

IMPLICATIONS OF AUTOMATION and Other Technological Developments

A Selected Annotated Bibliography

Bulletin No. 1319-1

December 1963

**U.S. Department of Labor
W. Willard Wirtz, Secretary**

**Bureau of Labor Statistics
Ewan Clague, Commissioner**



OTHER BLS PUBLICATIONS ON AUTOMATION AND PRODUCTIVITY

Industrial Retraining Programs for Technological Change (Bulletin 1368, 1963), 34 pp., 25 cents.

A study of the performance of older workers based on four case studies of industrial plants.

Impact of Office Automation in the Internal Revenue Service (Bulletin 1364, 1963), 74 pp., 45 cents.

A case study of a major conversion to office automation in the Federal Government. Includes information on planning and administering manpower policies, impact on employees and occupations, staffing and training activities, manpower problems, and outlook.

Impact of Technological Change and Automation in the Pulp and Paper Industry (Bulletin 1347, 1962), 92 pp., 50 cents.

Surveys the nature, status, and outlook of technological innovations and implications for productivity, production, employment, occupational requirements, and industrial relations practices. Includes three case studies of recent technological innovations.

Implications of Automation and Other Technological Developments: A Selected Annotated Bibliography (Bulletin 1319, 1962), 136 pp., 65 cents.

Describes over 500 books, articles, reports, speeches, conference proceedings, visual aids, and other readily available materials published primarily since 1956.

Technological Change and Productivity in the Bituminous Coal Industry, 1920-60 (Bulletin 1305, 1961), 136 pp., 65 cents.

Trends in technology and productivity and implications for employment, unemployment, wages, prices, and profits.

Impact of Automation (Bulletin 1287, 1960), 114 pp. Out of print, available in libraries.

A collection of 20 articles about technological change, from the Monthly Labor Review.

Adjustments to the Introduction of Office Automation (Bulletin 1276, 1960), 86 pp., 50 cents.

A study of some implications of the installation of electronic data processing in 20 offices in private industry, with special reference to older workers.

Studies of Automatic Technology (Free).

A series of case studies of plants introducing automation. Describes changes and implications for productivity, employment, occupational requirements, and industrial relations.

A Case Study of a Company Manufacturing Electronic Equipment.
The Introduction of an Electronic Computer in a Large Insurance Company.
A Case Study of a large Mechanized Bakery (Report 109).
A Case Study of a Modernized Petroleum Refinery (Report 120).
A Case Study of an Automatic Airline Reservation System (Report 137).

Trends in Output per Man-Hour in the Private Economy, 1909-1958 (Bulletin 1249, 1959), 93 pp., 50 cents.

Indexes of output per man-hour, output, and employment in major sectors. Analysis of trends and factors affecting changes.

Sales publications may be purchased from the Superintendent of Documents, Washington, D. C. 20402, or from regional offices of the Bureau of Labor Statistics at the addresses shown below. Free publications are available, as long as the supply lasts, from the Bureau of Labor Statistics, U.S. Department of Labor, Washington, D. C. 20210.

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IMPLICATIONS OF AUTOMATION AND OTHER TECHNOLOGICAL DEVELOPMENTS

A Selected Annotated Bibliography

Introduction

This bibliography is a supplement to BLS Bulletin 1319, Implications of Automation and Other Technological Developments, which was published in February 1962 and covered publications issued from 1956-61. Copies of Bulletin 1319, which lists over 500 references, may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, price 65 cents.

This supplement cites 307 references published mainly between the latter part of 1961 and early 1963. Some earlier references, not included in Bulletin 1319 are included in this bulletin. The references have been classified under 11 sections, as in Bulletin 1319.

Scope and Limitations

Books, articles, reports, pamphlets, speeches, conference proceedings, and other readily available materials are included. The term "automation" is used broadly to cover a variety of technical developments. A number of references describing these developments in different industries, useful to the nonspecialist, are listed. Most of the references, however, relate to the social and economic aspects of automation: The implications for employment, unemployment, occupational and skill requirements, training and retraining, collective bargaining, business management and organization, and the progress of automation in other countries.

No effort was made to include references on certain subjects indirectly related to the general topic, such as the problem of economic growth and stability; the impact of research; and the history of science and invention. Publications in foreign languages are also excluded.

Using the Bibliography

Effective use of the bibliography may be facilitated by the following features:

Classification by Subject. References are classified under 11 broad topics. The second section, on technology, is further divided into 10 subdivisions covering different industries. When a reference pertains to more than one section, it is listed only once, under the section to which a major portion of it relates. However, the item is cross-referenced in the subject index.

Alphabetical Arrangement by Authors. Most references are arranged and numbered alphabetically by author within each section. The number to the left of the decimal indicates the section and the number to the right represents the item within the section.

Brief Annotations. Most of the references are briefly annotated to indicate the subjects covered, the general content of the publication, and the principal ideas and viewpoints of the author where appropriate. Annotations are not written for most of the items on technical trends in specific industries listed in section 2, and for items in other sections where the content and/or viewpoint are indicated by the title.

Index to Authors. Appendix A presents an alphabetical listing of authors, with the numbers of all references cited. Writers of articles included in collections are not listed unless designated in the reference.

Index to Subjects. Appendix B presents an alphabetical listing of subjects with the number of all references related to them. Where a reference is related to more than one subject, it is cited under each subject.

Periodical and Publisher List. Appendix C is an alphabetical listing of periodicals and publishing organizations, with addresses, cited in the bibliography.

This bibliography was prepared by John J. Heberle, assisted by David Tatel, under the supervision of Herbert Hammerman, in the Bureau's Division of Technological Studies, under the general direction of Leon Greenberg, Assistant Commissioner for Productivity and Technological Developments.

SECTION 1 - IMPACT OF AUTOMATION AND TECHNOLOGICAL CHANGE: SOME GENERAL SURVEYS

This section includes references to publications providing general discussions on the concept, scope, development, and characteristics of automation as well as the economic and social implications of automation for management, labor, government, education, leisure, culture, and philosophy.

- 1.01 AFL-CIO Industrial Union Department. Automation's Unkept Promise, Publication No. 47 (Washington, AFL-CIO Industrial Union Department, June 1962). 28 pp.

The ability to consume has not increased as rapidly as the ability to produce, with resultant idle capacity and unemployment. Suggests ways to cushion the impact of displacement because of automation, e.g., maintenance of income, early retirement, increase worker mobility, retraining, and shorter hours with no loss in pay. Also suggests that Government establish a permanent clearing house to gather and maintain information on technological change.

- 1.02 Brady, Robert A. Organization, Automation, and Society (Berkeley, University of California Press, 1961). 481 pp.

Impact of science and technological change on the organization of industry and society. Discusses the best method of organizing productive resources in an age of advanced technological knowledge.

- 1.03 Bush, Vannevar. "Automation's Awkward Age," Saturday Review, August 11, 1962, pp. 10-11.

- 1.04 Diebold, John. "Facing Up to Automation," Saturday Evening Post, September 22, 1962, pp. 26-29.

- 1.05 Diebold, John. "Urgent Need: All-Out Automation," Nation's Business, July 1961, pp. 178-182.

- 1.06 Dunlop, John T., editor. Automation and Technological Change, The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, 1962). 184 pp.

Leading authorities consider several aspects of the impact on society of automation and technological change. Includes 10 articles covering subjects such as educational and social consequences, psychological and organizational impacts, significance for collective bargaining, effects on employment, and on managerial decisions. For annotations of individual articles, see 1.11, 2.05, 3.04, 5.10, 5.36 7.11, 8.37, 9.02, and 10.03.

- 1.07 Ferry, W. H. Caught on the Horn of Plenty (Santa Barbara, Fund for the Republic, Inc., January 1962). 8 pp.

Suggests that the replacement of scarcity by abundance has outmoded traditional economic thought; national planning, accompanied by radical changes in public attitudes toward work and leisure, is required to overcome technological unemployment.

- 1.08 Fuchs, Victor R. "Fallacies and Facts About Automation," The New York Times Magazine, April 7, 1963, p. 27ff.

Author examines two prevailing attitudes concerning automation and concludes that either position involves some fallacious thinking. Concludes that the danger is not from rapid technological change, but rather that institutional adaptation to change is too slow.

- 1.09 Gomberg, William. "Problems of Economic Growth and Automation," California Management Review, Summer 1961, pp. 4-17.

Maintains that, while automation creates unemployment and downgrades skilled labor, other forces constrict capital formation. Suggests increased public investment, tax reforms, and new concepts of wages and profits, as against an economy based on "compulsive consumption" and "synthetic obsolescence."

- 1.10 Goodman, Edith Harwith, editor. "Effects of Computers on Personnel," Data Processing, Part I, November 1961, pp. 8-24; Part II, December 1961, pp. 17-24.

A roundtable discussion by educators, employer and union representatives, consultants, and others. Part I considers displacement, psychological reactions, and job opportunities. Part II is primarily concerned with skill requirements, education, training, and social responsibilities.

- 1.11 Heilbroner, Robert L. "The Impact of Technology: The Historic Debate," Automation and Technological Change, The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, 1962), pp. 7-25.

Cites contributions to the theory of technological change from Adam Smith to Josef Schumpeter, in an attempt to place the economic and social impacts of contemporary automation in perspective.

- 1.12 How to Handle the Impact of Automation, Report on Business (Englewood Cliffs, N.J., Prentice-Hall, December 16, 1961). 32 pp.

General characteristics, examples, and benefits of automation. Effects on employment, productivity, composition of the workforce, and skill requirements. Discussion of labor's viewpoint and the responsibilities of government.

- 1.13 "Is Automation a Boon or a Menace?" Mill and Factory, February 1962, pp. 65-70.

Arthur J. Goldberg, George Meany, and John I. Snyder present, respectively, the viewpoints of government, labor, and business on problems and solutions of automation.

- 1.14 Johnson, Richard A. Employees-Automation-Management, Management Series No. 3, (Seattle, University of Washington, 1961). 31 pp.

Effects of automation on the employee in terms of long-run and short-run demand for labor, skill requirements, training, wages, workweek, and working conditions. Reasons for worker resistance to change. Suggests program to reconcile differences between labor and management.

- 1.15 Killingsworth, Charles, issue editor. "Automation," The Annals of the American Academy of Political and Social Science, March 1962. 198 |

Scientists, engineers, social scientists, and spokesmen for labor, management, and government consider various aspects of automation. The 14 articles are concerned with the nature of automation, the current state-of-the-art, individual and social impacts, private and public policies, and an international perspective. For annotations of individual articles, see 2.08, 2.16, 2.17, 2.44, 2.51, 4.02, 5.07, 5.12, 5.15, 6.09, 8.20, 8.31, 9.20, and 10.06.

- 1.16 Michael, Donald N. Cybernation: The Silent Conquest (Santa Barbara, Fund for the Republic, Inc., January 1962). 46 pp.

"Cybernation" is a term coined by the author as a composite of "cybernetics" and "automation." Its effects, within 20 years, are predicted to include unemployment in most occupational groups and industries, psychological frustration due to enforced leisure, and inadequate consideration of the individual due to computerized decisionmaking. Concludes that, if these problems are to be met in time, many traditional attitudes and beliefs will have to be changed.

- 1.17 Philipson, Morris, editor. Automation--Implications for the Future (New York, Vintage Books, 1962). 456 pp.

A collection of 18 articles concerned with various aspects of automation, including implications for industry, labor, social sciences, government, education, and leisure. For references to selected articles, see 2.10, 2.40, 8.16, and 9.16.

- 1.18 President's Advisory Committee on Labor-Management Policy. The Benefits and Problems Incident to Automation and Other Technological Advances (Washington, U.S. Government Printing Office, January 11, 1962). 11 pp. Summarized by Lloyd W. Larson in Monthly Labor Review, February 1962, pp. 139-144.

A tripartite body representing the public, industry, and labor presents a program concerning: (1) the necessity of automation; (2) the need to preserve human values; and (3) the importance of both private and governmental action. Recommends 11 specific measures on subjects such as economic growth, education, retraining, dissemination of information, cushioning the impact of change, and job placement.

- 1.19 Quinn, Francis X., editor. The Ethical Aftermath of Automation (Westminster, Md., The Newman Press, 1962). 270 pp.

Based on a seminar held at Woodstock College, August 6 to 11, 1961. Eighteen contributors, including Seymour L. Wolfbein, Abraham Weiss, Joseph D. Keenan, Senators Barry Goldwater and Eugene J. McCarthy, and the Rt. Rev. Msgr. George G. Higgins. Covers moral implications of automation as it affects employment and unemployment, working conditions, older workers, collective bargaining, economic security, leisure, and decisionmaking by management. Underlying theme is that automation is not an end in itself, but must serve the ends of social justice. Includes a bibliography of 50 books and publications.

- 1.20 Seligman, Ben B. "Man, Work, and the Automated Feast," Commentary, July 1962, pp. 9-19.

Discussion of various forms of automation--computers, "Detroit" automation, and advanced instrumentation. Predicts effects of automation: 8 to 10 million unemployed by end of decade; reduction in union membership and strength; and greater managerial inflexibility. Offers reduction in workweek as the only practical solution.

- 1.21 Velie, Lester. "Automation--Friend or Foe," Reader's Digest, October 1962, pp. 101-106.

- 1.22 Walker, Charles R., and Walker, Adelaide G. Modern Technology and Civilization: An Introduction to Human Problems in the Machine Age (New York, McGraw-Hill, 1962). 469 pp.

A book of readings on ways in which industrial technology affects people, organizations, and values. Attempts (1) to place modern technology in historical perspective, (2) to outline the problems and benefits resulting from automation, (3) to reveal basic problems now evident in developing non-Western countries due to technology, and (4) to provide an interdisciplinary approach to assessing the impact of automation. Short bibliographies after each topic.

- 1.23 Zelomek, A. W. A Changing America: At Work and Play (New York, John Wiley and Sons, 1959). 181 pp.

A discussion of current trends relating to automation, culture, leisure, services, suburban living, and woman's role. Chapter on automation mentions what has been learned from case studies as to employment and other effects upon labor.

- 1.24 Landsberg, Hans H., Fischman, Leonard L., and Fisher, Joseph L. Resources in America's Future (Baltimore, Johns Hopkins Press, 1963). 1017 pp.

Comprehensive projections to year 2000 of the adequacy of our resource base (in terms of land, water supply, energy and nonfuel materials) on the basis of projections of requirements for future living and demand for key materials.

