One personnel officer was reluctant to use the system because of a lack of trust in its reliability and of the entire data processing staff. Another manager felt that data processing should be involved with computers, not personnel people. Because of dislike for a system that personnel was forced to buy which did not meet their needs, another personnel manager expressed little regard for their system but did have some systems knowledge. A substantial amount of knowledge was possessed by only one personnel director who had been transferred from data processing. This group

as a whole expressed the opinion that a great deal of knowledge about computers and systems was unnecessary.

Advantages and Disadvantages of a Computerized Personnel System

The four groupings used in the previous section are used in the following discussion of advantages and disadvantages of a computerized personnel system as expressed by respondents in this survey. A short summary of these results is included at the end of the chapter.

Advantages of a computerized personnel system.

Group A--less than 500 employees. Three major areas were identified by Group A users as being of great value to them: (1) time; (2) increased accuracy; and, (3) cost savings. Time savings especially for typing and retyping were noted several times. Increased accuracy was noted by many respondents as being provided by the computer. Lastly, cost savings resulted from reduced clerical staff and ability to do a job rapidly. One manager commented, "We do the same thing now in less time." Other remarks were: "It frees a manager's time for other functions," and, "We now have better information to make decisions."

One officer reported that, "Personnel is now a part-time job." Not only was the computer useful for reducing processing time, increasing information accuracy and

reducing costs, but in three cases, a full-time personnel manager was not needed because of the use of a computer to handle personnel matters. Examples given were in the area of Equal Employment Opportunity reports, seniority listings and Date of Birth Listings (used for retirement counseling and insurance policies).

Group B--500 to 999 employees. No real difference was expressed by these personnel managers concerning the benefits resulting from their personnel system. Reduced costs, time savings and increased accuracy were the major advantages. A typical comment was the following, "We can do the same job better and with less people." However, there was some shift to more sophisticated statistical analyses, especially in the Equal Employment Opportunity Area.

Group C--1000 to 1999 employees. Reduced staff, resulting in cost savings, less time spent and increased accuracy were again the most frequently mentioned advantages. At this organization size, the computer was employed extensively. As one personnel manager noted, "It is like using a telephone." Another comment was, "We wouldn't return to a manual system."

A change from the two previous groups was seen in comments like, "It doesn't forget people," and, "We now have available working records." These statements point out a change in personnel that was best described by one

manager when he said, "Personnel has moved from a more clerical to a more managerial function because of better information." Not only were the typical benefits of time, cost and accuracy mentioned by this group, but the improvement in the personnel function itself was noted.

Group D--over 2000 employees. Again time, cost savings and better accuracy were mentioned. But other benefits reported were increased flexibility and better control. Computer calculations produced data that as one personnel officer said it, ". . . because data is quickly and easily extracted, information is available now that wasn't available before." The best aspects of having a computerized system that several personnel managers in this survey expressed was summarized this way by one,

We could not operate in Personnel without the use of a computer because useful variable information regarding an employee is available, when it is required and in a timely basis.

Disadvantages of a computerized personnel system.

Group A--under 500 employees. Many problems existed in the computerized personnel systems of this group. Corporate divisions at the local level complained of functioning as mere input stations to their headquarters. Inability to receive information and lack of input to future plans were similar problems. A duplication of records which increased their work load was also pointed out by this section of Group A. The second major area of

difficulty focused around the input part of the system. Getting employees to input correctly and maintaining an updated system are the two problems associated with the input area.

Other problems discussed centered on lack of data processing assistance and the cost of the system. One firm with a timesharing system was forced to relinquish the system due to cost. Where there were no problems volunteered by the interviewers, they mentioned that they had used a service bureau, and as a result of this experience, had little trouble in converting to a computerized system.

Group B--500 to 999 employees. Because of being in a field unrelated to the field of their parent company, one company discussed some corporate interface problems that existed with their system. A more common response was the input difficulties associated with keypunchers and because of these, the familiar garbage-in-garbage out (GIGO) situation. The most serious things brought up were the extra work and inflexibility associated with the companies' systems. In short, the problems in this group were similar to those outlined by Group A.

Group C--1000 to 1999 employees. The major criticisms leveled against the computer systems in this group was the problem of GIGO. This problem was mentioned

several times, primarily in connection with the people problems. Delays in getting information after requesting it and working with too complex a system also were discussed. An interesting statement about one computer system and how their company's employees reacted to it is seen from the comment, "Computers can't be human; you need the milk of human kindness."

Group D--over 2000 employees. Inflexibility in dealing with a computer system, input errors and the resulting unreliability of output were the most common complaints in this group. Two specific opinions are below:

A total person's history is a total waste.

It is very limiting to buy software outside.

These two statements taken in conjunction with all of the previous statements show that although there are benefits to having a computerized system, there are also drawbacks and headaches. An indication that some companies went overboard in computerizing was mentioned several times.

Personnel computer systems. Sample organizations are chosen for discussion in each of the four groupings, due to the advantages of their systems. These discussions of specific organizations in the survey are followed by a summary of all the computer systems in that particular grouping. In all cases care was taken to protect their identity.

Group A--under 500 employees. Example 1. The first example in this group is a manufacturing concern of 350 employees chosen because Personnel is a part-time job, the result of efficiencies from possessing a computer. Efficiency stemmed from the benefits of getting personnel reports from a modified payroll system. Employees are put on the system when first hired by means of a payroll change notice and the application blank to supplement personnel data. Time cards with production data are edited every day and keypunched at the end of the week. This edited time card serves as the source document for both payroll and personnel. Data included in the payroll file is shown in Appendix E. To change certain payroll information the payroll change notice is used (see Exhibit IV.1).

Payroll reports are generated not only for paychecks but for personnel and production uses. Types of reports are the deduction listing which shows by various breakdowns the amount by employee for the savings plan, savings bonds, insurance, pensions, United Fund and other authorized deductions. Government payroll requirements are generated when needed. The second set of reports are personnel oriented. These include a monthly listing of employees who are due for merit review. Every quarter a run is generated showing the entire year to date history on each employee. Not only are personal and company data in this report but

EXHIBIT IV.1

PAYROLL CHANGE NOTICE

PAYROLL CHANGE NOTICE

PLEASE ENTER THE FOLLOWING CHANGE(S) IN YOUR RECORDS TO TAKE

EFFECT _____ DATE OF LAST INCREASE _____
(DATE)

EMPLOYEE _____

EMPLOYEE NO. _____

THE CHANGE(S)

<input checked="" type="checkbox"/> CHECK ALL APPLICABLE BOXES	FROM	TO
<input type="checkbox"/> DEPARTMENT		
<input type="checkbox"/> JOB		
<input type="checkbox"/> SHIFT		
<input type="checkbox"/> RATE		
<input type="checkbox"/>		

REASON FOR THE CHANGE(S)

- HIRED
- RE-HIRED
- PROMOTION
- DEMOTION
- TRANSFER
- MERIT INCREASE
- PROBATIONARY PERIOD COMPLETED
- RE-EVALUATION OF EXISTING JOB
- RESIGNATION
- RETIREMENT
- LAYOFF
- DISCHARGE

LEAVE OF ABSENCE FROM _____ UNTIL _____
(DATE) (DATE)

OTHER (EXPLAIN) _____

RATING SUPERVISOR _____ DATE _____

REVIEWED BY _____ DATE _____

FINAL APPROVAL _____ DATE _____

PERSONNEL APPROVAL _____ DATE _____

also absences are shown by various breakdowns such as weekly or just Mondays, etc., but also regular and overtime pay is listed for each employee.

Production type reports are the third category generated from the payroll file. Overtime by department and by branch and employee is shown for that week and year to date. The final listing which was described as particularly useful in cutting down on administrative expense is the Indirect and Direct Report which shows both total costs for each department. By combining these three sets of reports, a better and more efficient use was made of the company's employees while eliminating the position of Personnel Manager.

Example 2. The second company is a division of a larger one that used their headquarter's computers to generate their reports. Again payroll and personnel are tied together. Initial data are entered from the application blank and payroll identification card, similar in style to Example 1. Like that example, daily attendance cards are keys to the system's value and usefulness. The system is designed to improve the organization's absentee and overtime problems. Thus, a number of reports are generated weekly, monthly, quarterly, and yearly to help management control their costs and manpower efficiency.

Other reports and listings generated are listed below:

1. Employee review dates.
2. Organizational chart by division, department, section, job classification.
3. Seniority listings by division, department, group.
4. Job classification listings.
5. Employment date by section.
6. Employee listing by union by birth date.
7. Birth date.
8. EEO reports.

Summary of Group A. All organizations combine payroll and personnel. Only one organization not having this combination indicates they are planning to combine both departments. Personnel reports are the result of computerized payroll system with the capability of going beyond the printing of paychecks. In the private sector, great use is made of the reports showing employee efficiency and attendance. This ability allows one company to eliminate the personnel management position and the other firms surveyed in this group also point to savings in the personnel area because of their system.

Group B--500 to 999 employees. Example 1. No Personnel Department. This organization combines payroll with personnel and can operate without a Personnel Director. As a spin-off from the computer applications in payroll,

inventory and production planning and scheduling, personnel reports are generated for managerial and accounting uses. The data on the Payroll Master File are entered by using the forms seen in Appendices F and G. Approximately two dozen payroll reports can be generated. These reports are used for payroll, personnel and production purposes. An on-demand capability can be used by looking up in the program index the report wished, and calling the data processing department for it. The master personnel file includes the following:

1. Employee number.
2. Department.
3. Name.
4. Social Security number.
5. Federal tax exemptions.
6. State tax exemptions.
7. Rate of pay.
8. Married or single.
9. Date of hire.
10. Date of birth.
11. Termination date.
12. Extra federal tax withheld.
13. Extra state tax withheld.

Example 2. Division of a Parent

Organization. This company has a well-defined personnel

function and a sophisticated personnel system because corporate headquarters has a group dedicated to improving personnel's ability to use a computer system. Personnel initiates all actions with the form shown in Exhibit IV.2. The input from the local division is put into two files at corporate headquarters, a Personnel File and a Payroll File. By combining the information in both files, many reports can be issued. The payroll file has the information needed to generate all reports necessary to meet those requirements incumbent upon them by law.

The personnel file has a great deal more information. A Skills and Interest Inventory for certain occupational levels is operational and serves as a skills inventory and retrieval system for all units of the corporation and its divisions. The Skills Inventory is updated annually and to record changes. It includes highest educational level obtained, current grade and pay level, work history and appraisals, testing programs and training programs attended. According to the interviewee, the system works very well. Other reports generated are listed below:

1. Seniority listings.
2. Date of birth.
3. Vacation listing, showing eligibility and duration.
4. Equal Employment Opportunity Report.

EXHIBIT IV.2

PAYROLL-PERSONNEL INFORMATION ACTION FORM

COMPANY - PERSONNEL ACTION RECORD

ALL ACTIONS		Date of Form _____
NAME _____	EMPL. NO. _____	
Effective Date _____	Original Empl. Date _____	
Dept. _____	Unit Service Code _____	
Div. Dist., Unit _____	Barg. Local No. _____	
City, County & State _____ <small>(Req'd. only upon employment or change in Co. location)</small>		
Job Title _____	_____ <input type="checkbox"/> Exempt <input type="checkbox"/> Non-Exempt	
Job Code & Grade _____		
<input type="checkbox"/> EMPLOYMENT	<input type="checkbox"/> RE-EMPLOYMENT	<input type="checkbox"/> Eligible for Benefit Plans
Birth Date _____	Soc. Sec. No. _____	Draft Status _____
Address _____		Zip Code _____
Base Rate at Rate of \$ _____	<input type="checkbox"/> Hr. <input type="checkbox"/> Mo. <input type="checkbox"/> Year	
Sex <input type="checkbox"/> M <input type="checkbox"/> F	Race <input type="checkbox"/> White <input type="checkbox"/> Oriental <input type="checkbox"/> American Indian	<input type="checkbox"/> Negro <input type="checkbox"/> Spanish Am. Exp. Code _____
CHANGE IN STATUS		
Pay Basis: <input type="checkbox"/> Hr. <input type="checkbox"/> Mo. <input type="checkbox"/> Yr.	Expense Code _____	
Present Base Rate _____	<input type="checkbox"/> Rate Change	
at rate of: \$ _____	<input type="checkbox"/> Transfer	
<input type="checkbox"/> Inc. <input type="checkbox"/> Decr. Recum. \$ _____	<input type="checkbox"/> Code or Name Change	
New Base Rate _____	<input type="checkbox"/> _____	
at rate of: \$ _____	Reason for Rate Change:	
Amt. & Date of last <input type="checkbox"/> inc. <input type="checkbox"/> dec. \$ _____	<input type="checkbox"/> Promotion	
date _____	<input type="checkbox"/> Merit	
Former Job Title _____	<input type="checkbox"/> Length of Service	
_____	<input type="checkbox"/> Demotion	
_____	<input type="checkbox"/> Job Reclassification	
_____	<input type="checkbox"/> _____	
Trans. from (Ur III) _____	Birth Date _____ <small>(Req'd. only in trans. to reg. empl.)</small>	
SEPARATION		
<input type="checkbox"/> Resignation	Reason _____	
<input type="checkbox"/> Release	Address _____	
<input type="checkbox"/> Discharge	Zip Code _____	
<input type="checkbox"/> Retirement	<input type="checkbox"/> Has received full vacation	
<input type="checkbox"/> _____	<input type="checkbox"/> Pay _____ hours vacation pay, less _____ hours _____ previously received.	
Send Check to: <input type="checkbox"/> Above Address		<input type="checkbox"/> E. R. Office

REMARKS:

P.I.C.

Approvals

Authorized Signature _____

5. Merit review date.

6. Employee listings.

All of these reports are from the personnel file. Any specific information needed regarding an employee can be received from combining the payroll and personnel files with a two-day turnaround from corporate headquarters. Not all information is in a computer file, but this firm was planning on more extensive utilization of their computers in the future.

Example 3. A Division of a Parent

Organization. This company uses a turnaround document. A master employee file is kept at corporate headquarters. When someone is initially hired, all information is entered on the turnaround document with a carbon copy being kept at the local level. Whenever a change occurs, the box in the turnaround document is circled, the old information has a line drawn through it and the new information is written above the old information. The document is then sent to headquarters and a new document is returned. After checking to see if the information is correct, the old document is discarded. Because of this procedure, the personnel department is able to operate easily using a computerized system (see Exhibit IV.3).

There are two computerized summary reports. The first report is the employee master inventory. This listing by

EXHIBIT IV.3

PERSONNEL-PAYROLL HARD COPY RECORD FORM

A LAST NAME FIRST NAME N I BADGE I CC I ADDRESS I CITY I STATE/PROV I ZIP I COUNTRY I HOME PHONE I PROCESSED I
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

B STREET I CITY I STATE/PROV I ZIP I COUNTRY I HOME PHONE I PROCESSED I

C SOC SEC I BACH/ASSOC DEG I GRADUATE DEG I BIRTH I SEX/MARRI I MILI FAMILIAR I PREV LAST NAME I

D JC I TITLE I HIRE I GUIDE I REMIRE I ADJ HIRE I REO I INRAI I SOURCE I

E HOUR I PERK/MONTH I YEAR I NEXT REV I SUPSID RATE I MTG: REA: PC: CLKI SH I STAT I PF I REOIVET I

F FED I STA I NS I OS I STA CDI I RES I OFH I UN2: UTH3 I INS I DATE I STOCK I STOCK NAME I

G SITE: BLDG: FLR I POST I MAIL I PHONE I UNDI I OSOUCT I TYPI I BOND NAME I BOND NAME I COMM: DEDUCT I SAVINGS I

H LOA START: PAY THRU I LOA END I NET: STATE: TERMINATE: PAY THRU I REAT: CO: AC: REB: AIR: CAR: FLE: P: SEC: TV: L: R: I

I DATE I AMOUNT I PCT RTG P I JC I DATE I AMOUNT I PCT RTG R I JC I DATE I AMOUNT I PCT RTG R I JC I

J EFFECTIVE DATE I SCHOOL I YEAR I DEGREE I MAJOR I

K COMMISSION I 1ST DEGREE I 2ND DEGREE I

L APPROVAL 1 I DATE I APPROVAL 2 I DATE I APPROVAL 3 I DATE I

cost center, department and alphabetically has the following information columns:

1. Badge number.
2. Name.
3. Minority code.
4. Date of birth.
5. Date of hire.
6. Employment status.
7. Job class.
8. Wage class.
9. Wage rate.
10. Weekly pay.
11. Annual pay.
12. Date of last salary increase.
13. Amount of last salary increase.
14. Per cent of last salary increase.
15. Amount of prior increase.
16. School attended.
17. College degree.
18. Major.