- 1.25 National Bureau of Economic Research. The Rate and Direction of Inventive Activity: Economic and Social Factors (Princetown, Princetown University Press, 1962). 635 pp.

Collection of 23 papers and 17 commentaries represents both theoretical and empirical findings covering: allocation of resources to inventive effort; output of inventions; and case studies of effects of research and development programs.

SECTION 2 - TECHNOLOGICAL CHANGES IN SOME LEADING INDUSTRIES

This section includes references describing important technical innovations in key industries. Surveys of technical trends are annotated. Industry references are annotated only when titles do not adequately indicate the contents.

SURVEYS OF BROAD TECHNOLOGICAL TRENDS

- 2.01 Amber, George H., and Amber, Paul S. Anatomy of Automation (Englewood Cliffs, N.J., Prentice-Hall, 1962). 245 pp.

A detailed summary in text, schematic and table form, of the principles, philosophy, and different forms of automation. Covers computers tooling, feedback and control, and information theory. Discusses automation trends. Bibliography.

- 2.02 American Data Processing, Inc. Data Processing Yearbook 1962-63 (Detroit, American Data Processing, Inc., 1962). 299 pp.

A state-of-the-art presentation of the scope of data processing and management information systems. Includes papers by 32 experts in their respective fields. Subjects covered include: (1) developments in equipment; (2) advanced applications, e.g., information retrieval and operations research; (3) impact on management and corporate structure; (4) developments in selected industries and specialized fields; e.g., insurance and finance, government, utilities, medicine, law; and (5) a survey of computer use and personnel (with coverage, however, limited to subscribers) and directories of computers and computer courses in universities and private data-processing schools. Bibliography.

- 2.03 Barach, Arnold., and the Kiplinger Washington Editors. 1975 and the Changes to Come (New York, Harper & Brothers, 1962). 195 pp. Summarized in Changing Times Family Success Book, "The Fabulous Years Ahead" (Washington, D.C., Kiplinger Washington Editors, Inc., 1963 Edition), pp. 5-19.

Popularized preview of technological progress with particular reference to marketable consumer goods expected to be technically feasible and in sufficient supply by 1975, and an indication of social changes which may result from them.

- 2.04 Bauer, W. F., Gerlough, D. L., and Granholm, J. W. "Advanced Computer Applications," Proceedings of the IRE, January 1961, pp. 296-304.

Detailed summary of the most advanced applications. Emphasis on utilization in literature and the arts, medicine, business and government, "on-line" applications, air transportation, communication, automobile traffic control, and language translation. Extensive references.

- 2.05 Bello, Francis. "The Technology Behind Productivity," Automation and Technological Change. The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, 1962), pp. 153-168. Summarized in Monthly Labor Review, August 1962, pp. 865-867.

States that increased industrial research provides the best means of attaining the 4.5 percent growth rate which should be a major objective of government policy and is necessary to fulfill domestic and foreign obligations. Distinguishes between types of research expenditures with respect to their ability to increase productivity.

- 2.06 Berkeley, Edmund C. The Computer Revolution (Garden City, N.Y., Doubleday, 1962). 249 pp.

Concise description of the computer, its history, functions, and principal applications. Extensive discussion of the computer's capacity to converse in ordinary language with human beings, the use of the computer for war and peace, its impact on employment and on society, and the social responsibilities of computer users. Glossary of computer terms.

- 2.07 Dickinson, William B. Jr. "New Products of Industry and Changes in Markets," Editorial Research Reports, September 12, 1962, pp. 665-671.

Summarizes the need for and impact on the economy as a result of the introduction of new products and materials. Discusses the contributing influence of research and development.

- 2.08 Diebold, John. "The Application of Information Technology," The Annals of the American Society of Political and Social Science, March 1962, pp. 38-45.

Discusses various applications of electronic computers. Concludes that immediate advantages will be less important than the long-range effects and that the most critical problems stemming from information technology are not yet generally recognized.

- 2.09 Engineering Research Committee. The Nation's Engineering Research Needs, 1965-1985 (New York, Engineers Joint Council, May 25, 1962). 50 pp.

Examines future responsibilities of engineers for the creative application of science and technology to meet changing needs of our society. Appraises some engineering research opportunities for which existing programs appear inadequate.

- 2.10 Gabor, Dennis. "Inventing the Future," Automation--Implications for the Future (New York, Vintage Books, 1962), pp. 131-161.

Discusses such topics as the possibility of a prediction computer, mechanization of creative activity, the role of the individual inventor versus the corporate inventor, and the imminence of a leisure-dominated society.

- 2.11 Klaw, Spencer. "What Can We Learn From the Teaching Machines," The Reporter, July 19, 1962, pp. 19-26.

- 2.12 Leaver, Eric W. "The Next Fifteen Years of Automation," Automation, September 1962, pp. 52-58.

- 2.13 Lessing, Lawrence. "The Mighty Mix of New Materials," Fortune, May 1962, pp. 140-144 ff.

- 2.14 Neisser, Ulric. "The Imitation of Man by Machine," Science, January 18, 1963, pp. 193-197.

Asserts that, while computers are purposive, capable of learning from experience, and of creating novelty, they are different from men in that they do not grow, have no emotions, and are shallowly motivated. Warns against using them for making social decisions.

- 2.15 Pierce, J. R. "How Smart are Computers," Saturday Evening Post, November 4, 1961, p. 25 ff.

- 2.16 Reintzes, J. F. "The Intellectual Foundations of Automation," The Annals of the American Academy of Political and Social Science, March 1962, pp. 1-9.

Historical outline of man's efforts to increase his productivity by using mechanical devices, outside power sources, and automatic control systems. Discusses the foundations of modern technology in the physical, chemical, mathematical, and electrical sciences as well as other engineering disciplines. Specifically discusses feedback control, digital computers, tape control, and man-machine integration.

- 2.17 Samuel, Arthur L. "Artificial Intelligence: A Frontier of Automation," The Annals of the American Academy of Political and Social Science, March 1962, pp. 10-20.

Discusses approaches to use of the computer as a problem-solving machine: one aimed at a complete understanding of intellectual processes, another at duplicating the behavior of the brain. Believes artificial intelligence will reduce rather than increase technological unemployment.

- 2.18 Science, (Instrument Issue), October 20, 1961. 216 pp.

Nine articles describe and evaluate advanced instrumentation in such fields as astronomy and medicine.

- 2.19 U.S. Army, Ballistic Research Laboratories. Thesaurus of the Names of Electronic Digital Computers and Data Processors, by Martin H. Weik, BRL Technical Note No. 1492. (Aberdeen, Md., U.S. Army Ordnance Computing Laboratory, September, 1962). 17 pp.

A listing of computer names and their manufactures.

- 2.20 Worsnop, Richard L. "Approach to Thinking Machines," Editorial Research Reports, July 25, 1962, pp. 539-554.

Discusses the development, uses, and limitations of contemporary computers, and their impact on employment.

AGRICULTURE AND MINING

- 1.21 "The Challenge of Coal's New Growth Era," Coal Age, October 1961, entire issue. 328 pp.

Several articles on technological change in the coal mining industry, including forecasts of developments up to 1970.

- 2.22 "Invention Sprouts on California's Farms," Fortune, January 1963, pp. 90-99.

Pictorial presentation of agricultural mechanization. Captions summarize costs, savings, productivity, and manpower requirements.

- 2.23 Zeller, W. L. "Underground Planning and Control Using Electronic Computers," Mining Congress Journal, January 1961, pp. 43-46.

DATA PROCESSING - OFFICE

- 2.24 Bailey, Mildred L. "Cobol: A User's Progress Report," Data Processing, October 1962, pp. 13-19.

Application of a program language to computer inventory control and ordering. Impact on managers, analysts and programmers, and machine operators.

- 2.25 "A Computer Market Survey: The Banking Industry," Computers and Automation, October 1962, pp. 14-20.

Surveys current use of electronic banking aids, and analyzes the market for computers during the coming half decade.

- 2.26 Dun's Review and Modern Industry, September 1962, entire issue. 100 pp.

Special report on office equipment and techniques.

- 2.27 Ferguson, William A. "Establishing Centralized Data Processing," Automation, May 1962, pp. 50-56.

- 2.28 Investment Bankers Association of America. "A Survey and Study of the Computer Field," Computers and Automation, Part I, January 1963, pp. 15-25; Part II, February 1963, pp. 25-29.

Report of the Association's Industrial Securities Committee, November 25-30, 1962, reprinted in full. Covers computer technology, history, economics, current state-of-the-art, and expected developments.

- 2.29 Johnson, Robert B. "Automation Data Input," Systems and Procedures Journal, January-February 1962, pp. 29-31.

Discusses various forms of input media for high speed computers, including punched cards, punched paper tape, magnetic ink character recognition, and optical scanning.

- 2.30 Kornfeld, Leo L. "Mechanizing Higher Education," Systems and Procedures Journal, Part I, January-February 1962, pp. 11-14; Part II, March-April 1962, pp. 36-40.

Discusses the desirability of installing data processing equipment to meet challenges of larger enrollment and of paperwork growth in colleges. Suggests possible applications and presents hypothetical cost projections.

- 2.31 Life Office Management Association. EDP in Life Insurance, Proceedings of the Automation Forum (New York, Life Office Management Association, 1962). 544 pp.

Collection of papers presented by life insurance industry executives and some computer manufacturers' representatives, covering various applications of computer systems to life insurance office functions. Briefly covers selection and training of electronic data processing personnel, and salary determination.

- 2.32 Meacham, Alan D., and Thompson, Van B., editors. Computer Applications Service (Detroit, American Data Processing, Inc., 1962). 300 pp., estimated.

Two volumes, each containing description of 50 computer applications. Subjects are indexed by equipment used, industry, and type of application.

- .33 Reistad, Dale L. Banking Automation and the Magnetic Ink Character Recognition Program (Detroit, Detroit Research Institute, 1961). 184 pp.

Study of the development of the magnetic ink character recognition (MICR) program, the automatic processing of documents, and the role of the computer in the MICR program.

- 2.34 Rieser, Carl. "The Short Order Economy," Fortune, August 1962, pp. 90-95.

Shows that manufacturers are introducing computers to facilitate order filling, inventory handling, and production scheduling, that major benefits are improved customer service and reduced inventory requirements. Among the results are centralizing organizational control and freeing salesmen from clerical duties.

- 2.35 Roach, Charles J., Ellestad, Myrvin, and Lake, Raymond B. "Medical Data Processing and Computer Automated Hospitals," Datamation, June 1962, pp. 25-28.

- 2.36 Ronayne, Maurice F. "SDA: Starting Point for ADP," Systems and Procedures Journal, March-April 1962, pp. 17-21.

Discusses methods of applying automation techniques from the point where information originates.

- 2.37 "Scanning the Gas Bill," Business Automation, December 1962, pp. 35-37.

Optical scanning equipment is combined with an EDP system to process utility payments.

DATA PROCESSING - RESEARCH AND CONTROL

- 2.38 Borko, Harold, editor. Computer Applications in the Behavioral Sciences (Englewood Cliffs, N.J., Prentice-Hall, 1962). 633 pp.

Specialists present and evaluate computer applications in such fields as psychological research, statistical computation, language analysis, simulation of neurophysiological models, and simulation of social system models.

- 2.39 Bushor, William E. "Information Storage/Retrieval," Electronics, June 29, 1962, pp. 40-62.

Exploration of the technology of information retrieval. Consideration of user needs, costs, and available equipment (including manual, punched card, and computer equipment) provides a background for discussion of specialized systems.

- 2.40 Crane, Diana. "Computer Simulation: New Laboratory for the Social Sciences," Automation--Implications for the Future (New York, Vintage Books, 1962), pp. 339-353.

Illustrates use of computers to simulate the behavior of large groups of individuals, and suggests computers may provide the means to understand and control the variables affecting human relations.

- 2.41 Johnson, Ernest F. "Automatic Process Control," Science, February 9, 1962, pp. 403-408.

- 2.42 National Science Foundation, Office of Science Information Service. Current Research and Development in Scientific Documentation No. 10, NSF-62-20 (Washington, U.S. Government Printing Office, May 1962). 383 pp.

Descriptive report of current research in government, industry, the universities, and other organizations on information requirements and uses, information storage and retrieval, mechanical translation, character and pattern recognition, artificial intelligence, and equipment.

- 2.43 "Robot in the Workshop," Dun's Review and Modern Industry, March 1962, pp. 88-108.

Discusses control of industrial processes by computers, illustrating computer use in the oil and chemical industries, in the numerical control of machine tools, and in the development of robots which perform actions resembling human motions. Predicts extensive replacement of production workers.

- 2.44 Stout, Thomas M. "Process Control: Past, Present, and Future," The Annals of the American Academy of Political and Social Science, March 1962, pp. 29-37.

Describes process control and evaluates it from manual adjustment through automatic control towards computer-controlled plants. Shows that advantages of process control include greater capacity, lower raw material and utility costs, and improved quality control. Labor savings, already achieved by automatic equipment, are minimal.

- 2.45 Williams, T. J. "Digital Computers in Process Control," Automation, March 1962, pp. 56-60.

GOVERNMENT

- 2.46 "EDP in Public Administration, a Symposium," Public Administration Review, September 1962, pp. 129-152.

Six articles discuss applications, effects, and plans regarding use of electronic data processing in Federal, State, and local governments.

- 2.47 Hearle, Edward F. R., and Mason, Raymond J. "Data Processing: Its Future in State Government," State Government, Winter 1961, pp. 47-51.

- 2.48 U.S. Bureau of the Budget. Inventory of Automatic Data Processing (ADP) Equipment in the Federal Government (Washington, U.S. Government Printing Office, August 1962). 126 pp.

Inventory of ADP equipment by Government department, location, and make and model of computer, including costs, categories of use, and personnel utilization. Contains charts on ADP growth and applications.

METAL INDUSTRIES

- 2.49 Aerospace Industries Association of America, Inc. Aerospace Technical Forecast 1962-72 (Washington, Aerospace Industries Association of America, Inc., 1962). 144 pp.

Summarizes broad trends and requirements for propulsion systems, materials, ground support equipment, manufacturing processes, testing and related aerospace vehicle systems development.

- 2.50 American Society of Tool and Manufacturing Engineers. Collected Papers: Numerical Control (Detroit, American Society of Tool and Manufacturing Engineers, 1963). 83 pp.

Fourteen selected technical papers covering history, equipment, methods, outlook, advantages and limitations, training experience and requirements, and other technical considerations of numerical control. For annotations of particular articles, see 2.57 and 7.06.

- 2.51 Ashburn, Anderson. "Detroit Automation," The Annals of the American Academy of Political and Social Science, March 1962, pp. 21-28.

Discusses various types of industrial automation, including mechanical transfer of work between linked machine tools, transfer machines, and numerically controlled machines. Considers factors limiting growth of automation in metalworking and concludes that rate of growth in metalworking is rising after a recent tapering off.

- 2.52 Benton, Rufus R.C., Bauchspies, David A., and Woodring, G. Daniel. "A Production Man's Guide to Chemical Machining," American Machinist/Metalworking Manufacturing, August 6, 1962, pp. 73-80.

- 2.53 Black, T. W. "Lasers Cast Light on Machining, Welding Problems," The Tool and Manufacturing Engineer, June 1962, pp. 85-91.

- 2.54 Black, T. W. "Lightning Strikes Manufacturing--Electrical Material-working Processes," The Tool and Manufacturing Engineer, January 1963, pp. 87-94.

- 2.55 Black, T. W. "West Coast Industry," The Tool and Manufacturing Engineer, September 1962, pp. 123-128.

Survey of 20 metalworking companies. New materials, vacuum welding, numerical control and computer controls are among subjects covered.

- 2.56 Boulger, Francis W. "Review of Some Unconventional Methods of Machining," Machinery, April 1961, pp. 140-146.

- 2.57 Carlberg, Edward F. "Trends and Future Directions of Numerical Control," Collected Papers: Numerical Control (Detroit, American Society of Tool and Manufacturing Engineers, 1963). 8 pp.

Finds growing use for numerical control in industry because of the trend toward shorter production runs, more complex products, increasing use of exotic materials, declining cost of manufacturing as related to research and testing, and increasing technical capabilities of machines and electronic controls.

- 2.58 Erbe, J. Raymond. "Electrical Equipment for Automation of the Blast Furnace," Blast Furnace and Steel Plant, July 1962, pp. 641-652.
- 2.59 Jollis, G. S. "The Advantages of Numerically Controlled Machine Tools," Computers and Automation, March 1961, pp. 15-19.
- 2.60 Klein, Herbert E. "New Glow in the Foundry," Dun's Review and Modern Industry, August 1962, pp. 30-32.

- 2.61 "Latest Foundry Census," Foundry, April 1963, pp. 62-65.

Findings show fewer but larger plants in the foundry industry, and an increase in the number of plants utilizing advanced technology.

- 2.62 "1962 Production Preview," American Machinist/Metalworking Manufacturing, January 22, 1962, pp. 101-132.

Summary of metalworking technology and research. Considers economic outlook and various technological advances being made in cutting, forming, materials and components, welding, inspection, finishing, assembly, heat treating, materials handling, and manufacturing controls.

- 2.63 "Technical Surge Reshapes Steel Industry," Iron Age, September 13, 1962, pp. 163-170.
- 2.64 U.S. Army, Ordnance Weapons Command. Ordnance Corps Study of Numerically Controlled Machine Tools (Joliet, Illinois, Headquarters, Ordnance Weapons Command, 1960). 131 pp.

- 2.65 Weidenbaum, Murray L. "Aerospace Industry," Manage, September 1962, pp. 15-20.

Finds that rapid technological development is the dominating factor in the aerospace industry and may be expected to accelerate, resulting in a changing occupational structure with a smaller ratio of industrial workers to nonproduction workers.

OTHER MANUFACTURING

- 2.66 Baum, Arthur W. Part I; "The Turbine Auto," Part II; "Where Are Those Dream Cars," Saturday Evening Post, March 24, 1962, pp. 38-41, and March 31, 1962, pp. 34-35 ff.

Part I compares the gas turbine's performance with conventional engines. Part II discusses new advances in automobile design, power plants, and control.

- 2.67 Boehm, George A. W. "Electronics Goes Microminiature," Fortune, August 1962, pp. 99-102 ff.

Development of "thin-film" as computer memory device, and its implications for computer users.

- 2.68 "Greenville Show Foreshadows Coming Age of Automated Mills," Modern Textiles Magazine, December 1962, p. 30 ff.

- 2.69 "Latest Word in All-Out Automated Spinning," Textile World, October 1962, pp. 78-83.

- 2.70 "Trends in the Fast-Moving World of Synthetic Fibers," Chemical and Engineering News, August 20, 1962, pp. 86-96.

- 2.71 Yasaki, Ed. "The Computer and Newsprint," Datamation, March 1963, pp. 27-31.

TRADE

- 2.72 Goeldner, Charles R. "Automation: Evolution in Retailing," Business Horizons, Summer 1962, pp. 89-98.

Describes forms of retail automation including automated stores, vending machines, electronic data processing, and automatic materials handling. Analyzes feasibility of automation by type of retail institution, such as mail-order houses, supermarkets, chain stores, and department stores.

- 2.73 Goeldner, Charles R. "Automation in Marketing," Journal of Marketing, January 1962, pp. 53-56.

Describes types of automatic equipment, and suggests that greatest impact of marketing automation will be at wholesale level.

- 2.74 "A New Systems Concept for Retail Automation," Data Processing, December 1962, pp. 42-44.

Suggests use of optical scanning equipment as a means of making automation of retailing operations more practical.

- 2.75 Schrieber, G. B. "1962 Census of the Industry," VEND, March 15, 1962, pp. 20-50.

Analysis, including numerous charts, of the automatic vending industry, comparing sales and numbers of machines in relation to product vended.

- 2.76 Seligman, Ben B. "Automation Comes to the Supermarket," Challenge, November 1962, pp. 25-29.

Discusses specific developments involving prepackaging, material handling, automatic vending and electronic control, and the pace of technological change in retailing and distribution. Notes implications for the future, and employment effects.

- 2.77 Shenton, D. W. "Automatic Order-Picking of Case Goods," Automation, Part I, "Justifying Order Picking Systems," April 1962, pp. 52-59; Part II, "Controlling Order-Picking Systems," May 1962, pp. 62-70.

Discussion of the problems involved in the selection and operation of order filling and materials handling equipment for an automated warehouse or manufacturing concern.

TRANSPORTATION

- 2.78 "Airline Passenger Processing: It Takes Nerves of Steel--Literally!" Systems Management, March 1962, pp. 13-15 ff.
Description of computer-controlled airline reservation systems.
- 2.79 Clayton, Curtis T. "Automatic Ships--Only Hope for the U.S. Merchant Marine?" Control Engineering, July 1962, pp. 73-76.
- 2.80 Federal Aviation Agency. Report of the Task Force on Air Traffic Control (Washington, U.S. Government Printing Office, October 1961). 109 pp.
Review of technological changes in aviation facilities and related research and development to assure safe and efficient utilization of airspace.
- 2.81 Gellman, Aaron J. "Why Railroad Innovation Gets Sidetracked," Business Horizons, Spring 1962, pp. 55-60.
- 2.82 Report of Task Force on National Aviation Goals. Project Horizon (Washington, U.S. Government Printing Office, September 1961). 339 pp. Annex to Project Horizon. Selected Characteristics of U.S. Air Carrier, General Aviation, and Military Flying Activity--Historical and Projected Through 1970, November 1961. 55 pp.
- 2.83 Shott, John G. Progress in Piggyback and Containerization (Washington, Public Affairs Institute, 1961). 67 pp.
Discusses the developments and economies of "piggyback" service and the prospects for containerization. Examines the opposition of the motor carrier industry to these innovations.
- 2.84 "A Survey of Airline Reservation Systems," Datamation, June 1962, pp. 53-55.
- 2.85 U.S. Congress, Senate, Committee on Interstate and Foreign Commerce. Operating the Jet, Subcommittee on Aviation. Together with A Report of Progress and Developments on Jet Age Planning by the Civil Aeronautics Administration of the U.S. Department of Commerce. 85th Cong., 2nd sess., May 9, 1958 (Washington, U.S. Government Printing Office, 1958). 100 pp.

- 2.86 U.S. Department of the Interior. Report to the Panel on Civilian Technology on Coal Slurry Pipelines (Washington, U.S. Government Printing Office, May 1, 1962). 330 pp.

Evaluates the economic potentials for transporting and utilizing coal in the form of slurry. Concludes that transportation via pipeline would result in average net savings of approximately \$1.93 per ton. Appraises the economic impact on the railroad, coal, petroleum, and natural gas industries, as well as on consumers.

UTILITIES AND COMMUNICATIONS

- 2.87 Blair, Claude M. "Today's Challenges, Tomorrow's Promise in Communications Technology," Bell Telephone Magazine, Summer 1962, pp. 20-26.
- 2.88 Dulberger, Leon H., and Vogel, Sy. "Lasers: Devices and Systems," Reprinted from Electronics, October 27, 1961, and November 3, 10, and 24, 1961. 26 pp.
- 2.89 Feder, H. S., and Spencer, A. E. "Telephone Switching," Scientific American, July 1962, pp. 132-142.
- 2.90 Kremers, John E., and Durkee, Paul C. "Electronic Data Processing in the Bell System," Bell Telephone Magazine, Winter 1961-1962, pp. 12-20.
- 2.91 Sheldon, I. R., and Luzon, T. B. "Facts and Cautions for Planning Data Communications," Control Engineering, August 1962, pp. 105-108.
- 2.92 "Today: Automatic Dispatch Systems Control Over 80% of U.S. Capacity," Electrical World, April 9, 1962, pp. 36-42.
- 2.93 U.S. Atomic Energy Commission. Civilian Nuclear Power--A Report to the President (Washington, U.S. Government Printing Office, 1962). 67 pp.

Report on nuclear technology, its development, the role of government, and the legal, financial and administrative matters surrounding the development of civilian nuclear power. Considers possible industrial impacts.

SECTION 3 - IMPACT OF INDUSTRIAL AUTOMATION

This section includes case studies and other research into the effects of automation and other technological changes in plants and industries and on workers, managers, and industrial relations.

- 3.01 Christenson, C. L. Economic Redevelopment in Bituminous Coal: The Special Case of Technological Advance in United States Coal Mines, 1930-1960 (Cambridge, Harvard University Press, 1962). 312 pp.

Attempts to determine the impact of technological advances on employment and earnings. Considers changing patterns of fuel consumption, competition in the industry, and pressures toward mechanization. Assesses social costs of mechanization and proposes increasing the mobility of the unemployed through retraining, encouraging area redevelopment, and inducing miners to accept wage variation.

- 3.02 "Displaced Labor: 1962," Factory, October 1962, pp. 78-81.

Survey of 500 plants representing a cross section of industry in the first 6 months of 1962. Several findings, e.g., changes in work methods eliminated more jobs than did new equipment, and, in some plants, skilled workers were affected more than the unskilled.

- 3.03 Goldstein, Sidney. The Norristown Study (Philadelphia, University of Pennsylvania Press, 1961). 366 pp.

Progress report on a long-term, interdisciplinary research program conducted by the University of Pennsylvania, covering numerous studies on social adjustments to technological change. Subjects include worker mobility, readjustment of unemployed workers within the community, changing attitudes of workers, and the changing job structure. Research methods involve household enumeration, case studies, and historical research.

- 3.04 Mann, Floyd C. "Psychological and Organizational Impacts," Automation and Technological Change. The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, 1962), pp. 43-65.

Summarizes findings of six empirical studies of plant and office automation. Draws several conclusions for the plant and office separately. Generally finds an increasing similarity between work in plant and office, increasing worker awareness of the personal impact of automation, and the probability of extended periods of disruption in basic working patterns.

- 3.05 U.S. Department of Labor, Bureau of Labor Statistics. Impact of Technological Change and Automation in the Pulp and Paper Industry, Bulletin 1347 (Washington, U.S. Government Printing Office, October 1962). 92 pp. Summarized by Richard W. Riche in Monthly Labor Review, October 1962, pp. 1114-1119.

Surveys the nature, status and outlook of technological innovations and implications for productivity, production, employment, occupational requirements, and industrial relations practices. Includes case studies of three different types of technological innovations.

SECTION 4 - IMPACT OF OFFICE AUTOMATION

This section contains case studies and larger surveys into the effects of and adjustment to the introduction of electronic and other data processing systems in offices in private industry and government.

- 4.01 Eckert, James B., and Wyand, Robert R. "Automation at Commercial Banks," Federal Reserve Bulletin, November 1962, pp. 1408-1420.

Survey of commercial banks shows: (1) 2 out of 5 banks with total deposits of \$25 million or more are using or are planning to use computer systems; (2) nearly all large banks are acquiring such systems; (3) regular checking accounts are foremost among automated functions; and (4) almost universal preprinting of checks in magnetic ink may be expected within 3 years.

- 4.02 Faunce, William A., Hardin, Einar, and Jacobson, Eugene H. "Automation and the Employee," The Annals of the American Academy of Political and Social Science, March 1962, pp. 60-68.

Summarizes the results of case studies of both office and factory automation with respect to material welfare, job satisfaction, attitudes toward change, and the role of work in the life of the employee. Reveals a considerable diversity in the effects of automation and in attitudes, and a tendency to welcome change. Suggests decreasing importance of work in a more leisure-oriented society.

- 4.03 Scott, W. H. Office Automation and the Non-Manual Worker (Paris, Organization for Economic Co-operation and Development, 1962). 50 pp.

Progress report of current studies of office automation in five European countries. Primarily concerned with current status. Considers structure and size of office force, job content, working conditions, rewards, qualifications and attitudes of employees prior to automation. Analyzes the decision to install a computer and the problems involved in its implementation. Tentatively assesses the long-term effects of computer installations.

- 4.04 Siegman, Jack, and Karsh, Bernard. "Some Organizational Correlates of White Collar Automation," University of Illinois Bulletin, Reprint Series No. 110, February 1962, pp. 108-116.

Case study of the sociological effects of the introduction of electronic data processing in a State government bureau. Finds an increase in the authority of specialists who direct the EDP program, conflict between them and the existing bureaucracy, and a change in customary mobility patterns within the organization.

- 4.05 U.S. Congress, House of Representatives, Committee on Post Office and Civil Service. Use of Electronic Data Processing Equipment; Hearings, Subcommittee on Census and Government Statistics, 87th Cong., 2nd sess., October 2, 3, and 5, 1962 (Washington, U.S. Government Printing Office, 1962). 328 pp.