From these data, the personnel manager is able to draw most information necessary for his work. The second major document generated for personnel use is an index by job classification which shows by jobs the highest to lowest

paid. This information is used in salary administration and recruiting, especially for salaried recruiting.

Other reports include benefit runs for insurance purposes and deduction listings. Equal Employment Opportunity runs including applicant tracking are on the computer. This personnel department relies heavily on these reports while, at the same time, being relatively unknowledgeable about computers.

Example 4. User of a Service Bureau. A concern with absenteeism pervades this company's system derived from the payroll system. Reports include listings by date of birth and hire, insurance reports, address labels, salary brackets and general alphabetical listings. A typical absentee report is shown in Exhibit IV.4, and a combined payroll-personnel report is seen in Exhibit IV.5. Although absentee reports are of prime importance, this company does have the capability of generating EEO reports, benefit breakouts and merit review anniversaries.

Summary of Group B. At the 500 to 999 level, a division arises between those firms that combine both payroll and personnel into one system and those organizations that have personnel reporting their input directly to data processing and being independent of payroll. A growing sophistication is exhibited by several of the computer users but there are also many personnel

EXHIBIT IV.4

ABSENTEE REPORT EXAMPLE

BRANCH 025 TOTALS				
TOTAL HOURS WORKED	14,416.4	ABSENCE ANALYSIS		
AVERAGE NUM OF EMPLOYEES	101.7	DAYS ABSENT - SICK + PAID	37.5	
		DAYS ABSENT - SICK + UNPAID	10.5	
		DAYS ABSENT - PERSONAL UNPAID	10.0	
		DAYS ABSENT - PERSONAL PAID	.0	
		DAYS ABSENT - MILITARY	.0	
		DAYS ABSENT - JURY DUTY	.0	
DAYS SCHEDULED	2,035.0	DAYS ABSENT - FUNERAL	.0	
MINUS DAYS ABSENT	93.0	DAYS ABSENT - OTHER	.0	
ACTUAL DAYS WORKED	1,942.0	TOTAL UNSCHEDULED ABSENCE	58.0	
		DAYS ABSENT - EARNED DAYS	7.0	
AVG HOURS WORKED PER WEEK	37.1	DAYS ABSENT - VACATION	28.0	
PERCENT ABSENTEEISM TOTAL	4.5	TOTAL SCHEDULED ABSENCE	35.0	
PERCENT ABSENTEEISM UNSCH	2.8	TOTAL ABSENCES	93.0	

EXHIBIT IV.5

PAYROLL-PERSONNEL REPORT EXAMPLE

BR	DEPT	EMPNO	AVERAGE HOURS PER EMPLOYEE	NAME	DATE
			HOURS DAYS		
026	002	0117	39.5		5/ 4/75
026	002	0117	37.3		5/11/75
026	002	0117	38.3		5/18/75
026	002	0117	38.3		5/25/75
026	002	1147	36.2		5/ 4/75
026	002	1147	37.2		5/11/75
026	002	1147	35.9		5/18/75
026	002	1147	35.7		5/25/75
026	002	1689	35.7		5/ 4/75
026	002	1689	35.8		5/11/75
026	002	1689	29.5	1.0S	5/18/75
026	002	1689	35.0		5/25/75
026	002	1879	35.7		5/ 4/75
026	002	1979	30.9		5/11/75
026	002	1879	35.9		5/18/75
026	002	1879	29.2	1.0S	5/25/75
026	002	2005	35.8		5/ 4/75
026	002	2005	35.3		5/11/75
026	002	2005	37.2		5/18/75
026	002	2005	35.0		5/25/75
026	002	2250	35.0		5/ 4/75
026	002	2250	35.0		5/11/75
026	002	2250	34.0		5/18/75
026	002	2250	35.0		5/25/75
026	002	2268	15.7	2.0S 1.0P	5/ 4/75
026	002	2268	28.0	1.0P	5/11/75
026	002	2268	35.3		5/18/75
026	002	2268	30.3	1.0P	5/25/75
026	002	2306	35.0		5/ 4/75
026	002	2306	28.5	1.0U	5/11/75
026	002	2306	35.0		5/18/75
026	002	2306	35.0		5/25/75

departments that do not fully comprehend the ability of a computer. It seems unlikely that they will develop into sophisticated users. The reports and listings generated are very similar to the first group's, although a great many reports of various types are being used. None are very analytical, but they can be very useful and necessary.

Group C--1000 to 1999 employees. Example 1.

Division. A joint payroll-personnel system with a sophisticated skills and interest file characterizes this organization's operation. (See Exhibits IV.6 and IV.7.) Any payroll changes must be approved by Personnel and all personnel data is sent through payroll for keypunching into the company's system. The skills inventory is for exempt salaried people and is used for searching when job openings occur. Weekly, an overtime report by department is generated, and monthly, a listing of the number of employees by department is received. Equal Employment Opportunity reports are printed quarterly and yearly. Monthly and yearly, a budgetary report is issued to each department showing all costs incurred year to date.

The wage and salary administration area uses the computer file, as well as the recruiting and selecting staff. The system has a great deal of information on salaried employees but little except payroll data on its hourly employees. Any unusual computer report requests

EXHIBIT IV.6

PERSONNEL SKILLS INVENTORY INPUT DOCUMENT

INDUSTRIAL RELATIONS MOORE BUSINESS FORMS INC. T

THIS FORM MUST BE PREPARED ON A TYPEWRITER

PERSONAL CAREER PROFILE

RECORD NO. 102710 SOCIAL SECURITY NO. [] [] [] DATE PREPARED [] [] []

01	← LINE	ADD CHANGE DELETE 1 2 3	LAST NAME	FIRST NAME	MIDDLE INITIAL	EMP. NO.	AREA CODE	EXCHANGE NUMBER		
			YOUR PREFERRED COMINATION				HOME TELEPHONE			
LET THE BLANK UNLESS APPLICABLE										
02	← LINE	1 2 3	CITY	STREET	APT. NO.		CITY			
03	← LINE	1 2 3	STATE	ZIP CODE	COUNTRY	SEX	MARITAL STATUS	FIRST NAME	MO DAY YR	
OTHER THAN US										
04	← LINE	1 2 3	DEPARTMENT NAME			SALES ONLY				
05	← LINE	1 2 3	BIRTH DATE	AGE DATE	SCOT. SERVICE	RESERVE	MILITARY EDUCATION		BRANCH OF SERVICE AND UNIT	
06	← LINE	1 2 3	MO DA YR		MO DA YR		MO DA YR		MO DA YR	
07	← LINE	1 2 3	COLEGE EXPERIENCE		UNIVERSITY EXPERIENCE		OTHER EXPERIENCE			
08	← LINE	1 2 3	AREA OF BUSINESS DESCRIPTION			LANGUAGE		LANGUAGE		
			COMPLETE ONLY WHEN OTHER AREA OF BUSINESS IS APPLICABLE			CIRCLE ANY THAT APPLY		CIRCLE ANY THAT APPLY		
09	← LINE	1 2 3	BUSINESS EXPERIENCE							
10	← LINE	1 2 3	MO DA YR		MO DA YR		MO DA YR		AREA OF BUSINESS	
11	← LINE	1 2 3	MO DA YR		MO DA YR		MO DA YR		AREA OF BUSINESS	
12	← LINE	1 2 3	MO DA YR		MO DA YR		MO DA YR		AREA OF BUSINESS	
13	← LINE	1 2 3	MO DA YR		MO DA YR		MO DA YR		AREA OF BUSINESS	

EXHIBIT IV.7

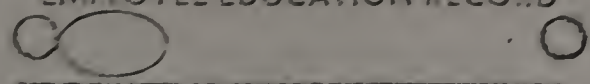
PERSONNEL SKILLS INVENTORY EDUCATIONAL INPUT DOCUMENT

THIS FORM MUST BE PREPARED ON A TYPEWRITER

EMPLOYEE EDUCATION RECORD

03

Form with horizontal lines and a small box.



NAME	DATE	GRADE	DEPARTMENT	STATUS	DATE PREPARED
------	------	-------	------------	--------	---------------

EDUCATIONAL LEVEL	EDUCATIONAL INPUT			DEPARTMENT	STATUS	DATE PREPARED
	1	2	3			
61						
62						
63						
64						

EDUCATIONAL LEVEL	EDUCATIONAL INPUT			DEPARTMENT	STATUS	DATE PREPARED
	1	2	3			
65						

EDUCATIONAL LEVEL	EDUCATIONAL INPUT			DEPARTMENT	STATUS	DATE PREPARED
	1	2	3			
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						

are given to a programmer assigned to the payroll-personnel area.

Example 2. Independent Corporation. This company uses four short forms to maintain a computerized records system that have as spinoffs several listings of personnel use. The four input forms are: (a) an employment notice; (b) an employee status change notice; (c) a payroll deduction authorization card; and, (d) a termination notice. (See Appendices H and I.)

The system is a combined payroll-personnel system which is updated not only from the four notices but weekly from the time card seen in Appendix J. Productivity by department and employee, the company wage structure and coded time cards are the secondary by-products of the system. The most important feature is the computerized employee records.

All employees, including top management, are on a hard copy file in the personnel office. This computerized listing is updated every week and serves as a working record. The information in the report can be generated by any listing desired. Below is the information in the record:

- | | |
|----------------------|--------------------------------|
| 1. Clock number. | 11. Weekly salary. |
| 2. Name. | 12. Yearly salary. |
| 3. Address | 13. Federal exemptions. |
| 4. Birth date. | 14. State exemptions. |
| 5. Vacation credit. | 15. Department. |
| 6. Pension credit. | 16. Shift. |
| 7. Job code. | 17. Social Security
number. |
| 8. Job title. | 18. Sex. |
| 9. Telephone number. | 19. Marital status. |
| 10. Labor grade. | |

This report has eliminated traditional employee records. Through trial and error this company has arrived at this stage.

Summary for Group C. For this group, some personnel systems are joined with payroll and other systems are independent of payroll. No new reports or uses are noticed, but there is a much greater understanding of their computer system and trust in it. All companies report that the computer has increased their ability to manage and, in fact, has increased their prestige. As one personnel manager notes, "Personnel has moved from a clerical to a managerial job."

Group D--over 2000 employees. Example 1.

Division. A combined payroll and personnel system is used by this division. More information is kept on salaried

than hourly employees. The payroll department does all the updating necessary. Typical reports generated by this system include seniority listings and address labels, anniversary listings and salary listings by department. Employee benefit information is computerized to print out pension and retirement data, and savings and investment reports. Insurance listings are also available. The information generated by this system is used more for historical work than analytical analysis. Although there is nothing extraordinary about the system, the size of the firm dictates the computerization of this information.

Example 2. Personnel system package bought from outside firm. A very sophisticated computerized payroll-personnel information system has been purchased by this organization. It consists of the following files: a payroll file containing basic payroll data, the personnel file, updated to retain mostly non-payroll data on current and previous employees, and the auxiliary file which contains historical service and salary data. The personnel file is the most extensive one containing grade, performance, education, job category, car registration and sundry other data. It is this file which is used most often. The auxiliary file is considered of little use.

The input document to the personnel system is shown in Appendix K. The payroll file generates payroll reports

and employee benefit listings as well as federal and statistical information. The personnel file gives cost by cost center, salary information for surveys, EEO reports and employee listings. In spite of its potential, there are a number of reasons why the system is not being utilized as its sellers have claimed.

Summary of Group D. This group of organizations is similar to other organizations with the exception of larger numbers of employees. The same type of reports and listings are being received from their systems and less understanding of the system is expressed by several members of this group compared to Group C. Although the use of a computer is widespread, its potential is not realized by any of these organizations.

Large companies outside of Springfield-Chicopee-Holyoke SMSA--over 5000 employees. Example 1. 5000 employees. This large division of a larger company is charged with setting up its own personnel system. Its most unique problem is the job posting difficulties resulting from having several unions and over 5000 employees. The result of this order is a combined personnel-payroll system. The main output document from the computer that personnel uses is a four-inch by six-inch (4" x 6") document. The input source for it is sent

from personnel to payroll and then to data processing. Appendix L is the source document.

The major difficulty in the personnel department revolves around job posting and bidding; this has been computerized using the form shown in Exhibit IV.8. Without going into the specific details, personnel now handles the weekly average of 500 bids easily. File maintenance is simplified by microfilming all bid requests and resultant actions. A recent slowdown in business forced 150 employees to be laid off resulting in almost 900 employees being affected. The computerized system using Exhibit IV.8 handles all moves quickly and easily. The reports generated by this system are described in the following section.

The employee current status listing by job code and seniority is a weekly report (see Exhibit IV.9). Different ways this report is generated is by alpha name, continuity date, birth date, area summary, physical classification and years of education. A monthly job classification profile by department, area, person and by people whose paid rate exceeds their job rate is available every month.

Minority reports by several breakdowns and labor turnover reports are in the system. Listings of downgraded and lack of work employees are monthly runs, as are monthly quits and discharges. Job history on employees is available

EXHIBIT IV.8

JOB POSTING AND BIDDING FORM

EMPLOYEE'S FOLDER - STATUS & APPROVAL SLIP														
REPORT #		TYPE OF ACTIVITY						DEPT.			ISSUED DATE			
NAME				S.S. ACCT. #			COMP. #		PAY #		STATUS	UNION	INAC REASON	
LOCAL STREET					LOCAL CITY					HOME TELEPHONE				
		AREA		PHONE #										
LOCAL STATE		LOCAL ZIP	BIRTH DATE		CONT. SER. DATE		SENIORITY DATE		TURNOVER	TRANSF. REASON	EFFECTIVE DATE			
JOB CODE # 1	OCCUPATION DESCRIPTION				JOB RATE SYMBOL		PAID RATE SYMBOL		PAID RATE		EXEMPT LEVEL	ACCOUNTING DISTRIBUTION		
GRADE	SHIFT	BASE HRS.	SEX	MARITAL	ETHNIC	CITIZEN	PHYS CLASS	TAX EX.	YRS EDUC	JOB CODE		COMPONENT		PAY #
JOB CODE # 2	REASON FOR TRANSFER OR REMOVAL				TRANSFER CODE		WORKED		PAID		FORMER JOB RATE SYM.			
BLDG.	ROOM	SUPERVISOR				REPORT FOR WORK		FORMER		DEPT.		PAID RATE SYM		
YET	LEGAL STATE		REQUEST #	CRED. SER. DATE		SUPV. RATING					FORMER OCCUP. DESCRIP.			
	DEP.	ATT.	REH.	ABIL.	SAF.									
PHYSICAL RESTRICTION														
PERSONNEL SECTION			APPROVING MANAGER			DEPT EMPLOYEE RELATIONS			CURRENT SUPERVISOR			APPROVALS		
PF-5007 (9-73)														