Extent and uses of electronic data processing in Federal agencies and affiliated State agencies. Statistical data from Civil Service Commission on growth of EDP in Federal Government by agency, grade, and occupation. Data on costs and requirements for specific agency and bureau programs.

- 4.06 U.S. Department of Labor, Bureau of Labor Statistics. Impact of Office Automation in the Internal Revenue Service, Bulletin 1364 (Washington, U.S. Government Printing Office, April 1963). 108 pp. Summarized by Richard W. Riche and James R. Alliston in the Monthly Labor Review, April 1963, pp. 388-393.

Case study of introduction of ADP equipment in the Atlanta regional offices of IRS, the first region to be converted. Covers the nature and objectives of the conversion, the planning of manpower changes, administration of personnel procedures, impact on employees, staffing of ADP jobs, training and retraining of employees, manpower problems and outlook. Based on IRS documents and interviews with officials, employees, supervisors and union officials concerned with the new ADP system.

- 4.07 Wiener, Rose. "Changing Manpower Requirements in Banking," Monthly Labor Review, September 1962, pp. 989-995.

Considers current trends in employment and occupational structure as a result of changes in bank activities and organization. Suggests that employment will continue to increase during the next decade, although conversion to EDP will slow the rate of expansion and cause further changes in occupational structure.

SECTION 5 - IMPLICATIONS FOR EMPLOYMENT, UNEMPLOYMENT, AND MANPOWER TRENDS

This section includes references on automation's implications for employment, unemployment, displacement, productivity, manpower trends and outlook, and leisure time.

- 5.01 American Iron and Steel Institute. The Competitive Challenge to Steel (New York, American Iron and Steel Institute, March 1963). 84 pp.

Comprehensive analysis of the economics of the steel industry. Covers a wide range of topics including research and development, profits, economic growth, costs, productivity, and prices. A separate chapter on employment and unemployment emphasizes the impact of automation.

- 5.02 Anderson, Nels. Work and Leisure (New York, Free Press of Glencoe, Inc., 1961). 266 pp.

Examines concepts of leisure from historical viewpoint. Concludes that the traditions of dedication to work which helped to increase leisure time now hinder its enjoyment. Suggests that the refusal of youth to become work-centered should be viewed as a natural adjustment to impersonal technological changes.

- 5.03 Apel, Hans. "Should We Shorten the Workweek?" Challenge, March 1962, pp. 28-31.

Suggests, as a partial solution to technological unemployment, a return to the historical practice of reducing hours of work.

- 5.04 "Automation," Forbes, June 1, 1963, pp. 27-30.

Survey of employment and investment trends in 65 of the largest corporations in the United States (5 from each of 13 industries) from 1957 to 1962. Finds employment declining, output increasing, sales increasing and, despite a lower return, an increase in the amount of capital in use. Concludes that the consumer is the beneficiary of automation through lower or stable prices.

- 5.05 Bernstein, Peter L. "The Rewards of Leisure," Challenge, April 1962, pp. 40-43. From The Price of Prosperity (New York, Doubleday, 1962), pp. 129-142.

- 5.06 Brózen, Yale. Automation: The Impact of Technological Change (Washington, American Enterprise Institute for Public Policy Research, March 1963). 47 pp.

Maintains automation has not resulted in unemployment and, because of a slow rate of technological change, the unemployment situation will not be worsened by more automation. Also considers effects on occupational structure, older workers, and skill requirements.

- 5.07 Buckingham, Walter. "The Great Employment Controversy," The Annals of the American Academy of Political and Social Science, March 1962, pp. 46-52.
- 5.08 Buckingham, Walter. "Technology and a Changing Economy," Challenges to Labor Education in the 60's (Washington, National Institute of Labor Education, 1962). pp. 3-12.

Discusses the role of technology in increasing unemployment and the need for a higher rate of economic growth. Considers the problems created by the boredom in work and by increased leisure time.

- 5.09 Chamber of Commerce of the United States. A Shorter Workweek? An Information Manual on Key Questions (Washington, Chamber of Commerce of the United States, 1962). 114 pp.

Social and economic implications of a shorter workweek and factual material concerning the effects on efficiency, consumption, fatigue, and multiple jobholding. Opinions by management and labor leaders, educators, writers, public officials, and government specialists. Bibliography.

- 5.10 Clague, Ewan and Greenberg, Leon. "Employment," Automation and Technological Change, The American Assembly, Columbia University (Englewood, N.J., Prentice-Hall, 1962), pp. 114-131. Summarized as "Technological Change and Employment," Monthly Labor Review, July 1962, pp. 742-746.

Attempts to answer the question--"How much unemployment is due to technological change?" Analyzes production-worker employment associated with decreases in unit man-hours, indicating a substantial disemployment of 200,000 a year over a period of little economic growth, 1953-59, and as much as 90,000 a year over a period of considerable growth, 1947-57. Assuming greater economic growth in the next decade than in 1953-59, estimates that technological disemployment will average 200,000 a year for all nonagricultural industry.

- 5.11 Dankert, Clyde E. "Shorter Hours, In Theory and Practice," Industrial and Labor Relations Review, April 1962, pp. 307-322.

Discusses objectives of "hour policy" in light of physical output, worker satisfaction, and employer profit. Suggests that increased worker satisfaction should be the basic guide of policy.

- 5.12 Denise, Malcolm L. "Automation and Unemployment: A Management Viewpoint," The Annals of the American Academy of Political and Social Science, March 1962, pp. 90-99.

Asserts that automation is not displacing workers more rapidly than in the past and has not caused decreased employment at the Ford Motor Co. Maintains unemployment is caused by many factors, and that efforts to explain it as a result of automation confuse and delay the search for adequate solutions.

- 5.13 Denise, Malcolm L. "Unemployment and Automation," The Personnel Administrator, May-June 1962, pp. 18-21.

States that high rates of unemployment are the result of population growth rather than technological change. Draws on Ford Motor Co. experience to show that automation creates jobs.

- 5.14 Friedmann, Georges. "Leisure in an Automated World," The Nation, September 1, 1962, pp. 89-92.

States increased leisure time can create personal dissatisfaction. Alternatives to regular work as a center of psychic equilibrium may be second jobs, hobbies, and recreational activities. Democratic governments have an obligation to provide and promote educational leisure-time activities.

- 5.15 Goldberg, Arthur. "The Role of Government," The Annals of the American Academy of Political and Social Science, March 1962, pp. 110-116.

States that the private sectors of the economy cannot cope adequately with the complex problems caused by technological change. A Federal program, including training, aid to industry, and aid to education, is essential to achieve full employment and full production.

- 5.16 Henle, Peter. "Recent Growth of Paid Leisure for U.S. Workers," Monthly Labor Review, March 1962, pp. 249-257.

Statistical analysis of the trend and outlook on hours of work, paid vacations, and paid holidays. Finds that leisure time per full-time employed worker increased by 155 hours a year between 1940 and 1960. However, additional leisure time represents a small fraction of the productivity increase during that period. Provides essential background for the consideration of leisure as a consequence of technological change.

- 5.17 Hirsch, Phil. "Automation, Clerks, Bookkeepers," The New Republic, May 7, 1962, pp. 13-14.

States that office automation has slowed the rate of increase in clerical employment while increasing productivity, and predicts widespread clerical unemployment.

- 5.18 Horowitz, Morris A. "Automation and Full Employment: A Public Point of View," New York University Fourteenth Annual Conference on Labor (Albany, N.Y., Matthew Bender and Company, 1961), pp. 329-338.

Concludes that neither current public nor union policies are adequate to handle the growing technological unemployment trend. Proposes a program to include extension of unemployment compensation, retraining and relocation of the unemployed, and early retirement benefits under social security for "unemployables".

- 5.19 International Labour Organisation, Metal Trades Committee. The Acceleration of Technological Progress and Its Influence on the Effective Utilisation of Manpower and the Improvement of Workers' Income (Geneva, International Labour Organisation, 1962). 122 pp.

Discusses types of technological changes occurring in metalworking industry, e.g., machine tools, shipbuilding, foundry, and aerospace. Considers influence of research and development and new management techniques. Impact of change on workers is considered in terms of man-machine relationships, job enlargement, shift working, qualifications and skill requirements, education and training, measures to alleviate burden of displacement on workers; and the impact on incomes.

- 5.20 Jakubauskas, Edward B. "Technological Change and Recent Trends in the Composition of Railroad Employment," Quarterly Review of Economics and Business, November 1962, pp. 81-90.

Finds the principal effects of technological change to have been (1) a large reduction in man-hours worked in 1947-53, and (2) a sharp decline in employment in 1953-59. Also, finds that shifts in occupational structure may be as significant as total employment decline.

- 5.21 Keller, Leonard A. "Automation and the True Causes of Unemployment," Personnel Journal, July-August 1962, pp. 331-334.

Asserts that unemployment is mainly the result of competition, and suggests more automation as a remedy.

- 5.22 Lineberry, William P., editor. The Challenge of Full Employment (New York, H. W. Wilson Co., 1962). 214 pp.

This book, compiled from newspaper and magazine articles, describes the unemployed, the causes of unemployment (with special emphasis on automation), and proposed solutions to the problem. Extensive bibliography.

- 5.23 McCarthy, Russell C. "Automation and Unemployment: A Second Look," Management Review, May 1962, pp. 34-43.

States rapid increase in automation stems from increasing wage rates, competition, obsolescence, and increasing research and development. Changing skill requirements necessitate broad education and continued retraining. Maintains that increased investment and stable wage rates are necessary to overcome unemployment.

- 5.24 The President's Committee on Employment of the Handicapped. Report of the Advisory Council's Ad Hoc Committee on Automation (Washington, The President's Committee on Employment of the Handicapped, December 18, 1962). 5 pp.

A survey of 18 representative private firms and 13 government agencies indicated that, by reducing physical demands, automation is making more jobs compatible with more types of handicapping conditions, but that higher educational and skill requirements may disfavor the mentally retarded.

- 5.25 Rutzick, Max, and Swerdloff, Sol. "The Occupational Structure of U.S. Employment, 1940-60," Monthly Labor Review, November 1962, pp. 1209-1213. Manor, Stella P. "Geographic Changes in U.S. Employment from 1950 to 1960," Monthly Labor Review, January 1963, pp. 1-10.

First article describes the employment trend among occupational groups and individual occupations for the entire country. The second discusses the effect of geographic differences in the growth of employment on the distribution of occupational groups among the regions and States and the resulting changes in regional occupational profiles. The basic data for both articles are from the decennial censuses.

- 5.26 United Steelworkers of America. Steelworkers and Automation, Pamphlet No. PR-129 (Pittsburgh, United Steelworkers of America, 1962). 15pp.

Brief description of technological changes in the steel industry, emphasizing the impact on wages and employment.

- 5.27 U.S. Department of Labor, Bureau of Employment Security. "Changing Farm Technology Challenges Employment Service," Employment Security Review, January 1962, pp. 10-17.

Effect of mechanization and scientific advances in three specific areas of the farm economy, i.e., the green pea harvest, described by Vincent J. Brings, the blueberry harvest, by Fred Watts, and the production of sugar beets, by Louis Gillespie. Emphasis is on labor displacement and changing skill requirements.

- 5.28 U.S. Department of Labor, Bureau of Employment Security. Cotton Harvest Mechanization: Effect on Seasonal Hired Labor, BES No. 209 (Washington, June 1962). 17 pp.

Finds increasing mechanization has resulted in a one-fourth decline of seasonal workers over a 2-year period with very little change in production. Describes form and extent of mechanization and its effects on production and employment by region and State, and includes estimates of future employment needs.

- 5.29 U.S. Department of Labor, Bureau of Employment Security. "Impact of the Changing Economy on Our Manpower Resources," Employment Security Review, April 1962, pp. 8-20.

Analysis, with charts, of postwar developments in employment, unemployment, population change, urban growth, and other economic forces, with particular references to youth, the professions, minorities, and and farm workers.

- 5.30 U.S. Department of Labor, Bureau of Employment Security. "Meeting the Manpower Problems of: I. Area Redevelopment; II. Automation," Employment Security Review, July 1962. 43 pp.

Part I includes an analysis of the ARA training program by USES Director, Louis Levine, and contains articles on specific State programs. Part II contains: (1) a discussion of the role of the Bureau of Employment Security in automation by Administrator Robert C. Goodwin; (2) a description of community and worker response to layoffs resulting from the mechanization of a meatpacking plant in Omaha; (3) discussions of Pennsylvania's program to establish studies of automation.

- 5.31 U.S. Department of Labor, Bureau of Employment Security. "Telephone Industry Continues Long-Term Employment Decline," The Labor Market and Employment Security, July 1962, pp. 7-12.

Analyzes: (1) continued downward trend (1957-61) in telephone industry employment due to technological developments, despite growth of telephone services; (2) changes in occupational structure; (3) skill requirements; and (4) earnings.

- 5.32 U.S. Department of Labor, Bureau of Labor Statistics. Employment and Changing Occupational Patterns in the Railroad Industry, 1947-60, Bulletin 1344 (Washington, U.S. Government Printing Office, February 1963). 32 pp. Summarized by Bernard Yabroff and William J. Kelly as "Employment Changes in Railroad Occupations, 1947-60," Monthly Labor Review, October 1962, pp. 1129-1135.

Shows that postwar employment declined 42 percent while productivity rose more than 70 percent. Labor displacement resulted from extensive technological changes and from loss of traffic to other modes of transportation. Varying rates of employment decline in different occupations have resulted in changed occupational structure, increasing the percentage of operating and white-collar workers and greatly reducing employment in maintenance occupations. Bibliography.

- 5.33 U.S. Department of Labor, Office of Manpower, Automation and Training. "Automatic Data Processing in the Federal Government--Its Manpower Requirements," Manpower Report, Number 6 (Washington, U.S. Government Printing Office, May 1963). 11 pp.

Analyzes distribution of ADP equipment, and number of employees using the equipment, by agency of the Federal Government; geographic distribution of computers. Estimates growth in employment and computer use, and discusses training requirements.

- 5.34 U.S. Department of Labor, Office of Manpower, Automation and Training. "Manpower and Training: Trends, Outlook, Programs," Manpower Research, Bulletin No. 2 (Washington, U.S. Government Printing Office, March 1963). 26 pp.

Reviews background and current status of employment and unemployment, and the programs developed to help solve the problems of displacement caused by rapid structural changes.

- 5.35 U.S. Department of Labor, Office of Manpower, Automation and Training. Manpower Report of the President and a Report on Manpower Requirements, Resources, Utilization, and Training. Transmitted to the Congress March 1963 (Washington, U.S. Government Printing Office, 1963). 204 pp.

Eleven-page report to the Congress by the President outlines existing and proposed programs to solve manpower problems. Report by the Department of Labor surveys current manpower changes and projections to 1975. Includes effects of technological change on occupations, geographic distribution of industry, and productivity. Contains chapters on the problems of unemployment and worker mobility. Stresses throughout the need for higher levels of education and training to satisfy increasing skill requirements. Seventy-one page statistical appendix.

- 5.36 Wallis, W. Allen. "Some Economic Considerations," Automation and Technological Change, The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, 1962), pp. 103-113.

Examines several reasons for the development and introduction of technological changes. States that higher wages increase the pace of automation. Concludes that there is no problem of general unemployment due to automation and that problems caused by dislocations due to technological change are identical to problems caused by dislocations due to a shift in demand.

- 5.37 Weinberg, Edgar. The Effects of Technology on Employment of the Handicapped. Paper presented before the Mountain States Regional Meeting of the President's Committee on Employment of the Handicapped, Pueblo, Colo., June 29, 1962 (Mimeographed by U.S. Department of Labor, Bureau of Labor Statistics, Washington, 1962). 9 pp.

- 5.38 Wolfbein, Seymour L. "Automation and the Labor Force," Challenge, October 1961, pp. 24-28.

- 5.39 Worsnop, Richard L. "Shorter Hours of Work," Editorial Research Reports, June 13, 1962, pp. 419-435.

Summarizes positions taken by unions, government, and business concerning proposals for a shorter workweek.

- 5.40 California Department of Employment. Employment Trends in California's Canning and Preserving Industry, 1950-1961 (San Francisco, California Department of Employment, October 1962). 102 pp.

Finds technological change resulted in employment decline over 1950-61 period with substantial gains in output.

- 5.41 Haber, William, Ferman, Louis A., and Hudson, James. The Impact of Technological Change: The American Experience (Kalamazoo, W. E. Upjohn Institute for Employment Research, 1963).

Summary and evaluation of 17 case studies published between 1929 and 1961 and dealing with displaced workers.

- 5.42 "Manpower Implications of Technological Change," Labor Law Journal, August 1963, pp. 655-676.

Reprint of papers discussing research programs and findings in the United States and Canada by Seymour Brandwein, John P. Francis, and Gerald G. Somers, delivered at the Spring 1962 meeting of the Industrial Relations Research Association.

- 5.43 Smigel, Edwin O., editor. Work and Leisure: A Contemporary Social Problem (New Haven, College and University Press, 1963). 208 pp.

Nine papers on the changing roles of work and leisure among different occupational groups in our society. Technologically oriented.

- 5.44 U.S. Department of Labor, Bureau of Employment Security. Technological Changes in Sugar Beet Cultivation: Effect on Seasonal Hired Labor, BES No. F-219 (Washington, April 1963). 27 pp.

Use of improved seeds and increased use of thinning and weeding machines reduced seasonal hired labor requirements between 1960 and 1962. Predicts significant declines in seasonal hired work force, specifically in the use of migrant workers.

- 5.45 U.S. Department of Labor, Office of Manpower, Automation, and Training. "Reading Machines for Data Processing: Their Prospective Employment Effects," Manpower Report, No. 7 (Washington, U.S. Government Printing Office, June 1963). 12 pp.

Discusses status of optical character recognition, prospects for widespread adoption and its current limited impact on employment of key punch operators. Predicts significant declines in key punch operator employment after 1968.

- 5.46 Wilcock, Richard C., and Franke, Walter H. Unwanted Workers (New York, Free Press of Glencoe, 1963). 340 pp.

Analysis of studies of long-term unemployment due to plant shut-downs, particularly the Armour studies. Points up the limitations of present methods of dealing with worker displacement. Argues for an "active labor market policy" of coordinated programs for maintenance of income, upgrading skills, increasing mobility, and providing employment information.

- 5.47 U.S. Department of Labor, Bureau of Employment Security. Employer Attitudes Toward Advance Notice of Technological Change (Washington, June 1962). 41 pp.

Results of a pilot study by the U.S. Employment Service in developing an "Advance Notice System" designed to permit early identification of scheduled technological changes and render assistance to both the employer and workers with the aid of the State employment services.

- 5.48 U.S. Department of Labor, Bureau of Employment Security. Work Force Adjustments to Technological Change: Selected Employer Procedures, BES E-215 (Washington, U.S. Government Printing Office, January 1963). 62 pp.

A study of personnel procedures used by employers in planning and administering technological change, with specific reference to manpower planning for impending change, reassignment and relocation of workers, training programs, and minimizing income loss of displaced workers.

SECTION 6 - IMPLICATIONS FOR OCCUPATIONAL REQUIREMENTS, SKILLS, AND WORKING CONDITIONS

This section contains references to automation's implications for occupational requirements and structure, skills, job content, upgrading and downgrading, hours of work, health, and safety.

- 6.01 Brooks, Thomas R. "Bleaching the Blue Collar," Dun's Review and Modern Industry, January 1962, pp. 58-64.

States that by making blue-collar jobs much more like white-collar occupations, automation is having a significant impact upon the attitudes and aspirations of the workers, methods of compensation, and outlook of the unions.

- 6.02 Buckingham, Walter. "The Impact of Automation on Skills and Employment," Computers and Automation, April 1963, pp. 16-18 ff.

Considers effects of technological change on physical working conditions, psychological adjustments, skill requirements, job content and opportunities, wages, the necessity of planning for change, and the impact on total employment.

- 6.03 Davis, Louis E. "The Effects of Automation on Job Design," Industrial Relations, October 1962, pp. 53-71.

States that variations in "operator level jobs" under automation prohibit direct comparisons of content and skills. Many skills appear to be nontransferable. Automation increases an operator's responsibility and confronts him with an overall view of the process. Maintenance work will require an increase in skills required. Automation will upgrade the job structure of the economy as a whole, since more professional workers will be required.

- 6.04 Federal Reserve Bank of Boston. "Automation and Shifting Skill Needs," New England Business Review, October 1962, pp. 1-4.

Analysis of changes in the occupational structure of New England. Projections of the data to 1970 reveal shifts toward higher skills.

- 6.05 Foundation for Research on Human Behavior. The Worker in the New Industrial Environment (Ann Arbor, Mich., Foundation for Research on Human Behavior, 1962). 50 pp.

Report of a seminar discussing workers' needs and values, effects of automation on industrial and clerical workers, job enlargement, and the management of change. Contributors include Robert L. Kahn, Gerald Gurin, Solomon Barkin, Floyd Mann, Otto Pragan, and Arnold S. Tannenbaum. Bibliography.

- 6.06 Friedmann, Georges. The Anatomy of Work (New York, The Free Press of Glencoe, Inc., 1961). 203 pp.

Intensive inquiry into the nature of job specialization and job enlargement, leisure time, and dissatisfaction with work. The author draws on European and American research to analyze results of mechanization and automation on the work force. Speculates on the psychological and social impact of the reduction of manual labor and hours of work.

- 6.07 Nordenskiold, Otto. "Trends in Non-Manual Employment and Their Social Effects," Economic and Social Bulletin, November-December 1961, pp. 1-8.

States that statistical analysis reveals that the proportion of nonmanual workers in European countries has been increasing, as it has in the United States. Stresses importance of education for social mobility.

- 6.08 Snyder, John I., Jr. "The Impact of Automation," Challenge, May 1962, pp. 20-23.

Questions and answers on implications for employment, skills, labor mobility, and government policies, by a manufacturer of automation equipment.

- 6.09 Wolfbein, Seymour. "Automation and Skill," The Annals of the American Academy of Political and Social Science, March 1962, pp. 53-59.

States that in the fifties, automation contributed to an acceleration in the long-term growth of higher skilled, white-collar, and service-oriented occupations. One effect was the concentration of unemployment among the unskilled and semiskilled. Since this trend is continuing, the work force must be made flexible and responsive to change through education and training.

- 6.10 Wolfbein, Seymour L. "The Outlook for the Skilled Worker in the United States: Implications for Guidance and Counseling," Personnel and Guidance Journal, December 1961, pp. 334-339.

Projections show an increasing need for skilled workers during the 1960's. Suggests seven specific areas for consideration in counseling young people.

- 6.11 U.S. Department of Labor, Women's Bureau. Women Telephone Workers and Changing Technology, WB Bulletin 286 (Washington, U.S. Government Printing Office, 1963). 46 pp.

Analyzes effects of technological change on women in the telephone industry, their employment, job content, job opportunities, earnings and hours of work.

SECTION 7 - IMPLICATIONS FOR TRAINING, RETRAINING, AND EDUCATION

This section contains references on automation's implications for training, retraining, education, apprenticeship, and counseling. Examples of training programs are included.

- 7.01 Ambre, Ago. "Breakthrough in High School Computer Education," Occupational Outlook Quarterly, December 1962, pp. 3-8.

Short description of a successful high school course on digital computers in the Washington, D.C. area. Presents course prerequisites, course description, and general sources of information.

- 7.02 Auman, Fred A. "Retraining--How Much of an Answer to Technological Unemployment?", Personnel Journal, November 1962, pp. 505-507 ff.

Reviews results of several private and State-financed training programs, concluding that retraining is, at best, a partial solution to unemployment situation.

- 7.03 "Automation: Outlook for Youth," American Child, November 1962, pp. 1-15.

Four articles by leading authorities (Seymour Wolfbein, Louise Kapp, T. Stanley Warburton, and William Gomberg) on training of youth to meet the skill requirements of today's automated society.

- 7.04 Clark, Harold F., and Sloan, Harold S. Classrooms in the Factories (New York, N.Y., University Press, 1958). 139 pp.

Report of extensive training activities among 500 of the largest corporations in the United States. Describes the scope of training in American industry, types of programs, and cooperation with educational institutions.

- 7.05 Clark, Harold F., and Sloan, Harold S. Classrooms in the Stores (Sweet Springs, Mo., Roxbury Press, Inc., 1962). 123 pp.

Report of the training activities of 36 of the largest retailing establishments in the United States. Considers effect of education, research, and increased mechanization on retail productivity. Concludes productivity in retailing can be appreciably increased through training and serve to spur economic growth.

- 7.06 Clark, Robert E. "Methods of Training Plant Personnel for Numerical Control," Collected Papers: Numerical Control (Detroit, American Society of Tool and Manufacturing Engineers, 1963). 7 pp.

Experiences in selection and training of personnel at the U.S. Army Weapon Command's Rock Island Arsenal. Considers problems in the evaluation of job content, background requirements for training, and length of training programs for various jobs.

- 7.07 Cruikshank, Nelson H. "Retraining the Unemployed," AFL-CIO American Federationist, May 1962, pp. 16-21.

Cites need for the employment service to develop procedures which would enable it to recognize occupational changes created by automation and the shifting economy, and aid workers in obtaining employment in new occupations and areas.

- 7.08 Dickinson, William B. "Retraining for New Jobs," Editorial Research Reports, 1962. 20 pp.

Points to changing composition of work force and skill requirements due to automation. Experiences with State training programs, and training under Federal Area Redevelopment Act. Obstacles to effective retraining. Foreign retraining experiences.

- 7.09 Diebold, John. "Automation: Its Implications for Counseling," Occupational Outlook Quarterly, September 1962, pp. 3-6.

Asserts that counselors should study and use new information-handling techniques, to help students discover occupational possibilities for which they might qualify.

- 7.10 Drucker, Peter. "Education in the New Technology," Think Magazine, June 1962. 3 pp.

Analyzes the impact of technological change on skill requirements and its challenge to the educational system, to society, and to the cultural and intellectual life of the Nation.

- 7.11 DuBridge, Lee A. "Educational and Social Consequences," Automation and Technological Change, The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, Inc., 1962), pp. 26-42.

Discusses the social benefits of technological advances. Presents the problems of building an educational system capable of meeting the effects of automation and helping people adjust to it.

- 7.12 Duscha, Julius. "Retraining the Unemployed: Little, Late, and Limping," The Reporter, September 27, 1962, pp. 35-37.

Account of the events that influenced and delayed the passage of the Manpower Development and Training Act of 1962. Suggests that insufficient funds will restrict the training program.

- 7.13 Evans, Luther H. "The Challenge of Automation to Education," The American Behavioral Scientist, November 1962, pp. 16-19.

- 7.14 Evans, Luther H., and Arnstein, George E., editors. Automation and the Challenge to Education (Washington, National Education Association, 1962). 199 pp.

Symposium including 14 working papers by specialists and scholars in several fields of education, the social sciences, industry, and labor. General agreement that automation will require more intensive education to achieve the welfare of both the individual and society. Among the contributors are Wilma T. Donahue, Harold F. Clark, Einar Hardin, Stanley H. Ruttenberg, Frank H. Cassell, James E. Russell, and Harold Spears.

- 7.15 Fine, Benjamin. Teaching Machines (New York, Sterling Publishing Co., 1962). 176 pp.

Discusses use of teaching machines and programmed learning, the machines' operations, capabilities, advantages and disadvantages, and the effects upon students, teachers, administrators, and the educational system as a whole. Believes that teaching machines result in more learning and more efficient use of teaching staffs.

- 7.16 Glazier, William. "Automation and Joblessness," Atlantic Monthly, August 1962, pp. 43-47.

Concludes that skill requirements are reduced by automation, and that retraining will not overcome unemployment. Finds recent private training programs unsuccessful. Suggests increased leisure and earlier retirement as solutions to technological unemployment.

- 7.17 Hammerman, Herbert. Implications of Automation for Business Education. Paper presented before the Workshop on Automation and Business Education at the convention of the United Business Schools Association, Washington, D.C., November 1, 1962 (Mimeographed by the U.S. Department of Labor, Bureau of Labor Statistics, Washington, 1962). 12 pp.

Status of office automation and implications for levels of office employment, office occupations, and management training. Finds a growing need for training and retraining in business subjects and in data processing.

- 7.18 Lipstreu, Otis. "Training Implications of Automation," Journal of the American Society of Training Directors, June 1960, pp. 48-51.