EXHIBIT IV.9

EXAMPLE OF PERSONNEL COMPUTER PRINTOUT--CURRENT EMPLOYEE STATUS LISTING

PT	EMPLOYEE NAME	SENIOR DATE	COMP#	PAY #	JOB CODE	JOB RATE	PAID RATE	JOB DESCRIPTION	#2	TRADES-255	BY	JOB CODE & SRN	DATE RUN	PAGE	SOC-SEC-NO
04-02-73	04-02-73	41074	5614	0300	R-14	4,3900	4,3900	MAKE NP PT	120N	255	A	04-02-73	07/13/75	1	
04-08-75	04-08-75	46269	5620	0410	R-16	4,6750	4,6750	MIL FOL		12	A	11-29-40	12-05-71	1	
04-15-71	04-15-71	40016	5471	0410	R-16	4,6750	4,6750	MIL FOL		00	F	07-10-41	08-01-16	1	
04-10-42	04-10-42	41336	5112	0410	R-16	4,6750	4,6750	MIL FOL		00	D	03-04-42	12-26-70	1	
05-27-49	05-27-49	41787	5491	0410	R-16	4,6750	4,6750	MIL FOL		00	I	04-10-49	03-10-76	1	
04-20-53	04-20-53	48209	5321	0410	R-16	4,6750	4,6750	MIL FOL		00	A	05-20-53	02-13-73	1	
04-07-55	04-07-55	40553	5663	0410	R-16	4,6750	4,6750	MIL FOL		00	A	09-07-55	05-15-17	1	
07-27-66	07-27-66	44627	5610	0410	R-16	4,6750	4,6750	MIL FOL		00	A	07-27-66	01-26-12	1	
06-03-65	06-03-65	40779	5620	0410	R-16	4,6750	4,6750	MIL FOL		00	A	08-01-66	04-21-15	1	
06-03-65	06-03-65	40395	5161	0410	R-16	4,6750	4,6750	MIL FOL		00	A	03-08-66	01-18-36	1	
11-23-66	11-23-66	40008	5311	0410	R-16	4,6750	4,6750	MIL FOL		00	A	11-20-66	11-15-39	1	
01-30-67	01-30-67	44338	5161	0410	R-16	4,6750	4,6750	MIL FOL		00	A	01-30-67	01-29-16	1	
02-13-67	02-13-67	45250	5461	0410	R-16	4,6750	4,6750	MIL FOL		00	A	04-13-67	01-29-77	1	
04-24-57	04-24-57	42506	5640	0410	R-16	4,6750	4,6750	MIL FOL		12	F	04-24-57	07-20-75	1	
07-23-64	07-23-64	42136	5401	0110	R-16	4,6750	4,6750	MIL FOL		00	F	07-23-64	04-14-41	1	
12-02-51	12-02-51	42534	5181	0410	R-16	4,6750	4,6750	MIL FOL		00	A	12-02-66	02-03-18	1	
02-08-69	02-08-69	43106	5126	0410	R-16	4,6750	4,6750	MIL FOL		12	A	02-08-69	07-06-48	1	
02-11-67	02-11-67	43017	5331	0410	R-16	4,6750	4,6750	MIL FOL		00	A	02-11-69	06-09-47	1	
02-18-57	02-18-57	42145	5742	0110	R-16	4,6750	4,6750	MIL FOL		00	S	03-24-58	10-04-63	1	
03-24-58	03-24-58	42327	5610	0410	R-16	4,6750	4,6750	MIL FOL		00	F	03-24-58	09-23-74	1	
04-20-67	04-20-67	42720	5461	0410	R-16	4,6750	4,6750	MIL FOL		00	F	04-20-67	01-06-24	1	
05-27-69	05-27-69	42494	5610	0410	R-16	4,6750	4,6750	MIL FOL		00	F	05-27-69	06-04-44	1	
10-20-57	10-20-57	42053	5211	0410	R-16	4,6750	4,6750	MIL FOL		00	A	10-20-69	03-08-68	1	
07-23-70	07-23-70	44145	5462	0410	R-16	4,6750	4,6750	MIL FOL		00	A	07-23-70	07-19-51	1	
02-24-70	02-24-70	44979	5313	0410	R-16	4,6750	4,6750	MIL FOL		00	A	02-24-70	11-26-51	1	
03-02-73	03-02-73	44736	5173	0410	R-16	4,6750	4,6750	MIL FOL		00	A	03-02-70	01-27-66	1	
12-11-72	12-11-72	41140	5640	0410	R-16	4,6750	4,6750	MIL FOL		13	A	12-11-72	10-25-69	1	
02-05-71	02-05-71	45094	5461	0410	R-16	4,6750	4,6750	MIL FOL		10	V	02-05-73	11-01-51	1	
04-07-71	04-07-71	43029	5173	0410	R-16	4,6750	4,6750	MIL FOL		11	V	04-07-73	06-02-24	1	
06-16-41	06-16-41	41335	5073	0505	R-21	5,5550	5,5550	INSP PT WIND		00	A	07-00-41	03-22-33	1	
05-12-47	05-12-47	41501	5073	0505	R-21	5,5550	5,5550	INSP PT WIND		00	A	05-03-47	06-20-19	1	
05-19-47	05-19-47	44314	5073	0505	R-21	5,5550	5,5550	INSP PT WIND		00	A	07-11-47	12-19-28	1	
09-22-48	09-22-48	41673	5073	0505	R-21	5,5550	5,5550	INSP PT WIND		00	A	10-14-48	03-21-27	1	
10-03-63	10-03-63	41674	5073	0505	R-21	5,5550	5,5550	INSP PT WIND		00	A	10-25-48	06-23-21	1	
02-06-49	02-06-49	41576	5073	0505	R-21	5,5550	5,5550	INSP PT WIND		00	KG	02-26-49	05-20-27	1	
06-08-65	06-08-65	40897	5073	0505	R-21	5,5550	5,5550	INSP PT WIND		00	A	06-08-65	01-27-48	1	
03-10-40	03-10-40	40116	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	04-01-40	12-11-34	1	
10-00-41	10-00-41	40344	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	10-31-41	03-22-16	1	
10-05-41	10-05-41	40210	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	DZ	12-31-41	05-25-10	1	
03-30-42	03-30-42	41329	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	04-21-42	07-15-23	1	
04-07-42	04-07-42	43322	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	07-02-42	00-09-23	1	
08-23-43	08-23-43	40630	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	11-17-43	03-30-25	1	
06-20-46	06-20-46	44170	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	07-12-46	01-11-38	1	
07-22-46	07-22-46	40313	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	P	00-13-46	12-14-26	1	
03-16-47	03-16-47	40745	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	04-07-47	07-04-21	1	
04-07-47	04-07-47	40911	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	04-27-47	05-09-22	1	
03-03-43	03-03-43	40209	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	03-25-48	11-09-11	1	
09-30-48	09-30-48	40369	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	10-22-48	10-24-28	1	
12-07-49	12-07-49	40559	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	12-29-49	03-28-24	1	
11-24-51	11-24-51	43349	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	12-13-51	05-07-31	1	
04-13-54	04-13-54	41102	5073	0506	R-21	5,5550	5,5550	INSP PT ASH		00	A	05-07-54	07-05-23	1	

but has not been utilized. The philosophy of the company is to put as much data on the computer as possible with the idea that it might be of use at some later time.

This system is used because it was developed by its user; without it Personnel would not be able to do their job. Because only Personnel initiates changes in the file, file maintenance is easy. The four-by-six-inch document fits nicely into the old personnel file system, which eliminates a lot of conversion problems. Finally, the users of this system have started to get into manpower forecasting and other analytical areas without much assistance from their corporate counterparts.

Example 2. 9000 employees. Personnel and Payroll are independent of each other. The personnel system is being constructed gradually. There are personnel people in this organization who have knowledge of the system and can program it. Personnel additions and employee change data are entered by means of Appendices M and N.

The employee file has personal history that the company and employee can initiate and, secondly, work history data that only the company can initiate. This information gives this company automated employee records. Every time an employee's file is changed a new record sheet as seen in Appendix O is executed. When an employee's file

history reaches ten lines, it is stamped as permanent and the hard copy is filed. The file information is shown in Appendix P. Together with the payroll data the following reports are generated within the listed areas:

- Compensation-- 1. Monthly Group Salary Run by
alpha, job class and department;
2. Quarterly Compu-Ratio Report.
- Employment-- 1. Annual EEO Reports;
2. Terminations, Promotions;
3. Turnover Analysis;
4. Out-time Tolerance Report;
5. Education Report showing Degrees,
Disciplines, Schools Attended.
- Manpower
Planning-- 1. Executive and Management Reference
List:
- Benefits-- 1. Monthly Benefits Summary;
2. Service Pin Award Eligibility.
- Department
Management
Personnel
Report-- 1. Out-time Summary Reports;
2. Vacation Entitlement Report;
3. Merit Increase Eligibility Report;
4. Maturity Curve Information.
- Miscellaneous-- 1. Address Listings;

2. Salary Runs in Specific Format for Survey Participation.

The extent of Affirmative Action Reports that can be generated is seen by the following list:

1. Quarterly report by cost center, includes name, job title, male/female, minority code and male/female and minority totals.
2. Promotions by managers, professional, technical, sales and clerical.
3. Transfers by managers, professional, technical, sales and clerical.
4. New Hires by managers, professional, technical, sales and clerical, including hire source and job code number.
5. Terminations by managers, professional, technical, sales and clerical.
6. All employees by managers, professional, technical, sales, and clerical sorted by job code and totaled by male/female and minority code.
7. Alphabetical listing of all minorities includes name, department, date hired, current classification.
8. Minority and Female Promotability Inventory.

Starting with a payroll system this company has developed a system which they use not only for the types of

reports mentioned earlier but analytical reports such as maturity curves and compra-ratios are developed. Microfilm is used on year-end and out-time reports and employee records have been computerized. The proof of the system's benefit is that while the company experienced a 75 per cent growth rate, Personnel did not have to add any additional people because they had a computerized system.

Example 3. Over 30,000 employees. Another self-developed system is exhibited by this firm. A position is created to coordinate the computerized personnel system because of its complexity. New Hires are put in the system by means of Exhibit IV.10 and updating is normally done by using a pre-printed form attached to an individual's employment profile. The combining of the employee profile form and change of status authorization form is an unusual and imaginative idea. This document is seen in Appendix Q. If for any reason the usual change form cannot be used then Appendix R is used. The entire employee's job history coded when confidentiality is needed is automated. The document with just historical data is seen in Appendix S. Although this company uses a lengthy turnaround document the system works extremely well. The information in the employee profile can be listed in any desired order.

Regular reports include a monthly census by cost center and department. EEO listings are generated overnight for monthly, quarterly and yearly reports. A figure of 250 was given for the number of reports that are available for personnel use. Areas that benefited enormously from the system were salary administration, employee benefits and manpower planning.

Manpower Planning uses many analytical figures and plots provided by the computer. These include retention rates by jobs and turnover analysis by reason of quit by various location breakdowns. The Affirmative Action area benefits from the analysis of recruiting, staffing and retention rates for various recruiting sources. Many other reports are mentioned as being available and used. The system is a dynamic one and new uses are sent to systems people for costing and if it is possible, are done on a production (regular) basis. Personnel in the firm is called upon to do analytical work and solve managerial problems because of computer capabilities. The only report not done internally is the employee benefits statement which is done by an outside firm.

Summary. The large organizations visited outside the survey SMSA showed a high degree of computerization, although there was a great deal of difference between the firms. Generally, widespread

computerization of employee records, extensive Equal Opportunity reports, and several wage and salary analyses existed and were available for analytical purposes. Along with this high degree of sophistication, significant savings were noted in time and staff.

Computerization in the personnel function varied from organization to organization. Cooperation of data processing staff and direct personnel interest in computerization affected its development. Systems also varied depending on what an organization saw as its most pressing problem; an example follows. Union demands for seniority listings and government EEO reports sparked great interest in having this type of information readily available. Other forces were those of control, cost and employee demands for information on their benefit packages.

All users claimed savings of one type or another but those organizations that developed their own system were most pleased. Three of these companies were thinking of selling their software programs because they experienced great usefulness from their systems. Counts and averages were the most common computational tools. More sophisticated techniques were very few.

In the next chapter two models are presented drawing upon the information gathered from the surveyed organizations. Incorporated in these models are the best

practices encountered in this survey. Although the models must be by necessity general, it is hoped they will serve as a guide to interested parties.

C H A P T E R V

PERSONNEL MANAGEMENT INFORMATION SYSTEM MODELS

Based on the preceding survey findings, two general models for the utilization of a computerized personnel system emerge as optimal. The first is designed on the basis of the experiences of organizations of under 1000 employees, while the second is designed for larger organizations with more than 1000 employees. Both models are the direct result of the best practices uncovered in the existing personnel systems of the surveyed organizations.

Many factors determine the degree of computerization an organization employs. The survey shows that 67 per cent of the respondents do not use a computer for personnel work. For companies not affiliated with a larger organization, only 23 per cent use a computer in some type of personnel work. Only 44 per cent of multi-firm organizations use a computer in personnel. More importantly, this survey conducted during Summer, 1975, a period of economic decline, points to the cost factor as extremely important. It is possible to put every company record in a computer file; but if the resulting benefits are small, it makes little sense to spend money on an elaborate impressive computer system.

A point that needs to be emphasized is that most organizations simply do not utilize computers in their personnel departments. The lack of computer use in the personnel field is not necessarily negative. A more thorough analysis leads to the observation that there simply is no need for the introduction of computer facilities for personnel administration in many organizations. Only in those organizations in which there is a need for assistance from a very fast "adding-machine-typewriter," or (computer) will there be a successful marriage of the personnel department and a computer system. Many personnel officers are skeptical of a computer. This emotional fear can only be overcome when individuals see the computer as a tool that releases them from an avalanche of paperwork. Typing time, increased accuracy of reports and cost savings, and other advantages of a computer system mentioned by the users of a computerized personnel system, will also help encourage personnel to use a computer. The following section describes the first model for a personnel system.

Model One--A Personnel System for Small Organizations of Under 1000 Employees

When an organization employs under 1000 people, the personnel department needs some help in its work. Although personnel could ask to install a separate system to handle

its needs, it is more justifiable to use an already existing computer system. Because only 14 per cent of this survey's respondents did not have payroll computerized, it is logical to use the payroll system for personnel uses. This type of piggybacking is quite common in organizations of under 1000 people. Regardless of whether payroll is done in-house or by a service bureau, personnel departments can still use the system. Another benefit to piggybacking is the fact that little systems knowledge is necessary for personnel managers and such knowledge was found to be quite limited in the under 1000 employee organization.

The overriding evidence pointing to the symbiotic relationship that can exist between an already existing payroll system and a nascent personnel system is the type of information many payroll systems already have in their files:

1. Employee name.
2. Social Security Number.
3. Company employee number.
4. Employee's home address, including city, state and Zip Code.
5. Employee's pay code (salary or hourly rate).
6. All authorized employee payroll deductions.
7. Employee's work location (branch, department and shift).

These data, in addition to the weekly time card, can be combined to give many personnel listings before even adding any unique information that personnel departments may desire. If just Equal Employment Opportunity data are

added to the Payroll Master File plus data such as date-of-birth, date-of-hire, performance review dates, many types of reports can be generated from the payroll registrar.

Examples of possible reports resulting from the above combinations of data follow. A Year-to-Date report for each employee could be produced each week including all employee information such as regular and overtime hours, regular and overtime pay and all authorized deductions. Another type of report is a specific Deduction Listing of company benefits. Company benefits can be a savings plan, United States Savings Bonds, company insurance, pension plan, United Fund and any other unique benefit offered by the organization. Because of the Employee Retirement Income Security Act of 1975, organizations that do have pension plans are required to show all participants information concerning their plans at least once a year. The use of a computer for the purpose of calculating an employee's stake in the company's plan is of immense help and demonstrates another use for a computerized system. In addition, the existence of all reports on hard copy facilitates the satisfactory answering of any employee's inquiry by a personnel clerk.

Because this model uses a weekly time card, a thorough analysis of absences can be done, including analysis by any category desired by management. Categories that should be

included are those for military duty, jury duty, funerals, vacations, personal leave, lateness and others. Research concerning legitimate and illegitimate excused absences and tardiness can now be done. The analysis is possible for the entire company, each branch, each department, and each shift as well as for every individual employee. This type of analysis, plus overtime reports by company, branch, department, shift and individual, will enable production and personnel departments to identify trouble areas before they greatly vary from established targets. For example, an employee who is chronically absent on Fridays would show up upon analysis of an absence report done by days of the week for each employee.

Seniority listings, merit review listings and address listings are all within the capability of this system. If the company wishes to send a mailing to all employees who live in a certain area, all that is necessary is to run off the appropriate Zip Code listing. When Equal Employment Opportunity data is entered on the Payroll Master File, all government EEO information can be generated with little difficulty. Thus, all black females above a certain pay code could be tabulated for every department very easily. Any other type of breakdown is also facilitated by this computer system.

The advantages of this simple, easy-to-install system are many. First, little systems knowledge is required of the personnel office. As stated earlier, most personnel managers want very little to do with a complicated computer system. Second, the extra cost of adding a few pieces of data to the payroll system is small and requires little updating cost. Third, employee questions about their status relative to not only pay but company benefits are easily answered. Fourth, Equal Employment Opportunity reporting becomes easier to do from a time standpoint alone. Accuracy would also increase because the probability of overlooking an employee is reduced. Fifth, a service bureau can easily help the personnel department install the system if the company uses a service bureau for its payroll function. These benefits combined with the assistance that personnel can make to production are worth the extra cost in calculation and print-out time to most organizations.