- 7.19 Mali, Paul. "Retraining for the Unemployed," Journal of the American Society of Training Directors, August 1962, pp. 44-51.

Discusses institutional barriers to full employment; e.g., low school standards, archaic education laws, and limits on apprenticeships. Cites the success of Connecticut's training program in satisfying the demand for skilled workers.

- 7.20 Meuche, Howard O. "Machines, Materials and Manpower," American Vocational Journal, April 1962, pp. 11-13.

Maintains that existing student training programs are inadequate to supply the skilled workers required by technological advances in industry. Advocates the use of teaching machines to assist in worker education.

- 7.21 Norman, Robert R. "Automation and Counseling," Personnel and Guidance Journal, March 1962, pp. 594-599.

- 7.22 New York State Department of Labor. "Apprenticeship Training Is One Hope for Filling Skilled Jobs," Industrial Bulletin, July 1962, pp. 2-7.

States the main conclusions reached by delegates to the 18th Annual Eastern Seaboard Apprenticeship Conference.

- 7.23 Pennsylvania Department of Public Instruction. Education for Automation, Pennsylvania Curriculum Improvement Series, No. 2 (Harrisburg, Pa., Department of Public Instruction, 1961). 8 pp.

Study of the implications of automation for education and, more specifically, for the large number of high school dropouts. Suggests major objectives for educational programs in terms of tools and attitudes.

- 7.24 Peterson, Esther. "Training-Key to Employment," American Vocational Journal, April 1962, pp. 14-15.

Discussion of special problems in training women for skilled jobs. Includes a short summary of job opportunities and limitations for women.

- 7.25 Sprowls, R. Clay. "Computer Education in the Business Curriculum," The Journal of Business, January 1963, pp. 91-96.

- 7.26 Townsend, Edward. "More Education, More Pay," Challenge, October 1962, pp. 26-29.

Educational level of the work force is gradually being upgraded because of changing skill requirements occasioned by automation and the trend to hire high school graduates.

- 7.27 U.S. Department of Labor, Bureau of Employment Security. "An Approach to the Problems of Automation," Employment Security Review, April 1962, pp. 28-32.

Study of changes in the U.S. Employment Service instituted to meet the needs of technological change. Includes brief case history of an automated meatpacking plant and an outline of the activities of the Omaha automation demonstration project.

- 7.28 U.S. Department of Labor, Bureau of Employment Security. "New Programs and Policies," Employment Security Review, April 1962, pp. 21-27.

Discussion of the programs to deal with the problems of employment, automation and training. Programs cover revitalization of the Employment Service, the youth program, farm labor program, as well as the programs under the Manpower Development and Training Act and the Area Redevelopment Act.

- 7.29 U.S. Department of Labor, Bureau of Labor Statistics. Industrial Retraining Programs for Technological Change. Bulletin 1368 (Washington, U.S. Government Printing Office, June 1963). 34 pp. Summarized by Edgar Weinberg under the title "Older Workers' Performance in Industrial Retraining Programs," Monthly Labor Review, August 1963, pp. 935-939.

Pilot study on older worker adaptability to technological change. Analyzes results of retraining programs of four companies in different industries, to compare performance of older workers with that of younger workers. Confirms conclusions of earlier studies that age alone is an insufficient criterion for determining capacity of older workers to adapt to technological change.

- 7.30 U.S. Department of Labor, Office of Automation and Manpower. The Manpower Development and Training Act of 1962 (Washington, U.S. Government Printing Office, 1962). 8 pp.

Highlights of the developments leading to the passage of the Manpower Development and Training Act, and a summary of the major provisions of the act.

- 7.31 U.S. Department of Labor, Office of Manpower, Automation, and Training. On Research and Training Activities Under the Manpower Development and Training Act. Transmitted to the Congress February 1963 (Washington, U.S. Government Printing Office, 1963). 135 pp.

Analysis of the framework and operations of the training program under the M.D.T.A., and the characteristics of the trainees. Describes programs authorized under the act--including studies of mobility, automation, manpower development, utilization and requirements, and information and communications programs. Section on training contains charts, tables, and illustrations.

- 7.32 Weber, Arnold R. Retraining the Unemployed. Selected Papers No. 4 (Chicago, University of Chicago, 1963). 17 pp.

Critical appraisal of retraining as a means of overcoming unemployment. Examines potential difficulties in implementing government programs and the problems of selecting trainees and training programs. Draws on private experience to illustrate operational problems and concludes that retraining is a limited remedy which will function best in a climate of rapid economic growth.

- 7.33 Willis, Earl S. "General Electric's Plan for Financing Retraining," Management Record, April 1962, pp. 21-25.

Explanation of General Electric's retraining and income extension program designed to increase job security. Payments based on longevity and previous pay rates are made either weekly, in a lump sum, or to finance retraining. Concludes that displaced workers tend to be less mobile and less interested in learning new skills while under the security of company-financed benefits.

- 7.34 Wolfbein, Seymour L. "Automation and Education," New Leader, April 30, 1962, pp. 9-11.

Examines structural characteristics of unemployment, and proposes four major steps for adjustment to the impact of automation.

- 7.35 Smith, Harold T. Education and Training for the World of Work (Kalamazoo, W. E. Upjohn Institute for Employment Research, July 1963). 165 pp.

Discusses vocational training as preparation for technological change.

- 7.36 Watson, Goodwin, editor. No Room at the Bottom: Automation and the Reluctant Learner (Washington, D.C., National Education Association, 1963). 102 pp.

A symposium of psychologists and educators, sponsored by the Project on the Educational Implications of Automation, on how to motivate school dropouts and other "reluctant learners" to attend school and develop occupational skills.

SECTION 8 - IMPLICATIONS FOR LABOR-MANAGEMENT RELATIONS AND POLICIES

This section cites examples of collective bargaining approaches to automation's impact, union attitudes, and advance personnel planning. Implications for unions, collective bargaining, seniority, work rules, and unemployment benefits are covered.

- 8.01 Aaron, Benjamin. "Reflections on the Legal Nature and Enforceability of Seniority Rights," Harvard Law Review, June 1962, pp. 1532-1564.

Takes issue with two recent court decisions extending seniority provisions beyond termination of the collective bargaining agreement to relocated plants. The attempt to convert a negotiated employment relationship into rights protected by law is considered undesirable. Concludes that as a result of fundamental and irrevocable changes in the economic system, "the very concept of seniority is doomed to extinction."

- 8.02 "Adaption to Technological Change Under Collective Bargaining," Proceedings of the Twelfth Annual Labor-Management Conference (Morgantown, W.Va., Institute of Industrial Relations, April 12-13, 1962), pp. 1-15.

Roger C. Sonnemann, Otto Pragan, and Arnold R. Weber discuss the responsibilities of labor and management to mitigate the adjustments necessitated by automation. The ability to reach a settlement through collective bargaining, and under the pressures of technological change, is considered for issues such as training, wages, job security, and hours of work.

- 8.03 "Automation Issues and Arbitration": 1. F.A. O'Connell, "A Management View"; 2. Sylvia Gottlieb, "A Labor View", ILR Research, Volume VIII, No. 2, 1962, pp. 3-9.

Asserts management view that arbitration has become increasingly legislative in nature, instead of restricting itself to interpreting the agreement. The recognition clause of the contract, particularly in automation cases, has been abused, resulting in the creation of property rights in a job. The labor view is that rapid technological change is increasing the areas of conflict where "creative and original" contributions can be made by arbitrators to cushion the impact of technological and social change.

- 8.04 Backman, Jules. "Cushioning the Impact of Technological Change," Labor Law Journal, September 1962, pp. 731-746.

Asserts that programs to counter the adverse effects of automation should be designed to protect the worker, not to preserve the job. Discusses various labor-management programs and analyzes the methods of protecting the worker, such as through attrition, retraining, providing other jobs, and protecting wage levels.

- 8.05 Backman, Jules. "Rigid Railroad Seniority System," Labor Law Journal, February 1962, pp. 117-129.

Discusses economic restrictions placed on the railroad industry because of failure of the seniority district system and jurisdictional work rules to change with changes in railroad technology. Suggests revisions of seniority rules.

- 8.06 Billera, I. John. The Challenges and Opportunities of Automation (New York, U.S. Industries, Inc., June 25, 1962). 14 pp.

Describes program for labor-management cooperation to cushion the impact of automation through the formation of the Foundation on Automation and Employment, sponsored by U.S. Industries, Inc., and the International Association of Machinists.

- 8.07 Blum, Albert A. "Fourth Man Out--Background of the Flight Engineer-Airline Pilot Conflict," Labor Law Journal, August 1962, pp. 649-657.

Reviews the conflict between pilots and flight engineers, and between unions and airlines. Concludes that technological change is operating against the flight engineer, since many of his functions are now automatic while the responsibilities of the pilot have increased.

- 8.08 Coburn, Carrol L. "A Union View of Automation," Proceedings of New York University Fourteenth Annual Conference on Labor (Albany, N.Y., Matthew Bender & Co., Inc., 1961), pp. 313-327.

Suggests a number of short-run and long-run measures to alleviate technological unemployment, including: (1) a contractual right to move with the job with company paying costs of retransfer; (2) unlimited duration of unemployment insurance benefits; (3) reduction of working time; and (4) replacement of the hourly wage by a weekly salary.

- 8.09 Coughlin, Howard. "Union Profile: The Office Workers," Management Record, June 1962, pp. 14-21.

Interview with president of Office Employees International Union concerning problems of white-collar organization, including effect of automation in organizing white-collar workers.

- 8.10 Fanning, John H. "Some Challenges of the Sixties," Social Order, April 1961, pp. 159-177.

Anticipation of the general economic and social impact of automation within a decade: more specifically, the possible issues which may arise in collective bargaining, arbitration, and the courts in the settlement of disputes, and the role of Government in national emergency disputes.

- 8.11 Fleming, R. W. "The Problem of the Displaced Worker," Atlanta Economic Review, March 1962, pp. 7-11.

Findings of the Armour Automation Committee are discussed by its executive director. Considers limitations of collective bargaining, including problems posed by severance pay provisions, "crash" retraining programs, and interplant transfers.

- 8.12 Gomberg, William. "Featherbedding: An Assertion of Property Rights," The Annals of the American Academy of Political and Social Science, January 1961, pp. 119-129.

Discusses "featherbedding" as a conflict over the job as a property right, and the unsuccessful legislative and judicial attempts to resolve it. Proposes that arbitration be used to determine amounts of money due to recompense workers for their surrender of this property right.

- 8.13 Helstein, Ralph. "Bargaining Isn't Enough," I.U.D. Digest, Summer 1962, pp. 3-8.

President of the Packinghouse Workers asserts that programs developed by collective bargaining to study unemployment and to retrain workers cannot solve the problems created by automation. Suggests a shorter workweek and national, long-range planning to achieve human welfare.

- 8.14 Hildebrand, George H. The Use of Informed Neutrals in Difficult Bargaining Situations (Ithaca, N.Y., New York State School of Industrial and Labor Relations, 1961). 19 pp. Also, "The Use of Tripartite Bodies to Supplement Collective Bargaining," Labor Law Journal, July 1961, pp. 655-664.

Suggests that recommendations by consultants and study committees can prepare the way for labor-management negotiations in difficult bargaining situations which arise from the need to revise work rules. Discusses the manner in which neutrals have been used in the railroad, meatpacking, longshoring, steel, and glass industries.

- 8.15 Jacobs, Paul. Dead Horse and the Featherbird (Santa Barbara, Calif., Fund for the Republic, Inc., 1962). 62 pp.

History of alleged "featherbedding" practices in the printing and airlines industries and labor-management disputes involving them. Finds that, in both industries, industry as well as unions have been responsible for creation of "unwork" jobs. Concludes that such practices will be more generally extended unless limitations are placed upon technological change.

- 8.16 Kassalow, Everett M. "Labor Relations and Employment Aspects After Ten Years (1962)," Automation - Implications for the Future (New York, Vintage Books, 1962), pp. 316-336.

Discusses the changing attitudes toward automation and its effects on employment, citing as obsolescent, beliefs that machines create more jobs, increase skill requirements, and do not affect white-collar workers. Calls attention to the need for "solutions," particularly in the longshoring and meatpacking industries and in government programs.

- 8.17 Kassalow, Everett M. "New Union Frontier: White-Collar Workers," Harvard Business Review, January-February 1962, pp. 41-52.

Believes that automation will make white-collar workers more receptive to unionism as the number of these workers in the labor force increases. Compares (1) different forms of unionism in view of needs of white-collar workers, (2) the importance of different bargaining issues to white-collar and blue-collar workers, and (3) European experiences with white-collar unions.

- 8.18 Kennedy, Thomas. Automation Funds and Displaced Workers (Boston, Harvard University, 1962). 374 pp.

Analysis of six funds established by collective bargaining to share the benefits of automation between management and labor, and one supplementary unemployment benefit fund which accomplishes some of the same purposes. Finds that most automation funds are more for the benefit of the workers retained than those displaced and suggests improvements in future funds. Bibliography.

- 8.19 Killingsworth, Charles C. "Collective-Bargaining Approaches to Employee Displacement Problems (Outside the Railroad Industry)," Report of the Presidential Railroad Commission, Appendix Volume IV, Studies Relating to Collective Bargaining Agreements and Practices Outside the Railroad Industry (Washington, Government Printing Office, 1962), pp. 194-228.

Description of the principal collective bargaining developments which attempt to reconcile apparent labor-management conflicts concerning job security and management rights and flexibility in eliminating jobs to improve efficiency. Summary of agreements in the steel, automobile, rubber, meatpacking, and Pacific maritime industries. Specifically, considers limitations on plant relocation, employment guarantees, advance notice of displacement, training provisions, payment of moving costs by the employer, and severance pay.

- 8.20 Killingsworth, Charles C. "Industrial Relations and Automation," Annals of the American Academy of Political and Social Science, March 1962, pp. 68-80.

Maintains that elimination of jobs, or parts of jobs, requires new combinations of skills, and affects the worker's control over his rate of output. States that automation is causing a greater emphasis on job security, labor-management conflict has arisen mainly where, as in the airline industry, automation has encountered rigid job lines.

- 8.21 Killingsworth, Charles C. "The Modernization of West Coast Longshore Work Rules," Industrial and Labor Relations Review, April 1962, pp. 295-306.

Discusses the history of restrictive work rules in West Coast Longshoring and the development of labor-management attitudes which led to the 1960 agreement between the Pacific Maritime Association and International Longshoremen's and Warehousemen's Union. Analyzes the agreement provisions and the effects upon employers and employees.

- 8.22 Kirstein, George. "Labor's Ebbing Strength," The Nation, September 1, 1962, pp. 86-89.

Asserts that automation has reduced union strength by eliminating jobs, and that unions are "burying" themselves by seeking programs which soften the impact of unemployment, rather than reducing the workweek to spread employment and increase membership.

- 8.23 Lawrence, James S. "Agreement Between Labor, Management Smooths Shuttle Train Differences," Industrial Bulletin, March 1962, pp. 8-15.

Demonstrates how joint planning and mutual adjustment, including arrangement to use attrition rather than layoffs, resulted in union-management agreement on the introduction of an automated subway train.

- 8.24 Livingston, Frederick R. "An Approach to Automation," Proceedings of New York University Fourteenth Annual Conference on Labor (Albany, N.Y., Matthew Bender and Co., Inc., 1961), pp. 301-311.

Summary of the development, organization, and operations of the Armour Automation Committee.

- 8.25 Loewenberg, J. Joseph. Effects of Change on Employee Relations in the Telephone Industry (Thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Business Administration, Graduate School of Business Administration, George F. Baker Foundation, Harvard University, June 1962). 289 pp.

Outlines changes in operations, implementation of change, impacts of change on the organization and policies of both management and unions, and on collective bargaining. Bibliography.

- 8.26 "Long Range Sharing Plan for Kaiser Steel Corporation Employees," Monthly Labor Review, February 1963, pp. 154-160.

Text of the plan (except for introductory sections) agreed to by Kaiser Steel and United Steelworkers and providing for sharing of savings through automation and other efficiency gains.

- 8.27 McConkey, Dale D. "The NLRB and Technological Change," Labor Law Journal, January 1962, pp. 43-48.

Believes that changes in work force composition, brought about largely by technological change, will cause the National Labor Relations Board to reevaluate its criteria for determining bargaining units. Increasing numerical importance of white-collar groups and the widening gap between skilled and unskilled workers may require a greater number of bargaining units of narrower coverage. On the other hand, the influence of the integration of production operations and pressures for broadening seniority appear to indicate a move toward wider bargaining units.

- 8.28 "Mechanisation Clause in New United States Dockworker's Agreement," International Labour Review, July 1962; pp. 42-49.

Analyzes agreement reached in 1957 between the Pacific Maritime Association and the International Longshoremen's and Warehousemen's Union concerning installation of cargo-handling equipment, changes in work rules, job security, and methods of cushioning the impact of new procedures upon the dockworkers.

- 8.29 Presidential Railroad Commission. Report of the Presidential Railroad Commission (Washington, U.S. Government Printing Office, February 1962). 324 pp. Summarized in Monthly Labor Review, April 1962, pp. 375-389. Appendix Vol. I, Index-Digest to the Record of the Commission's Hearings. 135 pp. Appendix Vol. II, Pay Structure Study, Railroad Operating Employees. 267 pp. Appendix Vol. III, Studies Relating to Railroad Operating Employees. 269 pp. Appendix Vol. IV, Studies Relating to Collective Bargaining Agreements and Practices Outside the Railroad Industry. 434 pp.

Extensive study of the disagreement between the railroad carriers and the operating employee unions concerning work rules and compensation. The public members of this commission recommend that management be accorded the right to make technological changes, subject to procedures for collective bargaining and arbitration, and to the provision that employees deprived of employment be entitled to dismissal allowances, retraining programs, and preferential hiring status. Appendix Vol. III details employment trends and manpower characteristics of operating employees, their history and experience, including case studies under railroad employee protection plans, and seniority practices in the railroad and other industries.

- 8.30 Report to the President by the Emergency Board, Appointed by Executive Order 11015, Dated April 23, 1962, Pursuant to Section 10 of the Railway Labor Act, as Amended (Washington, U.S. Government Printing Office, 1962). 38 pp.

Results of an investigation of a dispute between the Chicago and North Western Railroad Telegraphers concerning job security and management's right to make technological changes to improve efficiency. Board recommends that negotiation between the parties include consideration of preferential hiring, maintenance of income, retraining, and other employee protection plans to cushion the impact of technological change.

- 8.31 Reuther, Walter P. "Policies for Automation: A Labor Viewpoint," The Annals of the American Academy of Political and Social Science, March 1962, pp. 100-109.

Asserts cost of technological change, now borne by the workers, must be shared by the whole community, that collective bargaining cannot solve the problems of structural unemployment, and the Government must help in instituting a flexible workweek and controlling corporate pricing power and plant relocation.

- 8.32 Rose, William T. "Lithographers Condemn Featherbedding, Welcome Automation as Tool for Progress," Industrial Bulletin, March 1962, pp. 3-7.

- 8.33 Ruttenberg, Stanley H. "The Future of Labor," Union Review, 1962, pp. 46-56.

Asserts that automation has reduced the wage share of production costs and that the "wage-price spiral" is a myth. Maintains that future of unionism, as of the Nation, depends on rate of growth and on extent to which growth creates jobs.

- 8.34 Severo, Richard. "Automation and the News Strike," The Reporter, March 14, 1963, pp. 29-32.

Description of technological changes in the newspaper industry and their implications for labor. Discusses the automation issues in the New York strike as they concern production, job security, union membership, and work rules.

- 8.35 Sinler, Norman J. "The Economics of Featherbedding," Industrial and Labor Relations Review, October 1962, pp. 111-121.

Economic analysis of the impact of featherbedding work rules on output, prices, and the distribution of income under conditions of competition and of monopoly in the product market.

- 8.36 Stieber, Jack. "Work Rules Issue in the Basic Steel Industry," Monthly Labor Review, March 1962, pp. 267-268.

Presents background of the work rules issue in the steel industry. Asserts that the work rules, rather than limiting technological change, have encouraged it.

- 8.37 Taylor, George W. "Collective Bargaining," Automation and Technological Change. The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, Inc., 1962), pp. 84-102.

Discusses problems created by technological change and restrictive union policies. Suggests the need for institutional changes to protect the public interest, including changes in units of representation, and greater use of tripartite bargaining and continuous bargaining. Believes that collective bargaining can aid in securing agreement on objectives and increasing employee acceptance of changes.

- 8.38 U.S. Commission to Inquire into a Controversy Between Certain Air Carriers and Certain of Their Employees. Report and Recommendations (Washington, U.S. Government Printing Office, May 24, 1961). 59 pp. Supplementary Report to the President (Washington, U.S. Government Printing Office, October 17, 1961). 15 pp.

Background of the dispute between the Flight Engineers' International Association, the Air Line Pilots Association, and the carriers. Recommends solutions to the issues of representation, jet crew complement, job security, and transition to a three-man crew.

- 8.39 Velie, Lester. "The Empty Chair by the Featherbed," The Reader's Digest, April 1963, pp. 97-102.

Cites two examples to demonstrate advantages of facing automation problems long before contract expiration dates.

- 8.40 Wirtz, W. Willard. Address before the National Academy of Arbitrators, Chicago, Illinois, February 1, 1963 (Washington, U.S. Department of Labor, 1963). 16 pp.

States that job security has become an important issue in collective bargaining because of technological change and increased competition; the public interest demands both an end to disruptions of economic life and the preservation of free collective bargaining. Points to necessity of achieving both a satisfactory rate of growth and developing "creative bargaining" procedures, e.g., consideration of issues, such as adjustments to automation in advance of contract negotiations.

- 8.41 Beirne, Joseph A. New Horizons for American Labor (Washington, Public Affairs Press, 1962). 89 pp.

Discusses the changing composition of the work force, the employment impact of automation, and the adequacy of collective bargaining tactics. Urges unions to adapt attitudes and policies to the new environment caused by social, economic, and technological change.

- 8.42 "Labor on United States and Canadian Railroads," Labor Law Journal, August 1963, pp. 677-699.

Reprint of papers delivered at the Spring 1963 meeting of the Industrial Relations Research Association, discussing findings of the Presidential Railroad Commission, new technologies and manpower requirements in Canadian railroads, and the diesel-fireman issue by Philip Arnow, Phillip Cohen, and Morris A. Horowitz, respectively.

- 8.43 Shils, Edward Benjamin. Automation and Industrial Relations (New York, Holt, Rinehart and Winston, 1963). 360 pp.

Analyzes effects of automation on national economy, security, worker skills, wage administration, job satisfaction and managerial methods. Describes labor attitudes, effects on union organization, and the role of restrictive work practices. Summarizes case studies and government programs.

- 8.44 Somers, Gerald G., Cushman, Edward L., and Weinberg, Nat, editors.
Adjusting to Technological Change (New York, Harper and Row, 1963).
230 pp.

Publication of the Industrial Relations Research Association containing 8 papers on impact of technology on organized labor and labor-management relations, cooperative approaches by labor and management, the interplant transfer of displaced workers, technological change and the community, and technological change in Western Europe. Contributors include Walter Buckingham, Philip Taft, Jack Barbash, Charles C. Killingsworth, Arnold R. Weber, Edwin Young, Bertil Olsson, Sar A. Levitan, and Harold L. Sheppard.

SECTION 9 - IMPLICATIONS FOR BUSINESS MANAGEMENT AND ORGANIZATION

This section includes references on automation's consequences for business management, organization, techniques, policy, and planning. Examples and case studies of company planning for conversion to automation and guides for personnel planning are included.

- 9.01 American Management Association. Advances in EDP and Information Systems. AMA Management Report No. 62 (New York, American Management Association, 1961). 187 pp.

Based on contributions of 21 participants at AMA's Seventh Annual Data Processing Conference in March 1961. Critical evaluations of management information systems. Covers advances and applications in EDP equipment, information retrieval, on-line and real-time systems and inventory control. Case histories of integrated data processing systems.

- 9.02 Anshen, Melvin. "Managerial Decisions," Automation and Technological Change, The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, Inc., 1962), pp. 66-83.

Focuses on decisionmaking to achieve defined objectives as the critical characteristic of a management job. Considers computer techniques for improving the quality of information to be used in decisionmaking; and concludes that information technology will result neither in the displacement of middle management nor in changing the organizational structure. However, the trend toward decentralization will be slowed or reversed with the increased ability to transmit information rapidly.

- 9.03 "Automation and the Foreman," Manage, February 1962, pp. 23-25.

- 9.04 Boehm, George A. W. "Helping the Executive to Make Up His Mind," Fortune, April 1962, pp. 128-131 ff.

Use of computers to aid in business decisionmaking.

- 9.05 Bright, James R., editor. Technological Planning on the Corporate Level (Boston, Harvard University Graduate School of Business Administration, 1962). 253 pp.

Proceedings of a conference designed to serve management's understanding of technological change. Includes 14 contributors from academic and business life with special experience in some facet of technological change. Subjects cover the new technologies, their effects on the corporation, methods and evaluation of research planning, and the role of natural resources in technological change.

- 9.06 Burlingame, John F. "Information Technology and Decentralization," Harvard Business Review, November-December 1961, pp. 121-126.

Disagrees with the widely expressed prediction that the rise of the computer will reverse the trend toward decentralization of business management decisionmaking and will reduce the need for lower and middle management.

- 9.07 Friedman, Jack J. "The Other Side of Automation," Dun's Review and Modern Industry, May 1962, pp. 42-44 ff.

Survey of 300 corporation presidents and chairmen covering subjects such as effects of automation on employment, impact on management, and responsibility for retraining.

- 9.08 Gallagher, James D. Management Information Systems and the Computer (New York, American Management Association, Inc., 1961). 191 pp.

Attempts to set up guidelines for the introduction of an information handling system. Concentrates on the objectives, problems, and control of such a system with emphasis on "software." Presents two case studies (American Airlines Sabre System and Sylvania Electric Products, Inc.) in which planning, implementation, and organizational impacts are considered.

- 9.09 Gerold, Charles. "ADP in Federal Personnel Management: The Sleeping Giant," Public Administration Review, Spring 1962, pp. 71-74.

Discussion of the fears associated with, and benefits to be derived from, the full utilization of ADP equipment in Federal personnel management.

- 9.10 Goodman, Edith Harwith. "The Effects of Computers on Corporate Management," Data Processing, Part I, January 1963, pp. 11-29; Part II, February 1963, pp. 19-26.

Report of a roundtable discussion by 11 specialists in information technology. Considers various impacts on the corporation, including the trend toward centralization, changes in corporate structure and decisionmaking processes, and the education of management personnel in the new technology.

- 9.11 Jacoby, Neil H. "Impacts of Scientific Change Upon Business Management," California Management Review, Summer 1962, pp. 31-43.

States that long range accelerated scientific change has made "techno-economic" planning by firms essential to their survival. Relationships between different levels of management and between various organizational departments are being changed. Marketing and research and development are being upgraded at the probable expense of production and finance.

- 9.12 Klein, Herbert E. "The Missing Links in Automation," Dun's Review and Modern Industry, February 1963, pp. 38-41.

Describes some of the managerial, technical problems of computer control, advanced instrumentation, and systems engineering which hinder fully automatic operations and make the production line a series of interdependent links.

- 9.13 Leavitt, Harold J., and Whisler, Thomas L. "Management in the 1980's," Harvard Business Review, November-December, 1958, pp. 41-48.

Defines "information technology" as including high-speed, large quantity information processing, applications of mathematical methods to decisionmaking, and computer simulation of high-order thinking. Predicts: (1) greater centralization with top management assuming more of the creative functions; (2) most middle management jobs becoming highly structured and declining in status and compensation, and (3) the line between top and middle management becoming similar to that between hourly workers and first-line supervisors.

- 9.14 Niland, Powell. Management Problems in the Acquisition of Special Automatic Equipment (Boston, Harvard University, 1961). 336 pp.

Analysis of the experiences of 18 metalworking plants in purchasing special automatic machinery, concentrating on: (1) the decision to make or buy equipment, (2) coordination of product and equipment design, (3) problems during the period immediately following installation, and (4) appraisal of financial problems. Questions the economic desirability of investment under certain conditions.

- 9.15 Raffaele, Joseph A. "Automation and the Coming Diffusion of Power in Industry," Personnel, May-June 1962, pp. 29-39.