There are two further advantages that this type of system provides. First, most organizations have already computerized their payroll function and this model builds on this already existing base. Second, and more importantly, a personnel department which can rather rapidly become accustomed to using a computer system can eventually develop a more sophisticated personnel system

tailor-made to its own unique needs. This type of system will be discussed by Model Two in the next section. The mechanics of this primarily payroll system will be different for each organization, but a sample model is graphically shown below, in Figure V.1.

Model Two--A Personnel System for Organizations
of Over One Thousand Employees

An organization may need a more sophisticated personnel system than outlined by Model One for such reasons as more employees, more money available to develop a system and more familiarity with computers. The key to this model is the development of a separate Employee File that can be merged with a payroll file or other file to produce a system with more sophisticated reporting and analytical abilities. Organizations that have systems similar to this type usually were part of a larger organization and could take advantage of their expertise in designing a personnel system. This model is management oriented and has many of the advantages of the systems surveyed in Chapter Four.

The creation of a master employee file is accomplished by entering data from a biographical application blank and other induction forms. A turnaround document is used for both the hard copy and for changes. The turnaround concept performs as follows: any changes desired are circled on

FIGURE V.1
MODEL OF PMIS IN ORGANIZATIONS UNDER 1000 EMPLOYEES

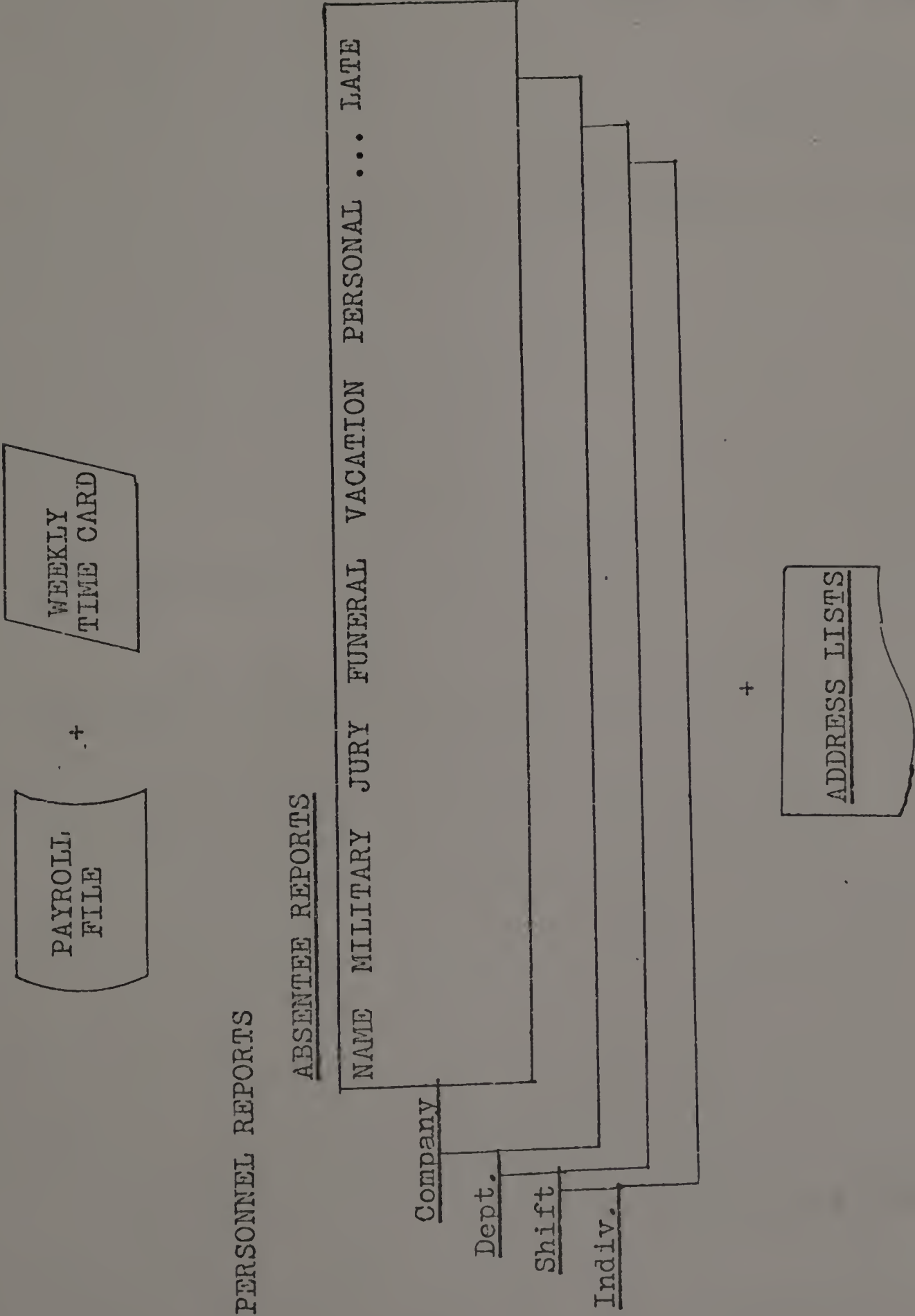


I. PAYROLL REPORTS

<u>Year to Date Report</u>						
Name	Regular Hours	Overtime Hours	Regular Pay	Overtime Pay	Federal Tax	FICA State Tax

<u>Deduction Listing</u>						
Name	Company Savings Plan	U.S. Savings Bonds	Blue-Cross	Company Health Insurance	Pension Plan	United Fund

FIGURE V.1 (Continued)



II. PERSONNEL REPORTS

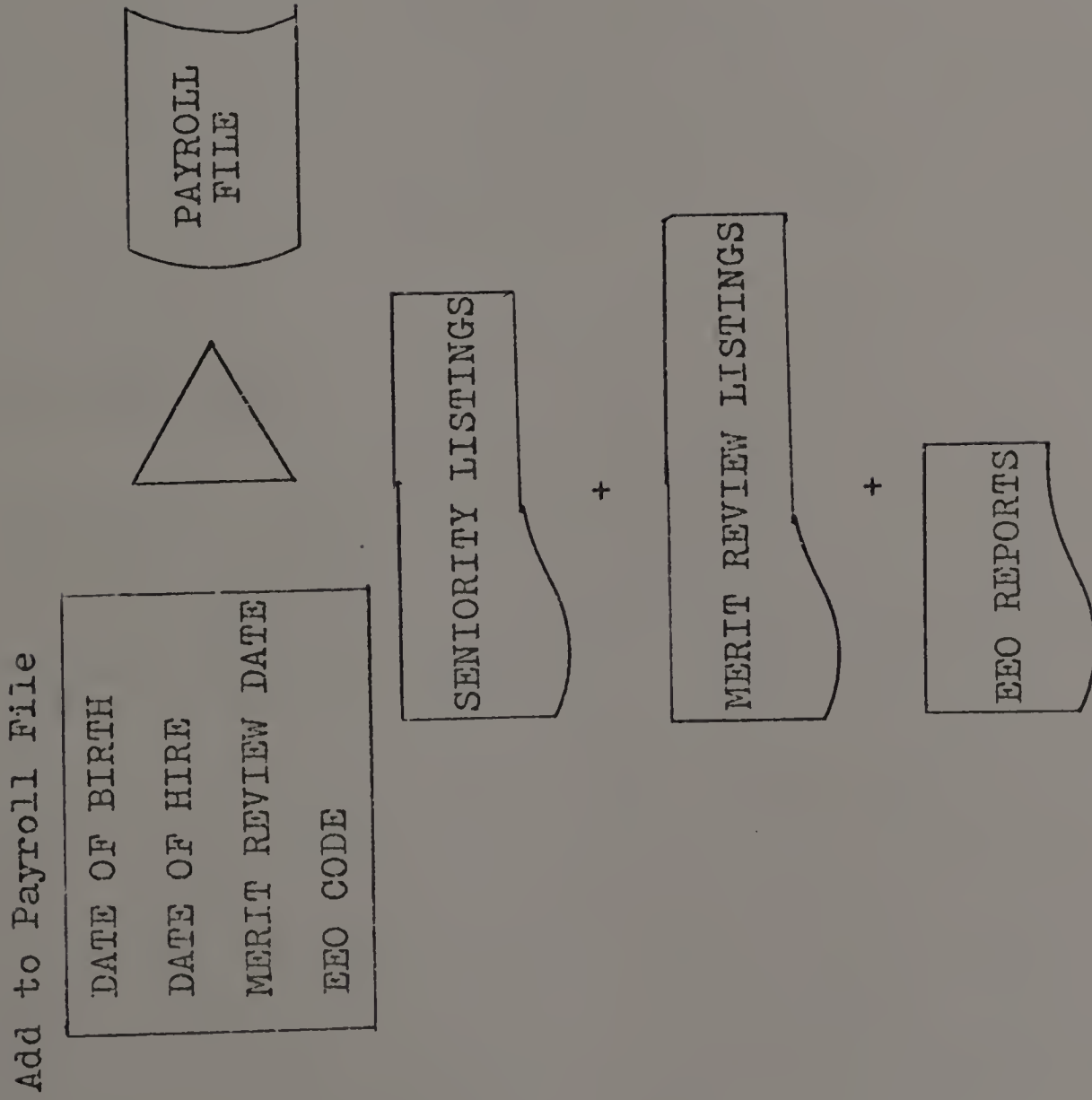
ABSENTEE REPORTS

NAME MILITARY JURY FUNERAL VACATION PERSONAL ... LATE

ADDRESS LISTS

Company
Dept.
Shift
Indiv.

FIGURE V.1 (Continued)



the employee record with the correct information written above it. This document is then sent to the data processing center where it is entered into the system. After this procedure has been accomplished the corrected file is returned to the personnel office where its correctness can be verified.

The master employee file of this model will include substantially more data than in Model One. The availability of a good data base can facilitate the personnel department's reporting function and also its ability to handle management inquiries for sophisticated information. Data that should be entered include much more than just personal characteristics, although these are of crucial importance. By combining data from the payroll system with data from the employee file, analyses can be made in all personnel areas.

Although not complete, this model will discuss the possibilities that exist in the following personnel areas: Human Resources Planning (Staffing and Management Development and Training), Compensation Administration (Direct and Indirect), the very large area of Employee Services (including Safety and Health and Equal Employment Opportunity), and finally, Labor Relations.

Human resources planning. Staffing. In the recruiting area, analysis of recruiting sources with their

accompanying costs should be conducted. This analysis would include the private employment agencies used, their frequency of use and costs. When employees leave the organization, turnover analysis should be done not only by employee characteristic but by position and performance evaluation received. In relation to turnover, the analysis of voluntary and involuntary quits aids greatly the prevention of leaks of classified information due to losses of personnel in sensitive positions such as research and engineering. For bumping situations, seniority lists can easily be obtained. Additional reports that should be included are out-time, promotions, and transfers, as well as address listings.

Skills inventory. A skills inventory is an additional part of this model which can be added if desired by the organization. This model should be designed to be modular. When more information is needed, the system can be changed to accommodate it. Unlike the first model, educational data, family data, interest areas, special abilities and talents, etc., can be added to the Master Employee File or put into an auxiliary file. If the personnel department in a large organization wants to maintain control over its policies, this type of file should be of assistance.

By combining recruiting data, turnover data and searches of the skills inventory, good short-range and

medium-range human resources planning is possible. Long-range planning requires the use of modelling. Modelling the system is possible but would require some mathematical analysis.

Management development and training. With the addition of a skills inventory, searches should be made to inventory the skills and abilities that exist. After this search is accomplished, those areas in which the organization feels itself weak can be remedied by starting on-the-job and off-the-job training programs. This should be done for both managerial and non-managerial employees.

Performance evaluation should serve as an integral part of the career development program. To assist in this part of personnel, merit-review listings should be done and automated records should be kept of performance results. These records can then be used for the analysis of departments' and individuals' progress in meeting organizational goals. Thus, position history and employee history with corresponding performance review data should be kept.

Compensation administration. Direct compensation.

The existence of position and employee history data facilitates: the reporting of average salary for each position, range of salary for each position, salary curve development, and wage and salary survey information. With an employee file it is possible to begin extensive analyses

of personnel trends, such as compa-ratios¹ by the compensation staff.

Indirect compensation. With the file capability of Model Two, the area of fringe benefits can be upgraded. One example of possible improvement is the possibility of developing a Cafeteria mix² for compensating employees. This would help employees choose the best mixture of fringe benefits and services for their particular needs.

The exercise of control of the cost of fringe benefits to the organization can also be achieved. This type of information is useful not only for control purposes but in the costing area in collective bargaining. Additional benefit reports should include Vacation Entitlement as well as the total monthly fringe benefits cost report. Insurance reports should also be included.

Employee services. The personnel sub-function of employee services includes a tremendous number of duties and responsibilities for personnel. Some of the areas are: cafeterias, employee discounts, educational reimbursements, credit unions, sports programs, security programs, records administration, insurance programs, and many more areas.

¹A compa-ratio is an arithmetic measure of central tendency showing the salary position of an individual or an unit relative to the group mid-point.

²Cafeteria mix is a concept that allows an employee to choose the cash value of non-mandated benefits or pick those benefits desired up to the dollar value the company has budgeted for that employee.

Because of the ability of a computer system to do listing and sorting, the above areas should benefit. Three sub-areas of employee services, Safety and Health, Equal Employment Opportunity, and Personnel Research will be discussed below.

Safety and health. Specifically, safety and health refers to the organization's responsibility to fulfill the requirements of the Occupational Safety and Health Act of 1970. This act requires reporting capability. However, personnel should go beyond reporting and conduct analyses dealing with the safety of the workplace and the health of their employees. For example, accident reports can be used to determine accident frequency and accident severity rate as follows:

$$\text{Accident Frequency Rate} = \frac{\text{Number of Accidents} \times 1,000,000}{\text{Number of Work Hours in the Period}}$$

$$\text{Accident Severity Rate} = \frac{\text{Number of Work Days Lost} \times 1,000,000}{\text{Number of Work Hours in the Period}}$$

These statistics plus analyses of departments and shifts with high accident rates will assist the organization in protecting its employees' health and minimizing company losses.

Equal Employment Opportunity. Equal Employment Opportunity data include alphabetical listings of minority groups by location or cost center. In addition, all

promotions, transfers, terminations and new hires by job code, sex and minority code for managerial, professional, technical, sales and clerical categories. The system should possess the capability of meeting any requests for information from the Equal Employment Opportunity Commission.

In addition, reports can be generated to compare minority employees against non-minority employees in any category. These reports can include hourly wage, wage range, seniority or any breakdown desired. The importance of a good data base is not just in the capability of EEO reporting but in the ability to go beyond and analyze organization trends.

Personnel research. Research using the data contained in these files can be done if desired by the personnel manager. This model should greatly facilitate such research. Employee and company data can be combined for all one-time analyses. Research should be done for planning, recruiting, hiring, compensation, evaluation, training, lay-off, separation, morale, productivity, benefit, safety, and other areas. Research areas are limited only by the imagination of the researcher. To point out the possible range of research easily available

through the use of a computer, Figure V.2, taken from Glueck (1974),³ is shown.

Labor relations. Collective bargaining information can include membership lists in a union, lists of union officers, and lists of employees with written grievances classified into grievance categories. Also, a list of all arbitration cases can easily be generated by examining grievance and arbitration lists; thus, personnel managers can determine the sections of the contract which should be reviewed. These are examples of the type of information which can be obtained. As in all other sections of this model, an organization can program any type of report they wish.

Summary. From the Master Employee File, analyses can be made through the use of employee data, department data and job classification and history data. Additional data can be entered into the master file without affecting the payroll file. But when the payroll file is needed, the two files, payroll and employee can be merged.

A master inventory of employees allows automated records to become a reality and, thus, for the first time in most organizations, the data in employee folders becomes accessible. Another benefit of a separate employee file is that the Equal Employment Opportunity data can be kept in a

³William F. Glueck, Personnel: A Diagnostic Approach (Dallas, Texas: Business Publications, Inc., 1974).

FIGURE V.2

PERSONNEL EVALUATION RATIOS

Organizational health ratios:

1. Number of grievances filed.
2. Number of arbitration awards.

Turnover and absenteeism ratios:

1. Attendance, tardiness, and overtime comparisons by organizational unit as measure of how well an operation is handling manpower loading.
2. Employee turnover by unit and for the organization.