Believes the present division of power among such groups in the economy as managers, labor leaders, government officials, and technologists will be altered as a result of rapid technological change.

- 9.16 Simon, Herbert A. "The Corporation: Will It Be Managed by Machines?" Automation--Implications for the Future (New York, Vintage Books, 1962), pp. 230-263.

Study of the economic factors that will determine the longrun utilization of man and machine in productive processes. States management functions will change as computers are adapted to make decisions in those areas where computers enjoy a comparative advantage. Concludes that, while the management of corporations by machines will be technically possible by 1985, it will not be economically feasible.

- 9.17 Simon, Herbert A. The New Science of Management Decision (New York, Harper and Bros., 1960). 50 pp.

Intensive inquiry into the process of decisionmaking, considering both traditional methods and the use of operations research and computers. Finds that while new techniques are easily adapted to routine and repetitive decisionmaking, programs to simulate the human thinking involved in policymaking are uneconomical; man-machine systems for decisionmaking will increase departmentalization and produce a pyramidal authority structure, reducing the importance of middle management.

- 9.18 Speroff, B. J. "Automation and Human Relations: Some Problems and Predictions," Personnel Administration, March-April 1962, pp. 4-11 ff.

Considers the special problems which technological change creates for business management, unions, government, and the individual. Emphasizes the effects of organizational decisions on personnel problems and their possible solutions.

- 9.19 U.S. Civil Service Commission, Office of Career Development. Automatic Data Processing Digest (Washington, U.S. Government Printing Office, 1962). 127 pp.

Report of the proceedings of a seminar conducted by the Civil Service Commission in 1961 to acquaint middle and top Government officials with various considerations in automatic data processing. Includes 13 selected discussions on topics such as the capabilities of computers, their implications for decisionmaking, adjustment to change, and methods of cushioning the impact on employees.

- 9.20 Whisler, Thomas L. and Shultz, George P. "Automation and the Management Process," The Annals of the American Academy of Political and Social Science, March 1962, pp. 81-89.

Believes computers can take over some of the decisionmaking functions of management, that effects will include reduction in the levels of management and centralization of control. Social implications include changing demands on the educational system and changes in managerial attitudes.

- 9.21 Hearle, Edward F. R., editor. Automation in Government (Chicago, American Society for Public Administration, July 1963). 37 pp.

Highlights of 15 presentations at the 1963 National Conference on Public Administration. Discusses the special problems attending automation in government agencies and suggests solutions to facilitate adjustments. Bibliography.

SECTION 10 - AUTOMATION IN FOREIGN COUNTRIES

Examples of developments and applications of automation in foreign plants and offices are presented in this section.

- 10.01 "Automation Doesn't Scare Europe," Business Week, December 22, 1962, pp. 56-57.

- 10.02 Bland, H. A. "Technological Change: Its Impact on the Work Force and Labour Relations," Personnel Practice Bulletin, March 1962, pp. 16-29.

Discussions of the impact of automation in Australia, emphasizing the need for careful planning to ease the problems. Also, discusses the economic and social effects, the need for training, and prospects for the future.

- 10.03 Cooper, Richard N. "International Aspects," Automation and Technological Change, The American Assembly, Columbia University (Englewood Cliffs, N.J., Prentice-Hall, 1962), pp. 132-152.

Reviews the current developments in technology, rates of investment abroad, and the possibilities for future economic growth. Assesses the impact of these considerations on United States foreign trade.

- 10.04 Forssman, Sven. "Age and Employment," CIRF Training for Progress, 1962, pp. 10-13.

Findings of April 15-19, 1962, Organization for Economic Cooperation and Development seminar on age and employment. Problems of age and working capacity in the face of increased mechanization are discussed in the light of changing age distribution in Europe. Suggests that "the problems of older workers should already be taken into account in the training of youth."

- 10.05 Kettl, Hans. "New Techniques--Different People," Economic and Social Bulletin, July/August 1962, pp. 9-16.

Results of a cross sectional study of Austrian industry for the period 1952-59.

- 10.06 Morse, David A. "Automation Outside the United States," The Annals of the American Academy of Political and Social Science, March 1962, pp. 117-126.

Shows that automation is a rapidly growing movement in the industrial countries, but examples of it are still rare and isolated in developing countries. In Western Europe, it is seen as a possible solution to the labor shortage rather than as a cause of unemployment. The International Labor Organization will continue to devote much attention to the social impact.

- 10.07 Netherlands Automatic Information Processing Research Centre. Development of the Computer Market in Europe (Amsterdam, Netherlands Automatic Information Processing Research Centre, June 1963). 57 pp.

Survey of the number and types of computer applications in Europe, the number of computers installed and on order, forecast of developments in the European Economic Community computer market until 1970, and corresponding need for computer personnel.

- 10.08 U.S. Department of Commerce, Business and Defense Services Administration. The Soviet Challenge to U.S. Machine Building (Washington, U.S. Government Printing Office, 1963). 73 pp.

Description and evaluation of the economies and technology of machinery production in the United States and the Soviet Union. Appendix includes a summary comparison of 25 major metalworking innovations. Numerous figures, charts, and tables. Bibliography.

- 10.09 U.S. Department of Labor, Bureau of Employment Security. Experience of Other Countries in Dealing With Technological Unemployment, BES ES-220 (Washington, U.S. Government Printing Office, August 1963). 42 pp.

Practices and policies of selected European countries to ease the adverse effects of automation, with specific reference to location of industry, relocation of workers, training programs, dismissal procedures, vocational guidance, and reduction of hours of work. Bibliography.

SECTION 11 - BIBLIOGRAPHIES

This section includes references to other recent bibliographies on automation.

- 11.01 Association for Computing Machinery. Computing Reviews (Published bimonthly).

Contains reviews and abstracts of current publications in all areas of the computer sciences.

- 11.02 Evans, W. H. "Small Office Automation," Small Business Bulletin (Washington, Small Business Administration, January 1962). 8 pp.

Bibliography of references on the general subject of office automation.

- 11.03 Hardin, Einar, Eddy, William B., and Deutsch, Steven E. Economic and Social Implications of Automation (East Lansing, Michigan State University, 1961). 78 pp.

Annotated bibliography on literature published during the period 1957-60 on economic and social implications of automation. References cover subjects such as employment, skill requirements, training, labor-management relations, and the administration of change.

- 11.04 Kreps, Juanita and Laws, Ralph. Automation and the Older Worker: An Annotated Bibliography (New York, National Council on the Aging, 1963). 43 pp.

- 11.05 National Education Association. Materials Generated by the Project on the Educational Implications of Automation; Bibliography (Washington, National Education Association, November 1962). 3 pp.

- 11.06 National Science Foundation. Current Projects on Economic and Social Implications of Science and Technology, 1961. NSF-62-4 (Washington, U.S. Government Printing Office, January 1962). 116 pp.

Report on 262 projects being conducted in colleges and universities, classified according to subject matter, and cross-referenced. Subjects include the impact of technology on selected industries and firms, decisionmaking, various aspects of labor, personnel relations, and management organization.

- 11.07 National Science Foundation. Current Projects on Economic and Social Implications of Science and Technology, 1962, NSF-63-8 (Washington, U.S. Government Printing Office, January 1963). 126 pp.

Expands 1961 survey coverage, reporting 306 projects in colleges and universities. Subjects include: automation and impacts on labor; scientific and engineering manpower, performance, education, and creativity; history and philosophy of science and technology; innovation; and impacts on selected industries.

- 11.08 Ronayne, Maurice F., editor. An Annotated Bibliography for the Systems Professional (Detroit, Systems and Procedures Association, 1962). 353 pp.

Twenty-four sections covering a wide variety of subjects of interest to systems analysts, such as organizational analysis, personnel training, management principles, industrial engineering, automatic data processing, information retrieval, and research and engineering. Detailed and comprehensive annotations.

APPENDIX A - INDEX TO AUTHORS

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Washington 6, D.C.

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AFL-CIO Industrial Union Department
815 16th St. NW.
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The American Behavioral Scientist
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P.O. Box 294
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National Committee on Employment
of Youth
National Child Labor Committee
419 Park Ave. South
New York 16, N.Y.

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American Enterprise Institute for
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Manufacturing
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New York 36, N.Y.

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New York 36, N.Y.

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Administration
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Chicago 37, Ill.

American Society of Tool and
Manufacturing Engineers
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Detroit 38, Mich.

American Vocational Journal
American Vocational Association, Inc.
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Annals of the American Academy
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American Academy of Political
and Social Science
3937 Chestnut St.
Philadelphia 4, Pa.

Atlanta Economic Review
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Atlanta 3, Ga.

Atlantic Monthly
The Atlantic Monthly Co.
8 Arlington St.
Boston 16, Mass.

Automation
The Penton Publishing Co.
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Bell Telephone Magazine
 American Telephone and Telegraph Co.
 Public Relations Department
 195 Broadway
 New York 7, N.Y.

Matthew Bender & Co., Inc.
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 Steel Publications, Inc.
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 Pittsburg 30, Pa.

Business Automation
 O.A. Business Publications, Inc.
 Elmhurst, Ill.

Business Horizons
 School of Business
 Indiana University
 Bloomington, Ind.

Business Week
 McGraw-Hill Publishing Co., Inc.
 330 West 42nd St.
 New York 36, N.Y.

California Department of Employment
 745 Franklin St., Rm. 302
 San Francisco, Calif.

California Management Review (CMR)
 Graduate School of Business
 Administration
 University of California
 Berkeley and Los Angeles, Calif.

Challenge
 Institute of Economic Affairs
 New York University
 475 Fifth Ave.
 New York 17, N.Y.

Chamber of Commerce of the
 United States
 1615 H St. NW.
 Washington 6, D.C.

Chemical and Engineering News
 American Chemical Society
 20th and Northampton Sts.
 Easton, Pa.

CIRF Training for Progress
 International Vocational Training
 Information and Research Centre
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Coal Age
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 New Haven, Conn.

Commentary
 American Jewish Committee
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 New York 22, N.Y.

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 Newtonville 60, Mass.

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Detroit Research Institute
12 East Hancock St.
Detroit, Mich.

Doubleday and Co., Inc.
Garden City, N.Y.

Dun's Review and Modern Industry

Dun and Bradstreet Publication, Corp.
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Economic and Social Bulletin

International Confederation of
Free Trade Unions
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Editorial Research Reports

1156 19th St. NW.
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Electrical World

McGraw-Hill Publishing Co., Inc.
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New York 36, N.Y.

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McGraw-Hill Publishing Co., Inc.
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New York 36, N.Y.

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U.S. Department of Labor
Bureau of Employment Security
Available from:

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New York 17, N.Y.

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Board of Governors
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Time, Inc.
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Fund for the Republic, Inc.
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Institutions
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New York 16, N.Y.

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49 East 33rd St.
New York 16, N.Y.

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Graduate School of Business
Administration
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Gallatin House, Soldiers Field
Boston 63, Mass.

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The Harvard Law Review Association
Gannett House
Cambridge, Mass.

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Graduate School of Business
Administration
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Holt, Rinehart and Winston, Inc.
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ILR Research
Distribution Center
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and Labor Relations
Cornell University
Ithaca, N.Y.

Industrial and Labor Relations Review
New York State School of Industrial
and Labor Relations
State University of New York
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Ithaca, N.Y.

Industrial Bulletin
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State Office Building
Albany, N.Y.

Industrial Relations
Institute of Industrial Relations
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201 California Hall
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Institute of Industrial Relations
West Virginia University
Morgantown, W. Va.

International Labour Organisation
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The Iron Age

Chilton Co.
Chestnut and 56th Sts.
Philadelphia 34, Pa.

I. U. D. Digest

Industrial Union Department, AFL-CIO
815 16th St., NW.
Washington 6, D.C.

Johns Hopkins Press
Baltimore 18, Md.

The Journal of Business

The University of Chicago Press
5750 Ellis Ave.
Chicago 37, Ill.

Journal of the American Society
of Training Directors

American Society of Training
Directors
330 West 42nd St.
New York 36, N.Y.

Journal of Marketing

American Marketing Association
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Chicago 3, Ill.

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Commerce Clearing House, Inc.
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Labor Market and Employment Security

U.S. Department of Labor
Bureau of Employment Security
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Life Office Management Association
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New York 17, N.Y.

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Machinery

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New York 13, N.Y.

Manage

The National Management Association
333 West Fifth St.
Dayton 2, Ohio

Management Record

National Industrial Conference
Board, Inc.
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New York 22, N.Y.

Management Review

American Management Association
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New York 36, N.Y.

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Office of Manpower, Automation
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Michigan State University
Labor and Industrial Relations Center
East Lansing, Mich.

Mill and Factory

Conover-Mast Publications, Inc.
205 East 42nd St.
New York 17, N.Y.

Mining Congress Journal
 American Mining Congress
 Ring Building
 Washington 6, D.C.

Modern Textiles Magazine
 Rayon Publishing Corp.
 303 5th Ave.
 New York 16, N.Y.

Monthly Labor Review
 U.S. Department of Labor
 Bureau of Labor Statistics
 Available from:
 Superintendent of Documents
 U.S. Government Printing Office
 Washington 25, D.C.

The Nation
 The Nation Co.
 333 6th Ave.
 New York 14, N.Y.

National Council on the Aging
 49 West 45th St.
 New York 36, N.Y.

National Education Association
 1201 16th St. NW.
 Washington 6, D.C.

National Institute of Labor Education
 1730 K St. NW.
 Washington, D.C.

Nation's Business
 Chamber of Commerce of the
 United States
 1615 H St. NW.
 Washington 6, D.C.

Netherlands Automatic Information
 Processing Research Centre
 6 Stadhouderskade
 Amsterdam, Netherlands

New England Business Review
 Federal Reserve Bank of Boston
 Boston, Mass.

New Leader
 American Labor Conference on
 International Affairs, Inc.
 34 North Crystal St.
 East Stroudsburg, Pa.

The Newman Press
 Westminster, Md.

The New Republic
 1244 19th St. NW.
 Washington 6, D.C.

New York State School of Industrial
 and Labor Relations
 Cornell University
 Ithaca, N.Y.

The New York Times Magazine
 The New York Times Co.
 229 West 43rd St.
 New York 36, N.Y.

New York University Press
 32 Washington Pl.
 New York 3, N.Y.

Occupational Outlook Quarterly
 U.S. Department of Labor
 Bureau of Labor Statistics
 Available from:
 Superintendent of