Employment ratios:

1. Vacations granted as a percentage of employees eligible.
 2. Sick-leave days granted as a percentage of man-days worked.
 3. Military leaves granted per 100 employees.
 4. Number and percentage of work force eligible for Selective Service (if in effect).
 5. Jury duty leaves granted per 100 employees.
 6. Maternity leaves granted per 100 employees.
 7. Educational leaves granted per 100 employees.
 8. Personal leaves granted per 100 employees.
 9. Employment distribution by chronological age.
 10. Employment distribution by length of service with organization.
 11. Employment distribution by sex, race.
 12. Managerial manpower distribution by chronological age.
 13. Average age of work force.
 14. Average age of managerial work force.
-

Source: William F. Glueck, Personnel: A Diagnostic Approach (Dallas, Texas: Business Publications, Inc., 1974), p. 642.

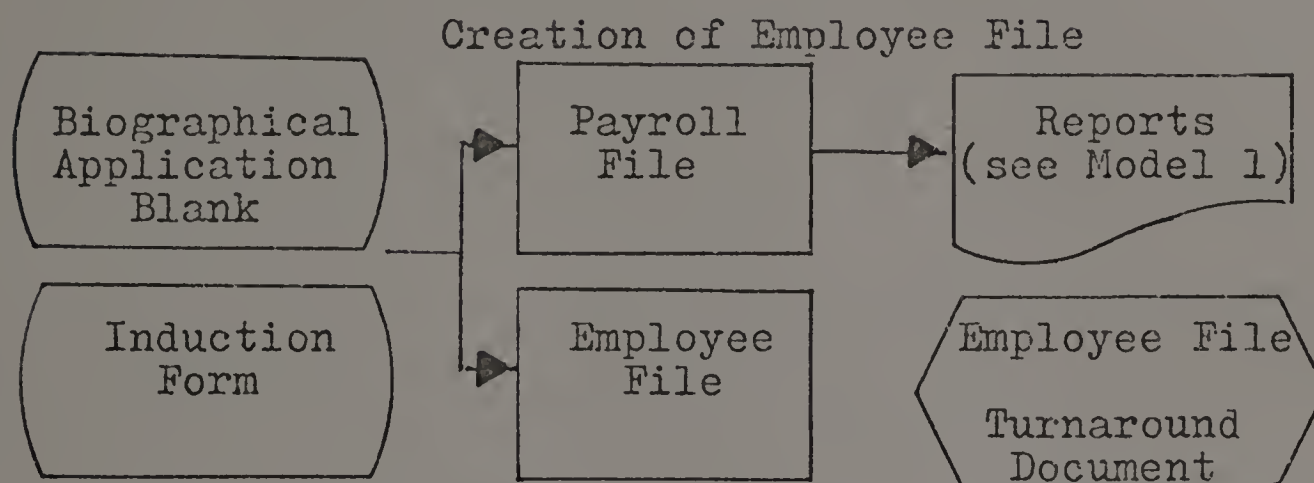
separate file so that charges of illegality regarding the use of this data will be minimized. This model also enables the personnel user to develop a familiarity with the computer system at a pace that should not tax a person with only a limited background in computers and systems. A programmer from the data processing system should be assigned to assist the personnel department. This is of great help to the person with limited technical ability or experience.

In conclusion, Model Two is capable of providing a vehicle for efficient and analytical personnel management. In all of the sub-functions of personnel--human resources planning, compensation administration, employee services, and labor relations--several uses have been demonstrated. None of the possible uses described above need long-term planning for their accomplishment; they are all presently feasible. As stated earlier, since every organization has its own unique needs, this overview has been of necessity general. A schematic view of this model follows in Figure V.3.

FIGURE V.3

MODEL OF PMIS IN ORGANIZATIONS OVER 1000 EMPLOYEES

MODEL TWO

EMPLOYEE FILE DATA

A. Employee Data:

Name

Home Address

Street

City

County

State

Zip Code

Home Phone

Social Security Number

Date of Birth

Sex

Marital Status

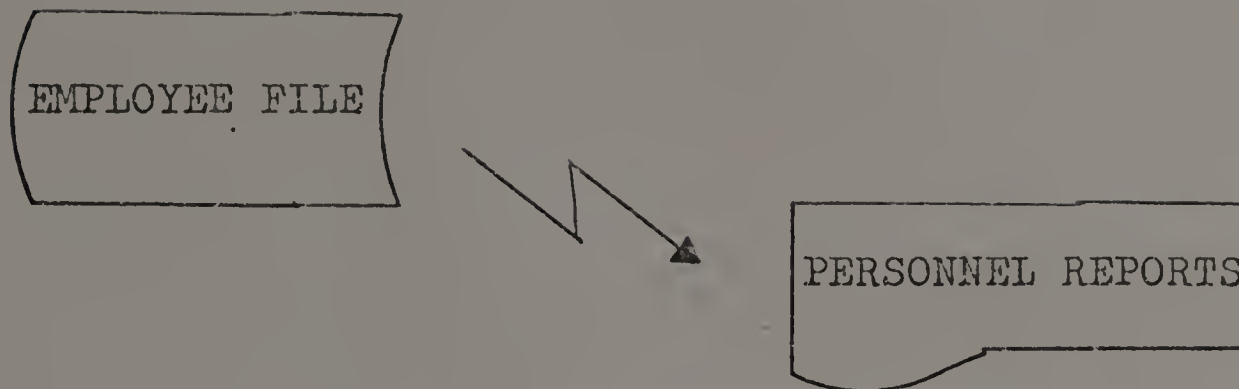
Veteran Status

Minority Code

FIGURE V.3 (Continued)

- B. Company Data:
Company Employee Number
Branch
Department
Shift
Pay Code
Job Classification
Performance Review Data
- C. Work History Data:
Date of Hire
Termination Date
Transfer Information
 Present and Last Five
 Locations and Pay
- D. Union Data:
Union Local
Officer
Grievance Date and Type
 Include up to Ten Occurrences

FIGURE V.3 (Continued)



RETIREMENT REPORT
YEARS TO RETIREMENT BY DEPARTMENT

+

INSURANCE REPORTS

DEPT. A	JOB CODE	AGE
NAME		

DEPT. B

+

Collective
Bargaining
Reports

1. Union Membership
2. Union Officers
3. Grievance Report
4. Arbitration Listing

FIGURE V.3 (Continued)

EMPLOYEE JOB HISTORY
RECORDS

+

EQUAL EMPLOYMENT OPPORTUNITY REPORTS

1. Alphabetical Listing
2. Location Listing
3. All Promotions, Transfers, Terminations,
New Hires by Job Code, Minority Code,
Sex for Managerial, Professional, Technical
Sales and Clerical Positions
4. One-Time Reports

+

Turnover Analyses

+

Absentee-Tardiness Analyses

FIGURE 3 (Continued)

COMPENSATION REPORT

1. Average Salary of Each Position
2. Compa-Ratios
3. Salary Range of Each Position

+

Individual Cafeteria Possibilities on Demand

+

SENIORITY LISTINGS

1. Company
2. Branch
3. Department
4. Job Position

+

PERFORMANCE REVIEW DATES

+

ADDRESS LISTINGS

FIGURE V.3 (Continued)

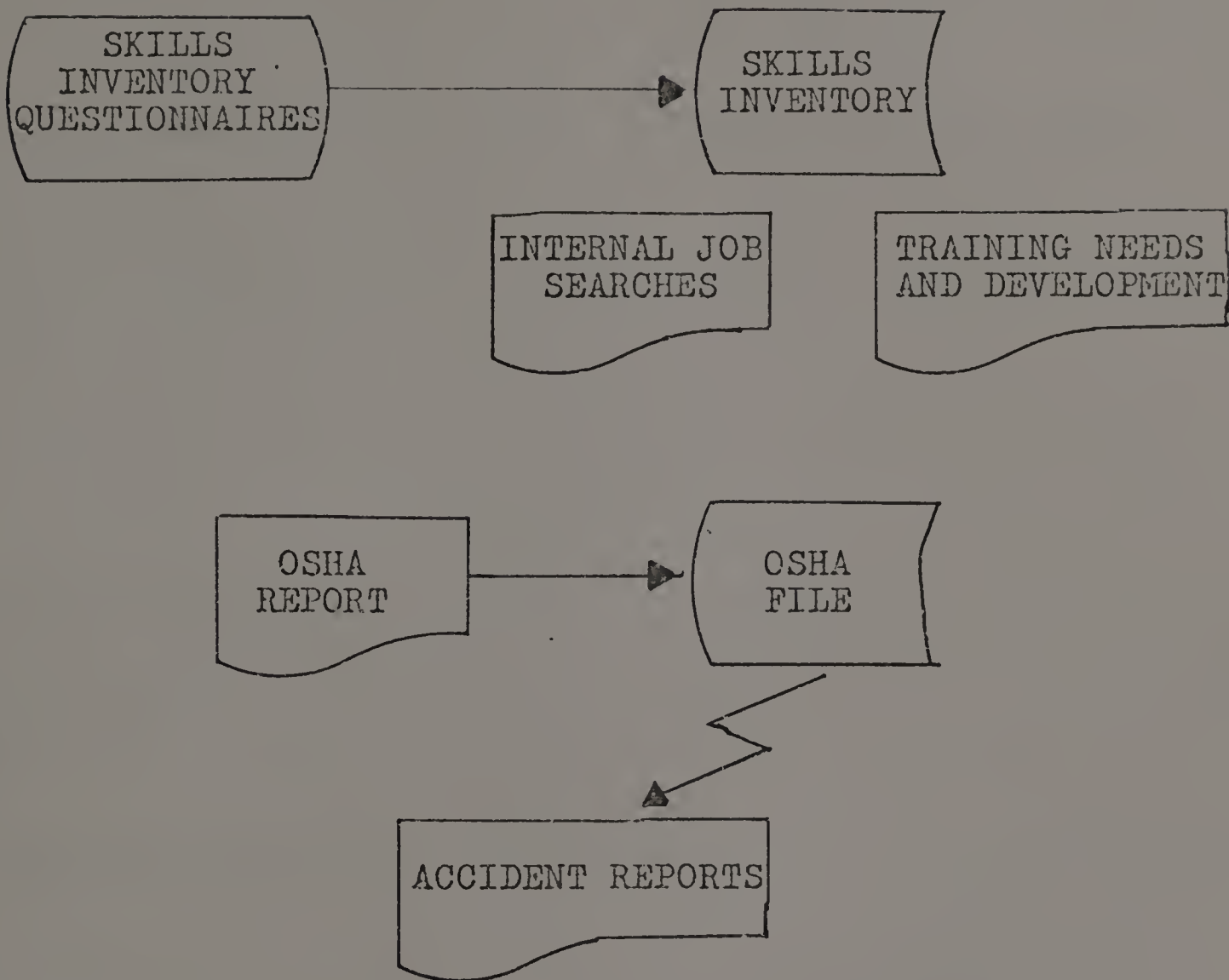
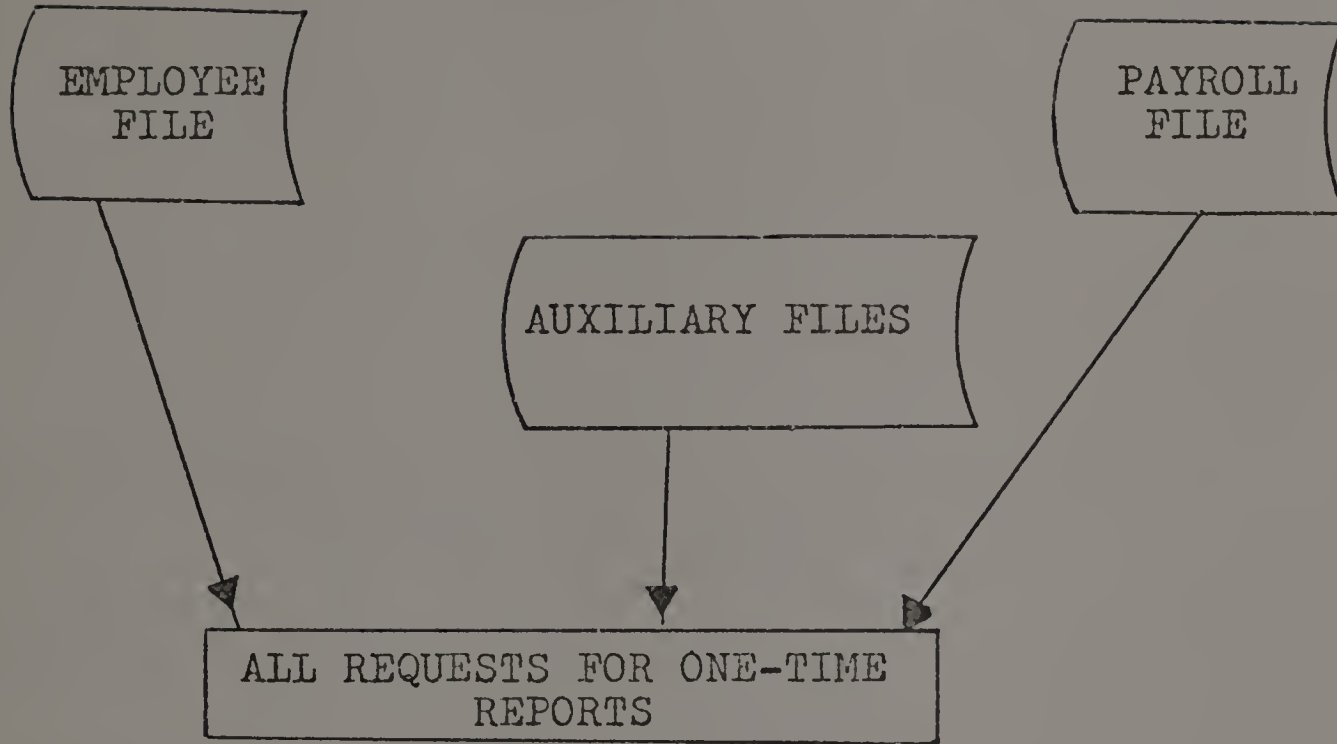


FIGURE V.3 (Continued)

MODEL TWO OVERVIEW



C H A P T E R VI

CONCLUSION AND FUTURE RESEARCH AREAS

This chapter is divided into five parts. The first section discusses the importance and purpose of this study. The second section presents a short summary of the research methodology. The third section summarizes the research results. The fourth section deals with the implications of the study for the field of personnel and human resources as a whole. The final section discusses potential research areas.

Research Purpose and Importance

This study accomplishes three major goals: the investigation of computer usage in the personnel field, the determination of the best practices involved in operating a computerized personnel management information system, and, the formulation of two models that could be employed in the personnel function. In addition, this research further aims to determine actual computer usage through the use of survey rather than secondary reports of computer usage.

The importance of the investigation of computerized personnel management information systems is in its benefit to personnel practitioners and academics. As pointed out in Chapter One, personnel has not enjoyed a great deal of

respect from top management of corporations or from academic researchers. The federal government has placed considerable pressure on organizations to provide information concerning the areas of occupational safety and health and equal employment opportunity. This has helped complicate the already complicated reporting responsibilities of personnel departments. A computerized personnel system can help meet both of these problems. Without the benefit of a computer there would be no opportunity for personnel to develop from a clerical into a sophisticated managerial function.

Methodology

The Springfield-Chicopee-Holyoke SMSA was chosen for the research area. From the membership directory of the Greater Springfield Chamber of Commerce, the Manufacturers' Directory of the Greater Springfield Area, a directory of personnel offices in the Springfield area received from the University of Massachusetts and a listing of all firms represented by Western New England College night students, survey organizations were chosen. Firms with fewer than 100 employees were not included. The final survey total reached 122.

A letter was sent with an enclosed self-addressed stamped post card. The letter explained the purpose of the

study. The post card asked for the respondent to write in company size, type of business and indicate if the organization used a computer in the payroll area. Finally, those personnel managers that were using a computer for personnel work were asked to indicate their name and telephone number. When the post cards were received, appointments with those organizations using a computer in personnel were arranged. If no post card was received from a survey firm, a telephone call was made to the company.

The interviews conducted consisted of open-ended questions. The areas investigated were amount of systems knowledge held by the personnel officer, and the mechanics of systems input and output. The advantages and disadvantages of their system were investigated. Most importantly, a thorough description of the personnel system was discussed. The informal approach worked extremely well judged on two bases. First, if the personnel officer had the knowledge of the system, it became apparent immediately; second, excellent rapport was established and many exhibits and examples were given that would not have been obtained in a rigidly structured interview format.

Summary of Research Results

A 95 per cent response from the letter was achieved. Sixty-seven per cent of the organizations did not use a

computer in the personnel area. Thirty interviews were held with personnel computer users, 26 in person and four by telephone. The post card yielded valuable information; for example, only 14 per cent of all firms in this sample did not have payroll computerized. The survey organizations were almost evenly split in being a division of a larger corporation or an independent organization. Corporate divisions reported a higher use of computerization in personnel. The larger the organization the more likely it is to computerize personnel.

When asked about their systems knowledge, most personnel officers regardless of organization size expressed the view that they were not really interested in knowing very much about the system. The advantages most often cited were increased accuracy of reports and reduced typing and clerical costs. Organizations over 1000 employees reported the increased managerial orientation possible because of a computerized system. All respondents noted the disadvantages associated with a computer, proper input of data, cost inflexibility, and several divisions stated that they felt that they were just input stations and resented the computer system.

Examples of the best practices of existing personnel management systems were discussed in Chapter Four. Using the best practices revealed in the study, two models were

prescribed for personnel use. Model One used the payroll system as the foundation for the generation of several personnel reports and the development of important analytical work. The payroll file was combined with the weekly time card to accomplish both payroll and personnel reports. Absentee reports, address listings, seniority listings, merit review listings, and EEO reports are all within the framework of this model.

The second model, for organizations over 1000 employees, employs a separate employee file. It is this employee file that enables it to do sophisticated analytical work as well as more routine report generation. Another key part of this model is the use of a turnaround document. Reports and listings generated by this model include retirement, insurance, address, performance review, seniority, accident, and others. Collective bargaining analyses can be done including grievance and contract clause problems. Extensive EEO reports are possible because of the expanded data base and analysis of turnover and absentee data are possible. The area of compensation is greatly assisted with salary ranges, and many types of compensation data being easily manipulated.

Implications for Personnel and Human Resources

The implications of this study are significant for practitioners of personnel and human resources. A survey of actual systems showing their strengths and weaknesses will help the personnel manager evaluate the system. If no personnel computer system exists, then this study should help to determine whether a system should be implemented. The models should also assist in giving advice to organizations concerning the possible configuration of a personnel system. Although both models have several important characteristics in common, extensive computer language programming or systems knowledge is not needed to use either system. Usage is the prime area of consideration in the development of these models. Also, Models One and Two result in extensive cost benefits in clerical and typing savings. Accuracy of personnel information and increased analyses are also distinct advantages.

To thoroughly research areas like human resources planning, a personnel management information system is practically a necessity. In all areas of personnel research, a good employee data base will be of importance. The more extensive the base, the more extensive the possibilities of research become. When an increasing number of

organizations have computer systems, research across organizations will not only be facilitated but the quality of computer systems will improve.

For academicians and students of human resources this study can be extensively utilized. Through surveys, teachers can discover the latest practical developments in the personnel field pioneered in industry. As a result, students will benefit. By comparing the similarities and differences among personnel computer users, students can further develop their own analytical reasoning. If theory diverges too far from practice, students will be better able to discern the trend and try to understand its causes. It will be necessary for personnel curricula to include courses in data processing and systems analysis. The student will have to be shown the possibilities in the application of computer systems to personnel. Finally, this study emphasizes the relationship between men and machines (personnel managers and computers). This emphasis should benefit new entrants into the field of personnel through the realization of the importance of systems training in academia.

Future Research Areas

Research questions that academic and corporate investigators can further explore, include the following

areas: An extensive research report using a sophisticated statistical technique to distinguish those unique characteristics of personnel managers who are users of a computer system. Included in this type of research would be a thorough analysis of their attitudes toward computers and other variables that can affect usage.

One area for further research deals with the origins of the computer in the personnel function. A study of other functions computerized previous to the personnel function and also subsequent to that function would shed new light on the nature of computer use in personnel. The hypothesis is that if the decision to use a computer was given by top management with little input from personnel then successful results seem highly doubtful.

The costs versus the benefits of using a computer in personnel work is a point that needs to be stressed. Unless there are real benefits to be gained, then the costs of a computerized system will seem enormous. Little if any information is usually discussed by personnel managers as to the conversion and usage costs associated with their system. If a study was specifically aimed at defining these costs then this type of study might lead to a decision regarding the type of information put into computer files and the means of handling it by the existing manual personnel system.

There were several veiled comments made by interviewed personnel officers indicating a personnel computer system designed by the in-house data-processing-systems people in conjunction with the personnel staff made for a better system than a system with several package routines bought from an outside vendor. An exploration of this opinion may stem from the decision of whether to employ a computer in personnel. This whole area is complicated but important, and thus needs further research.

The areas of personnel work which should be computerized is a crucial area of exploration. The hypothesis that emerged from this research is that the business in which an organization is engaged will to a large extent determine what is computerized. Of course, type of business is not the only variable, but it should be included with others, such as sales dollar value and number of employees.

Perhaps there is a question more important than the choice of areas to be computerized. The examination of those areas which should not be computerized may be of greater significance. To determine the validity of this comment, organizations that had negative experiences in the computerization of their personnel department need to be surveyed and the results should be analyzed. Of all the research areas, this is probably the most important and probably the most difficult to accomplish. Most companies

are extremely reluctant to discuss their mistakes. If a mechanism can be found to get around this hesitation, then all those in personnel work will benefit.

There is a great apprehension that those who work in personnel experience when they hear formally or through the grapevine that a computer is going to be installed. The security of their employment becomes suddenly tenuous in their minds. If extensive research into the area of whether the computer system eliminates or adds jobs is accomplished, then it will help in the installation of a new computerized personnel system. There are several important aspects to this area of job addition or loss. The importance of the boring or challenging aspects of jobs created should not be overlooked. Also, the qualifications required for these new jobs should be weighed for advantages and disadvantages in computerization.

A research questionnaire should be sent to Schools of Business to determine whether academia is informed of the advances in the personnel field in industry. Are those who major in Personnel Management adequately familiar with what can be done to computerize the personnel function? New college entrants in personnel should be questioned during orientation as well as later as to whether they feel they were sufficiently trained in systems analysis and hands-on computer use.

One determining factor in successful personnel work is an employee body with high morale. Therefore, research needs to be done to ascertain if the introduction of a computer system in the personnel department has affected employee satisfaction or morale. If there are differences in these two factors, then those who install computer systems should be aware of them. One way to conduct such a project is to break down an organization by branch, department, shift or foreman. In addition to these categories, demographic data on employees should be entered. If there is a union involved then a side survey needs to be done to query union attitudes. If any negative feeling is exposed, then it is to the benefit of the company to find out why it exists.

Like all staff functions, those in personnel have as their primary task to assist the Line. Therefore, the question arises as to whether those in middle management and those in a first-line supervisory position have substantially benefited from a personnel department that has a computer capability. To explore this area, first personnel departments that use a computer need to be identified. Second, a questionnaire needs to be administered to first-line and middle management. If it can be established that these people can see tangible

benefits because their personnel people have a computer, then the case for using a computer in personnel is strengthened.

Similar in nature to the previous research area is the question of the relative worth of personnel itself. This is a very difficult as well as sensitive question to ask personnel managers. It is hoped that if honest responses can be gathered from top management as well as those in charge of personnel departments, this question can be answered. The hypothesis is that with the additional capability to do analytical work rapidly and accurately, top management will call upon personnel to do more and more relevant work. As this trend progresses, the relative worth of the personnel function will increase. These are just some of the areas of further exploration that have emerged in the course of study.

One further note should be added concerning the security of the personnel files. Access to all personnel records and reports have to be handled within the framework of the law and on a right-to-know basis. The danger of misuse of records is magnified when they are within a computer system and, thus, the access problem is complicated. One way to help prevent misuse is to include personnel officers in all systems workshops on computer security and related topics.

In conclusion, the purpose of this study is the investigation of current usage of the computer in the personnel function and the determination of the best practices involved in operating a computerized personnel system. The two models formulated are the result of this research. Arguments that personnel is not management oriented (see Chapter One) are not substantiated when examined utilizing the evidence produced by the surveyed organizations. This study has found that the computer has been the major impetus in the coming of age of the personnel function.

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APPENDIX A

BUESCHEL QUESTIONNAIRE AND COMBINED RESPONSES

Questionnaire

[The combined answers of all respondents to the survey are shown after each question]

1. *Does your firm currently use data processing in the industrial relations or personnel functions?*

	<i>Number</i>	<i>Percent</i>
Yes	61	68%
No, but plans to in 1966	18	20%
No plans	10	12%

2. *If you have no plans, is it because:*

	<i>Number</i>	<i>Percent</i>
Other departments have priority?	5	50%
Not enough employees to warrant a system?	2	20%
Firm does not own or lease a computer?	2	20%
Too expensive?	1	10%

3. *If your firm uses data processing in the personnel function, what type of equipment is used?*

	<i>Number</i>	<i>Percent</i>
Tape computer	39	64%
Tabulating or EAM equipment	29	48%
Card computer	25	41%
Disc computer	13	21%

4. *In what areas of personnel do you use data processing?*

	<i>Number</i>	<i>Percent</i>
Employee records	50	82%
Compensation—wage and salary and benefits determination and analysis	48	78%
Skills inventory	22	36%
Labor relations and seniority	17	27%
Employment	16	26%
Testing	11	18%
Attendance	5	8%

APPENDIX A--Continued

4. (Cont'd)

	Number	Percent
Personnel research	4	6%
Medical	3	4%
Safety	2	3%

5. What data do you keep on tape or punched cards for each employee? The 61 companies that answered "yes" to Question 1 completed this section. The average company maintains 31 items of information on files useful for data processing. The lowest number of items for one user was 11 and the highest was 57. Most companies average between 20 and 40 items of data on each employee. The items are listed below by frequency of occurrence:

	Number	Percent
Date of hire	60	99%
Birth date	59	97%
Department number	58	96%
Name	58	96%
Sex	58	96%
Social security number	58	96%
Employee number	55	90%
Job code	55	90%
Salary	54	89%
Street address	53	88%
Marital status	51	83%
City, state	49	82%
Employee class	48	78%
Surname	47	77%
Job title	45	73%
Labor grade	43	70%
Date of salary	42	68%
Hospital insurance	41	67%
No. of dependents	41	67%
Life insurance	40	65%
Plant location	40	65%
Hours worked	37	61%
Major medical	37	61%
Seniority date	37	61%
Date of termination of L.O.A.	34	56%
Education level	33	55%
United Fund	30	49%
Vacation eligibility	30	49%
Pension or retirement date	30	49%
Bargaining unit	29	48%
Degrees	28	46%
Shift	27	45%
Union dues	26	44%
Rate range	25	41%
Reason for L.O.A. or termination	25	41%
Job family	23	38%
Last review date	23	38%
Zip code mailing number	23	38%

	Number	Percent
Citizenship	22	36%
Layoff date	22	36%
Field of education study	19	31%
Section number	19	31%
Company stock plan	18	29%
Draft status	17	27%
Schools attended	17	27%
Minority group	16	26%
Reason for present salary	16	26%
Home telephone number	15	24%
Languages	15	24%
Next review date	15	24%
Year of degrees	15	24%
Job evaluation points	12	20%
Test scores	9	14%
Date of security clearance	7	11%
Agency granting security clearance	6	9%
Alien status	6	9%
Level of security clearance	5	8%
Previous companies	5	8%
Professional societies	5	8%
Recall expiration date	5	8%
Blood bank donation	4	6%
Employment status	4	6%
Credit union	4	6%
Type of retirement plan	3	4%
Vacation allowances	3	4%
Sick-time allowances	3	4%
Disability	3	4%
Exempt code	3	4%
Alien number	2	3%
Parking assignments	2	3%
Payroll periods	2	3%
Names and birth dates of children	2	3%
Eligibility for free tuition	2	3%
Office telephone extension	2	3%
Office room and building	2	3%
Insurance coverage	2	3%
Company loans	2	3%
Patents	2	3%
Registries and licenses	2	3%
U.S. bonds	2	3%
Profit sharing	2	3%
Date of current job	1	1%
Date of current location	1	1%
Budget page and line items	1	1%
Research account	1	1%
Faculty status	1	1%
Sabbatical leave	1	1%
Absence record	1	1%
Tax location	1	1%
Union stewards	1	1%
Union initiation	1	1%

APPENDIX A--Continued

	Number	Percent
Benefits accrued under pension plan	1	1%
Garnishes	1	1%
Eligible for rehire	1	1%
Who initiates change	1	1%
Reason for next review	1	1%
Publications	1	1%
Veteran	1	1%
Emergency notification information	1	1%
Insurance beneficiaries	1	1%
Employment discount rate	1	1%
Physical defects	1	1%
Termination code	1	1%
Requisition date	1	1%
Lock number and combination	1	1%
Hire code (new, rehire, recall, transfer)	1	1%

6. How long has your company used EDP in the industrial relations-personnel functions?

	Number	Percent
Less than one year	11	18%
One to three years	14	23%
Three to five years	16	26%
More than five years	15	25%
Unanswered	5	8%

7. What has been the development cost of programs to process personnel data? Six firms answered; the cost per employee ranged from \$4.22 to \$21.60. The average of all six was \$15.23.

8. What is the annual operating cost for EDP in the personnel function? Nine firms answered; this cost ranged from \$.93 to \$8.40, and the average was \$5.46 per employee.

9. What have your savings been?

	Number
Clerical	4
Improved timeliness of data	10
More accurate	7
Better control	6
Data not previously available	6
Ease of processing	4
More efficient work force	3

10. What are your future plans? Answers are discussed in text on page 6.

[The following questions were answered by all 89 respondents, whether or not they use EDP in their personnel functions]

11. Often accounting, and usually payroll and

labor distribution, have much in common with personnel information needs. Do you feel it is desirable to combine the information of these functions?

	Number	Percent
Combined now	4	5%
Yes	59	73%
Only in limited situations	10	12%
No	7	9%
Unanswered	9	11%

12. Would you make use of a time-shared computer, through which you could receive an instant response, to identify specific skills within your company's employees or outside applicants if the information could be provided on an annual fee basis, including equipment and programs, at approximately:

	Number
\$7.50 per employee maintained on the file?	4
\$5.00 per employee maintained on the file?	1
\$3.00 per employee maintained on the file?	13
Would not make use	35

13. Would you make use of a time-shared computer, with an instant response and installed in your office, to simulate and calculate various compensation formulas, curves, job evaluation, and performance ratings?

	Number
\$7,500 a year (unlimited use)	3
\$6,000 a year (unlimited use)	0
\$5,000 a year (unlimited use)	5
\$3,000 a year (unlimited use)	15
Would not make use	27

14. Would you make use of a time-shared computer, with instant response and the sending and receiving device installed in your office, to simulate labor negotiations, alternative proposals, layoffs, and recalls?

	Number
\$7,500 a year (unlimited use)	1
\$6,000 a year (unlimited use)	1
\$5,000 a year (unlimited use)	2
\$3,000 a year (unlimited use)	11
Would not make use	34

15. If a service were available to train your staff in the specific applications of EDP, would you take advantage of it? Thirty-four respondents desire more comprehensive training at a course off the premises of the firm; 23 desire training to take place on the firm's premises; 4 desire training that would be offered by the equipment manufacturer; 27 answered no or did not respond. In addition, 35 indicated that they had already sent at least one person to a formal program.

APPENDIX B

EXAMPLES OF GENERAL ELECTRIC'S SOFTWARE LANGUAGE
(GEDAN) CONTROL CARDS AND OUTPUT

GEDAN control cards and output.

TITLE THE "YOUNG TURKS" -- PERSONNEL PEOPLE ON THE MOVE
CREATE FILE2 FROM FILE1 MOVELESS LE 1 NEXT-CHG EQ 1

.....
FILE NUMBER OF RECORDS
1 503
2 14

**** GEDAN CONTROL CARDS ****

SORT FILE2 BY NAME

PRINT NAME AGE DG-FIELD REL-SPEC SERVICE FROM FILE2

.....

THE "YOUNG TURKS" -- PERSONNEL PEOPLE ON THE MOVE

NAME	AGE	DG-FIELD	REL-SPEC	SERVICE
12560567	34	6	5	0
1915	28	1	0	
25364893	26	3	7	0
29034992	30	3	0	1
31232434	27	3	6	2
51104231	41	1	1	1
AF263061	35	1	5	9
BR661471	28	3	4	8
DEC41939	29	3	1	4
DEF	27	1	6	2
ER127068	27	3	2	5
HOTPOINT	25	2	6	0
JESTER	26	1	5	3
LBERTROS	32	3	3	1

----- NUMBER OF RECORDS ON FILE = 14 -----

GEDAN control cards and output.

TITLE FREQUENCIES AND PERCENTS ON THE VARIABLE "NEXT-CHG"
FREQUENCY FILE1 NEXT-CHG

.....

FREQUENCIES AND PERCENTS ON THE VARIABLE "NEXT-CHG"

NEXT-CHG	FREQUENCY	PERCENT
1	75	15.12
2	114	22.98
3	117	23.59
4	109	21.98
5	81	16.33
-----	-----	-----
TOTAL	496	100.00

THERE WERE 7 BLANKS NOT INCLUDED IN THE ABOVE TOTAL

APPENDIX B--Continued

GEDAN control cards and output.

TITLE AVERAGE ANNUAL SALARY (IN THOUSANDS) BY DEGREE FIELD
SUMMARIZE SALARY-K ON FILE1 BY DG-FIELD

.....
AVERAGE ANNUAL SALARY (IN THOUSANDS) BY DEGREE FIELD

DG-FIELD	FREQ	VARIABLE	N	SUM	AVERAGE
BL	117	SALARY-K	114	1944	17.05
1	167	SALARY-K	163	2796	17.15
2	13	SALARY-K	13	266	20.46
3	109	SALARY-K	104	1645	15.81
4	46	SALARY-K	44	902	20.50
5	2	SALARY-K	2	22	11.00
6	34	SALARY-K	33	575	17.42
7	15	SALARY-K	14	224	16.00

----- NUMBER OF RECORDS ON FILE = 503 -----

VARIABLE	N	SUM	AVERAGE
SALARY-K	487	8374	17.20

GEDAN control cards and output.

TITLE INTEREST IN A NEW CAREER AS A FUNCTION OF DEGREE FIELD
TABULATE FILE1

.....
-- TABULATE CONTROL CARDS --
TABULATE FILE1
COLUMN BSADM-DG DG-FIELD 1
COLUMN SOCSI-DG DG-FIELD 3
COLUMN OTHER-DG DG-FIELD 2 4 5 6 7
COLUMN NO-DEG DEGREE 0
COLUMN TOTALS DEGREE 0 1
ROWS NEW-LINE

INTEREST IN A NEW CAREER AS A FUNCTION OF DEGREE FIELD
TABLE OF FREQUENCIES

NEW-LINE	1	BSADM-DG	SOCSI-DG	OTHER-DG	NO-DEG	TOTALS
0	1	107	69	52	64	291
1	1	57	38	58	51	203
BLANK	1	3	2	0	4	9
TOTAL	1	164	107	110	115	494

INTEREST IN A NEW CAREER AS A FUNCTION OF DEGREE FIELD
TABLE OF PERCENTAGES

NEW-LINE	1	BSADM-DG	SOCSI-DG	OTHER-DG	NO-DEG	TOTALS
0	1	65.24	64.48	47.27	55.65	58.90
1	1	34.75	35.51	52.72	44.34	41.09
TOTAL	1	100.00	100.00	100.00	100.00	100.00

APPENDIX C

INFORMATION CODED IN IBM LINEAR PROGRAMMING
RECRUITMENT OFFICE EVALUATION MODEL,
BY CARD COLUMN

CARD COLUMNS

- 1-6 Location Name
An abbreviation by which the location is known throughout the model. This abbreviation, via a table lookup, is converted in the last phase of the model, to the complete name for the Allocation Report.
- 9-12 Engineering Requirements
The total number of college engineering requirements needed by the location.
- 13-16 Other Technical Requirements
The total number of college requirements classified as "Other Technical" needed by the location.
- 17-20 Non Technical Requirements
The total number of Non Technical requirements needed by the location.
- 21-24 Engineering NRO Percentage
The percentage of the Engineering college requirements that the location can be expected to fill from NRO schools.
- 25-28 Other Technical NRO Percentage
The percentage of the Other Technical college requirements that the location can be expected to fill from NRO schools.
- 29-32 Non Technical Percentage
The percentage of the Non Technical college requirements that the location can be expected to fill from NRO schools.
- 33-36 Engineering Campus Percentage
The percentage of Engineering college requirements that the location can be expected to fill as a result of campus interviews.
- 37-40 Other Technical Campus Percentage
The percentage of Other Technical college requirements that the location can be expected to fill as a result of campus interviews.
- 41-44 Non Technical Campus Percentage
The percentage of Non Technical college requirements that the location can be expected to fill as a result of campus interviews.
- 45-48 NRO East Percentage
The percentage of the college requirements of the location that can be expected to be filled from NRO East schools.
- 49-52 NRO South Percentage
The percentage of the college requirements of the location that can be expected to be filled from NRO South schools.
- 53-56 NRO Midwest Percentage
The percentage of the college requirements of the location that can be expected to be filled from NRO Midwest schools.
- 57-60 NRO West Percentage
The percentage of the college requirements of the location that can be expected to be filled from NRO West schools.

APPENDIX C--Continued

- 61-64 NRO East Cost
An estimate of the average total visit and move expense to be incurred by the location in filling one college requirement from an NRO East school.
- 65-68 NRO South Cost
An estimate of the average total visit and move expense to be incurred by the location in filling one college requirement from an NRO South school.
- 29-72 NRO Midwest Cost
An estimate of the average total visit and move expense to be incurred by the location in filling one college requirement from an NRO Midwest school.
- 73-76 NRO West Cost
An estimate of the average total visit and move expense to be incurred by the location in filling one college requirement from an NRO West school.

APPENDIX D.1

SURVEY ORGANIZATIONS

A & P Food Stores	Hamilton Standard
Acme Chain	Hano Business Forms
Aetna Insurance	Heublein
Alamac Knitting Mills	Holiday Inn
American Bosch	International Business Machines
American Optical	Jerrold Electronics
American Telephone and Telegraph	Kollmorgen
American Saw	Lechmere Sales
Arrow Elastic	Liberty Bakeries
Art Cement Products	Longueil Transportation
Bay State Gas	Ludlow Corporation
Bendix Abrasives	Mass. Mutual Life Insurance
Big Y Food Stores	Milton Bradley
John H. Breck	Monarch Life Insurance
Buxton	Monsanto
Carando	Moore
Champion Packages	National Blank Book
Cheney Bigelow	National Transparent Plastics
Chicopee Clothing	New England Container
Chicopee Manufacturing	Old Colony Envelope
Chicopee Undergarment	Oxford Precision
City of Springfield	Package Machinery
Coca-Cola Bottling	B. F. Perkins
Combustion Engineering	Phelon MagnaGrip
Columbia Manufacturing	Piel Brothers
Country Club Soda	Plastic Packaging
Crane	Pratt & Whitney Aircraft
Diamond International	Premoid Corporation
Dielectric Polymers	Pro Brush
Digital	Production Pattern
Eastern Airlines	Rainbow Girl Coat
Eastern Etching	Rakel's
Eastman Manufacturing	Rexcel
Farm Credit Banks	Rexnord
First Bank and Trust	Savage Arms
Forbes and Wallace	Scott Graphics
Friendly Ice Cream	F. W. Sickles
G & C Merriam	Smith & Wesson
General Electric	Springfield Cast Products
General Fibre Box	Springfield Foundry
General Offset Printing	Springfield Institute for Savings
H. P. Hood and Sons	Springfield Newspapers
Haarman Steel	Springfield Street Railway
Hartford Insurance Group	
HBA Cast Products	

APPENDIX D.1--Continued

Springfield Technical
Community College
Springfield Wire
Spalding
Stacy Machine
Standard Electric Time
Stanley Home Products
State Line Potato
Steiger's
Sterling Radiator
Storms Drop Forging
Strathmore Paper
Tampax
Taylor Rental
Technicarbon
Technicolor
Texon
Third National Bank
Titeflex
Toolkraft
Travelers Insurance
Uniroyal
United Engineers
U.S. Envelope
U.S. Post Office
Valley Bank & Trust
Van Norman Machine
Wall Street Journal
Western Mass. Electric
Westfield Chemical
Westinghouse Electric
Westover Knitting Mills
WICO Prestolite
Worthington CEI
Xerox

APPENDIX D.2

SURVEY LETTER

Western New England College

Springfield, Massachusetts 01119

Dear Sir:

Currently I am engaged in a research project on the use of computers within the Personnel function. I am planning to use the data for my doctorate in Business Administration.

I feel that research in this area is significant, not only for people like you, but for students of Personnel who hope to enter the field.

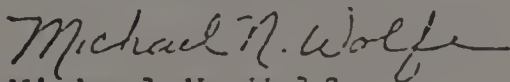
Therefore, I would like to enlist your cooperation in the completion of this project. If you are not presently using Electronic Data Processing in any of your work, please fill out the enclosed postcard.

However, if you are using EDP in any way in the Personnel Function, please note this on the accompanying postcard. I wish to talk to you informally regarding your uses of the computer and your reaction to its value for you.

All organizational information will be held in strictest confidence and will not be released in identifiable form. I would sincerely appreciate your cooperation.

Thank you.

Yours very truly,



Michael N. Wolfe

Assistant Professor

Western New England College

Ph.D Candidate

University of Massachusetts -- Amherst

BNW:pw

Enc.

APPENDIX D.3
SURVEY POSTCARD

Company Size (no. of people) _____

Type of Business _____

Is a Computer used for Payroll? Yes _____ No _____

Yes, we do use EDP in our Personnel Function. I would like to help in this project.

Contact:

Name _____

Telephone _____

Thank you.

APPENDIX D.4

SURVEY COST

Below is an approximate listing of expenses directly attributable to the survey part of this study.

Chamber of Commerce Material	\$ 5.00
Postage Stamps (200)	20.00
Printing	12.00
Stamped Postcards (200)	16.00
Telephone Calls	12.00
Gasoline	<u>42.00</u>
Total	\$107.00

APPENDIX D.5

SURVEY TIME TABLE

June 9, 1975	Survey Cover Letters Printed
June 16, 1975	Postcards Printed
June 23, 1975	Letters Sent
June 30, 1975- August 30, 1975	Survey Completed

APPENDIX E

PAYROLL FILE INFORMATION

Branch Number	Absent Codes 1, 2, 3
Department Number	Regular Hours
Employee Number	Overtime Hours
Mon. Y.T.D. Absent	Regular Pay
Tues. Y.T.D. Absent	Overtime Pay
Wed. Y.T.D. Absent	Sick Pay
Thurs. Y.T.D. Absent	Other Pay
Fri. Y.T.D. Absent	Vacation Pay
Rate	Holiday Pay
Salary Code	Gross Pay
Part or Full Time	Total Garnish
Student Code	Weekly Garnish
Bonus Code	F.I.C.A.
Review Code	State Tax
Name	Federal W/H Tax
Address	Net Pay
City and State	Deduction 1 Savings Plan
Zip Code	Deduction 2 Savings Bonds
Social Security Number	Deduction 3 Ins.
Period Ending Date	Deduction 4 Pensions
Pay Date	Deduction 5 Company Charge
Federal Exemption	Deduction 6 United Fund
State Exemption	Deduction 7
Married or Single	Deduction 8
Y.T.D. - F.I.C.A.	Date Last Increase
Y.T.D. - State Tax	Starting Date
Y.T.D. - Federal W/H Tax	Termination Date
Y.T.D. - Gross Pay	Extra Federal Taxes
Y.T.D. - Regular Pay	Extra State Taxes
Y.T.D. - Overtime Pay	Quarterly Gross

APPENDIX E---Continued

Y.T.D. - Regular Hours	Quarterly F.I.C.A.
Y.T.D. - Overtime Hours	Quarterly State
Y.T.D. - Days Absent	Weekly Absent
Y.T.D. - Week Number	Quarterly Fed. W/H
Y.T.D. - Deduction 1	Code Direct & Indirect
Y.T.D. - Deduction 2	Shift Code
Y.T.D. - Deduction 3	Fixed Ins. Cost
Y.T.D. - Deduction 4	Long-Term Disability
Y.T.D. - Deduction 5	Dental Rate
Y.T.D. - Deduction 6	Pension Per Cent Factor
Y.T.D. - Deduction 7	Number of Sick Days Paid
Y.T.D. - Deduction 8	Savings Plan Account Number

APPENDIX F

PAYROLL-PERSONNEL DATA SHEET INPUT FORM

PAYROLL DATA SHEET

MASTER NAME

DATE _____

INITIAL _____

NEW _____

CHANGE _____

CODE

EMP NBR

DEPT

1

1

2

5

6

7

FIRST NAME - MIDDLE INITIAL - LAST NAME

8

31

STREET ADDRESS

32

53

CITY AND STATE

54

73

ZIP CODE

74

78

MASTER STATISTICAL

CODE

EMP NBR

DEPT

3

1

2

5

6

7

FIRST NAME - MIDDLE INITIAL - LAST NAME

8

31

SOCIAL SECURITY NBR

FED EXP

ST EXP

RATE

32

40

41

42

43

44

45

49

M-MARRIED
S-SINGLE

50

HIRE DATE

BIRTH DATE

TERM DATE

51

56

57

62

63

63

X - FED TAX

X - ST TAX

69

72

73

76

APPENDIX G

PAYROLL-DEDUCTION AND ADJUSTMENT FORM

FORM 36 AWR

COMPANY

PAYROLL INPUT - CURRENT DEDUCTIONS

CODE	DEPT	EMP NBR	NH BLDG		BENE		STOCK		UNION/LTD	
01	67	25	18	22	23	27	28	32	33	37
			MISC		INS		BOND DENOM			
			48	52	43	47	38	42		
			BOND DENOM							
			53							

FI LL IN BOTH

ADJUSTMENTS TO YEAR-TO-DATE

CODE	DEPT	EMP NBR	GROSS EARNINGS		FICA		STATE		BENE	
01	67	25	0	14	21	26	27	32	58	62
			BONDS		B/C		INS		YTD HOURS	
			38	42	48	52	53	57	73	78
			STOCK		UNION/LTD					
			63	67	68	72				

WEEK ENDING _____
INITIAL _____

APPENDIX H

EMPLOYMENT NOTICE FORM AND EMPLOYEE STATUS
CHANGE NOTICE FORM

FORM
5903

EMPLOYMENT NOTICE

CLOCK NO.		DEPT.	ACCT.	SHIFT	FACTORY	OFFICE	EMPLOYMENT DATE		
LAST NAME				FIRST NAME	INITIAL	SEX	VACATION CR.	PENSION CR.	
HOME ADDRESS							ZIP CODE		
SCALE	L. G.	STEP	RATE	JOB CODE	JOB TITLE				
BENIORITY DATE (FACTORY)		SOCIAL SECURITY NUMBER		BIRTH DATE		PAY CASH		MASS. TAX YES NO	
SUPERVISOR		MISC. COMMENTS						OTHER STATE TAX	
								%	
								% OF GROSS	
APPROVED PERSONNEL DEPT.			APPROVED			APPROVED FINANCIAL			

APPENDIX H--Continued

FORM
5905

EMPLOYEE STATUS CHANGE NOTICE

CLOCK NO.	DEPT.	ACCT.	SHIFT	FACTORY OFFICE		DATE ISSUED
LAST NAME		FIRST NAME		INITIAL		DATE EFFECTIVE

CHANGE STATUS TO THE FOLLOWING						
DEPT./ACCT.	SHIFT	SCALE	L G.	STEP	RATE	JOB TITLE

HOME ADDRESS	ZIP CODE

OTHER CHANGE

MAKE PAYROLL PAYMENT		
AMOUNT	ACCOUNT NO.	REASON FOR PAYMENT

APPROVED PERSONNEL DEPT.	APPROVED	APPROVED FINANCIAL
--------------------------	----------	--------------------

APPENDIX I

PAYROLL DEDUCTION AUTHORIZATION FORM
AND TERMINATION NOTICE FORM

FORM
5904

PAYROLL DEDUCTION AUTHORIZATION

CLOCK NO.	DEPT.	ACCT.	SHIFT	FACTORY	OFFICE	DATE ISSUED
LAST NAME			FIRST NAME	INITIAL	DATE EFFECTIVE	

I, THE UNDERSIGNED, HEREBY AUTHORIZE PACKAGE MACHINERY COMPANY TO MAKE DEDUCTIONS FROM MY PAY FOR THE REASONS AND IN THE AMOUNTS AND FREQUENCY INDICATED BELOW. IT IS UNDERSTOOD BY ME THAT I MAY ADJUST SUCH DEDUCTIONS IN ACCORDANCE WITH THE PROVISIONS OF EACH OF THE INDIVIDUAL DEDUCTION PLANS.

UNION DUES WEEKLY	<input type="checkbox"/> PER CONTRACT <input type="checkbox"/> CANCEL	GROUP LIFE INSURANCE WEEKLY	\$
SUNSHINE CLUB WEEKLY	\$	DEPENDENCY COVERAGE GROUP INSURANCE WEEKLY	<input type="checkbox"/> YES <input type="checkbox"/> NO
CREDIT UNION WEEKLY	\$	A. A. 1ST PAY IN JAN.-MAY-SEPT.	\$
U. S. SAVINGS BONDS WEEKLY	DENOMINATION \$	PAYROLL SAVINGS WEEKLY	\$
OTHER:		ACCT. NO.	\$

PERSONNEL DEPT.	APPROVED	EMPLOYEE SIGNATURE

APPENDIX I--Continued

TERMINATION NOTICE

FORM 5906

CLOCK NO.	DEPT.	ACCT.	SHIFT	FACTORY	OFFICE	DATE ISSUED
LAST NAME		FIRST NAME		INITIAL		DATE EFFECTIVE
HOME ADDRESS						ZIP CODE
VOLUNTARY	INVOLUNTARY	REASON FOR TERMINATION				
FINAL PAYMENT					SUPERVISOR	
APPROVED PERSONNEL DEPT.		APPROVED			APPROVED FINANCIAL	

APPENDIX L

PAYROLL AND PERSONNEL MASTER FILE CHANGE NOTICE FORM

EMPLOYEE-PAYROLL MASTER FILE-CHANGES

WEEK ENDING

PREPARED BY: _____ PLACEMENT ADM. APPROVAL: _____ PAYROLL AUDITED BY: _____

PAY NO. 1 TRCD. CO. NO. 7 1

SOCIAL SECURITY NUMBER 16177 2122 NAME _____

DEPT. 40 GAP NO. 42 HOURLY RATE 49.50 STANDARD WORK HOURS: 52

BIRTH DATE 5/1/50 SENIORITY DATE 6/1/63 CONTINUITY SERVICE DATE 7/0/71 EMP. TYPE 77 78 79

ACCOUNTING DISTRIBUTION 18 10 CREG SERV. DATE 24 25 26 27 28 29 30 31 32 33 34 35 SEX 37 38 PERM. ACCID. INS. COV. 40 41 42 43 44 45 46 47 48

BANK ACCOUNT NUMBER 49 50 51 52 53

LOCAL STREET ADDRESS (Legal Address if L in Col. 8) _____ LOCAL CITY ADDRESS (Legal Address if L in Col. 8) _____

LOCAL STATE ADDRESS (Legal Address if L in Col. 8) _____ LOCAL ZIP CODE (Legal if L in Col. 8) _____

STATE CODE 67 INC. EXT. WKS. 69 AREA 70 HOME TELEPHONE NUMBER 72 80

NEW PAY NO. 1 TRCD. CO. NO. 7 8

SOCIAL SECURITY NUMBER 16177 FORMER PAY NO. 21

PERSONNEL: ON CD 3 FILL COL 22 23 WITH PROPER "TURNOVER" CODE:
 NE - ENGAGEMENT TB - TRANSFER BETWEEN RM - REMOVALS
 TC - RE-ENGAGEMENT TW - TRANSFER WITHIN CU - ALL OTHER CHANGES

JOB CODE NO. 1 PAID RATE SYMBOL JOB CODE NO. 2

1112 1718 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

ULOG. NO. 49 ROOM NO. 5152 SUPERVISOR 70 71 REQUEST NO. 76 V&T STATUS 77 78 79 80

APPENDIX M PERSONNEL ADDITION NOTICE

PERSONNEL ADDITION

Emp No	Dept No	Emp No	EFFECTIVE DATE		
13	14	15	Mo	Dy	Yr

Employee Last Name	Initials	Sex	Fire Source	Mo	Dy	Yr
13	30 31 32	33	34 35	36	37 38 39	40

Social Security No	Marital Status	Head of Household	Date of Birth	Yr	Date Hired	Mo	Dy	Yr
13	21	22	23 24 25	26	27 28 29	30	31	32

Type Addition	Pay Status	No	N
New Hire	Pay	15	16
13	14	15	16

Payroll Frequency	Type Pay Rate	Mo	Dy	Yr
Weekly	1	13	14	15

Work Type	PP	PN	HP	HN	SP	SN
Piece Wk Prod	13 14	15 16	17 18	19 20	21 22	23 24

Wage Hour Stat	Exempt	Non Exempt	Subj To O'Time	M.G.C.
13	14	15	16	17

Work Wk Hrs	Curr Base Salary	Curr Hire Rate	Cost Cntr	Overh Acct	Sub Acct
13	14	15	16	17	18

School	Discipline	Mo	Dy	Yr
13	14	15	16	17

Year of Exgree	Pin As and Surv Rate	Vacation Credit Date	Work Est Phone	Home Phone No
13	14	15	16	17

Job Classification	Job Description	Mo	Dy	Yr
13	14	15	16	17

Home Address Line No 1	Home Address Line No 2	Mo	Dy	Yr
13	14	15	16	17

Home Address Line No 3	Home Address Line No 4	Zip
13	14	15

Mailing Address Line No 1	Mailing Address Line 2	Mo	Dy	Yr
13	14	15	16	17

Mailing Address Line No 3	Mailing Address Line 4	Zip
13	14	15

Emp Hist	FICA No	Emp Class	Rank Code	Line Code	Emp No
13	14	15	16	17	18

Department Name	Employee Status	Work Location
13	14	15

Comments (Initial and Date)

Approved by Dept Head	Reviewed by Personnel Mgr	Date	Approved by	Date
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Checked by	Date	Control No
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APPENDIX N

EMPLOYEE CHANGE FORM

PERSONAL INFORMATION CHANGES

TO BE COMPLETED BY EMPLOYEE. Please type appropriate changes and/or additions.
Return to your Dept. Mgr. for his review and necessary distribution. Do not complete Code No. areas.

Date Submitted _____

ALWAYS complete this line.

Div.	Dept.	Employee No.	Employee Name	Department Name
1-3	4-7	8-12		

PERSONAL CHANGES

13-17 01100	New Employee Name (29 Characters) (Cols. 18-37)	Initials 13-17 02800	Marital Status (Cols. 18)	Single <input checked="" type="checkbox"/>	Married <input type="checkbox"/>	Head House <input type="checkbox"/>	Telephone
Name		Relationship		Telephone			

CHANGE IN
EMERGENCY
CONTACT

Address (Street, City, State, Zip)

Military Status (Explain change in Draft or Reserve)	Citizenship Status	Date of Papers
	First: _____	Final: _____

Dependents (Explain change in your family dependency status. Prepare R-4 Form)

ADDRESS CHANGES

Home Address		(Complete if other than Home Address)	
13-17 01400	Home Address - Line 1 (Cols. 18-37)	13-17 03100	Mailing Address - Line 1 (Cols. 18-37)
13-17 01500	Home Address - Line 2 (Cols. 18-37)	13-17 03200	Mailing Address - Line 2 (Cols. 18-37)
13-17 01600	Home Address - Line 3 (Cols. 18-37)	13-17 03300	Mailing Address - Line 3 (Cols. 18-37)
13-17 01700	Home Address - Line 4 (Cols. 18-37)	13-17 03400	Mailing Address - Line 4 (Cols. 18-37)
	Zip (35-37)		Zip (35-37)

TELEPHONE CHANGE

13-17 01800	New Home Phone No. (Cols. 18-29)	13-17 03500	Work Location (Cols. 18-19) Code No.
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EDUCATIONAL ADDITIONS

New Degree	Year Awarded In	Discipline Received In
School Awarding		

13-17 01900	School Codes (Cols. 18-20)	1	2	3	13-17 02900	School Discipline Codes (Cols. 18-29)	1	2	3
13-17 02000	School Degree Codes (Cols. 18-19)	1	2	3	13-17 03000	Degrees Awarded (Cols. 18-19)	Yr	1	2

COMMENTS

Employee Signature - Date	Dept. Head Review - Date	
Additional Review - Date	Personnel Mgr Review - Date	Recorded By - Date
Checked By - Date	Payroll Signer - Date	Control No. Cont. Code 4, 1

DISTRIBUTION

1. Dept. Head retain a copy & forward remainder to Personnel.
2. Personnel - retain copy & forward original to Payroll.

APPENDIX O

EMPLOYEE CHANGE OF STATUS RECORD

"PLEASE TYPE"

ROYAL & BUSINESS FORMS INCORPORATED makes new business

EMPLOYEE CHANGE OF STATUS-2300

TO BE COMPLETED BY DEPT HEAD

CURRENT STATUS

DIVISION NO	DEPARTMENT NO	EMPLOYEE NO	EFFECTIVE DATE OF CHANGE (MO DA YR)
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EMPLOYEE NAME	DEPARTMENT	JOB CLASS #	POSITION TITLE
SALARY	GRADE RANGE	POSITION IN RANGE - BEFORE INCREASE	
		<input type="checkbox"/> BELOW MIN	<input type="checkbox"/> LOWER THIRD
		<input type="checkbox"/> MIDDLE THIRD	<input type="checkbox"/> UPPER THIRD
		<input type="checkbox"/> OVER MAXIMUM	
DATE AMOUNT TYPE OF LAST INCREASE	LABOR CLASS	WRK WK HOURS	SHIFT
		<input type="checkbox"/> DIRECT	<input type="checkbox"/> INDIRECT
		<input type="checkbox"/> 1 ST	<input type="checkbox"/> 2 NO
		<input type="checkbox"/> 3 RD	<input type="checkbox"/> ROTATG
WAGE HOUR STATUS	HOURLY RATE	SUBJECT TO OVERTIME	PAY STATUS (LEAVE OF ABSENCE)
<input type="checkbox"/> EXEMPT	<input type="checkbox"/> NON-EXEMPT	<input type="checkbox"/> YES	<input type="checkbox"/> NO
		<input type="checkbox"/> PAY	<input type="checkbox"/> DO NOT PAY

NEW STATUS

NEW SALARY	% INCREASE	HOURLY RATE	TYPE INCREASE			
			<input type="checkbox"/> MERIT	<input type="checkbox"/> PROMOTION	<input type="checkbox"/> RECLASS	<input type="checkbox"/> ADJUSTMENT
		<input type="checkbox"/> AUTOMATIC PROMOTION				

SUBJECT TO OVERTIME	PAY FREQUENCY	TYPE PAY RATE			
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> WKLY	<input type="checkbox"/> BI-WKLY	<input type="checkbox"/> SEM-MO	<input type="checkbox"/> MO
		<input type="checkbox"/> WKLY	<input type="checkbox"/> BI-WKLY	<input type="checkbox"/> SEM-MO	<input type="checkbox"/> MO

JOB CLASS #	NEW POSITION TITLE	GRADE RANGE	WAGE HOUR STATUS
			<input type="checkbox"/> EXEMPT
			<input type="checkbox"/> NON-EXEMPT

PRODUCTION TYPE	WRK WK HRS	SHIFT
<input type="checkbox"/> REWORK	<input type="checkbox"/> DEF WORK PLAN PROJ	<input type="checkbox"/> HOURLY
<input type="checkbox"/> HOURLY NON-PROD	<input type="checkbox"/> SALARY	<input type="checkbox"/> SALARY V.V. PROD
		<input type="checkbox"/> 1 ST
		<input type="checkbox"/> 2 NO
		<input type="checkbox"/> 3 RD
		<input type="checkbox"/> ROTATG

WORK LOCATION (CITY AND STATE)	LOCATN CD	LABOR CLASS
		<input type="checkbox"/> DIRECT
		<input type="checkbox"/> INDIRECT

REASON FOR LEAVE OF ABSENCE	PAY STATUS	
	<input type="checkbox"/> PAY	
		<input type="checkbox"/> DO NOT PAY

REASON FOR TERMINATION	TERM CD	PAID SEVERANCE DAYS	PAID VACATION DAYS

TRANSFER

DIVISION NO	DEPT NO	GENL LEADER AGCT CHARGED			
		BY	COSTCTR	CHRGD	SUB AGCT

COMMENTS (INITIAL AND DATE)

DEPT HEAD	DATE	ADDITIONAL APPROVAL	DATE	ADDITIONAL APPROVAL	DATE
PERSONNEL MGR	DATE	CHECKED BY SUBJECT	DATE	CHECKED BY PAYROLL	DATE

APPENDIX P

FILE INFORMATION CONTAINED IN EMPLOYEE FILES

- I. Employee Personal Information:
 - A. Home Address;
 - B. Mailing Address;
 - C. Marital Status;
 - D. Date of Birth;
 - E. Sex;
 - F. Minority Group Classification;
 - G. Home and Work Phone Numbers.

- II. Educational Information:
 - A. Bachelor Degree Discipline;
 - B. Master Degree Discipline;
 - C. Ph.D. Degree Discipline;
 - D. Date of Degrees;
 - E. Schools Attended.

- III. Employment Information:
 - A. Source of Hire;
 - B. Date of Hire;
 - C. Termination Date;
 - D. Termination Reason.

APPENDIX P--Continued

IV. Benefits Information:

- A. Vacation Eligibility;
- B. Thrift Plan Eligibility;
- C. Thrift Plan Membership Date;
- D. Retirement Eligibility;
- E. Retirement Plan Eligibility Date;
- F. Service Pin Award Dates.

V. Employee Work History:

- A. Current and 10 previous CE positions held;
- B. Current and 10 previous salary rates;
- C. Current and 10 previous types of increases;
- D. Date of current and previous increases;
- E. Current and 10 previous cost center numbers;
- F. Current and 10 previous job class code numbers.

VI. Pay Information:

- A. Employee Number;
- B. Number of Exemptions;
- C. Per Cent Deduction Thrift Plan;
- D. Per Cent Deduction Group Insurance;
- E. Overtime Eligibility;
- F. Wage and Hour Status;
- G. Pay Status (Pay--Do Not Pay).

APPENDIX R

CHANGE OF STATUS FORM USED WITH EMPLOYEE PROFILE

REASON FOR NOT USING BLUE PCA

PERSONNEL CHANGE AUTHORIZATION

PERSONNEL CHANGE AUTHORIZATION											
TITLE CODE 11 11		SOCIAL SECURITY NO 11 11		RESPONSIBILITY CODE 3 11		LOCATION NAME 11 11		DATE OF EMPLOYMENT 11 11		PAYROLL S1000	
BASIC FILE 11 11		MAIL CODE 11 11		STATE OF ORIGIN 11 11		MAIL STATUS 11 11		DATE OF BIRTH 11 11		DATE OF HIRE S9505	
S2001 11 11		MAIL CODE 11 11		STATE OF ORIGIN 11 11		MAIL STATUS 11 11		DATE OF BIRTH 11 11		DATE OF HIRE S9505	
PERSONAL MAIL ADDRESS 11 11											
S2121 11 11											
ORGANIZATIONAL EXPENSE CODES 11 11											
U2210 11 11											
EMPLOYMENT TAX EXPENSES 11 11											
S2215 11 11											
PERSONAL STATISTICS 11 11											
S2333 11 11											
SALARY 11 11											
NE 500 11 11											
RESIDENCE 11 11											
S9524 11 11											
EMERGENCY AND ORIGIN 11 11											
S9555 11 11											
FAMILY AND MILITARY 11 11											
S9577 11 11											
COMMENTS 11 11											
S9588 11 11											
I.O.C.U. ONLY 11 11											

Notes: Submit Authorization to I.O.C.U. only when an entry is made in a "white" area. Hold all other changes until that time.

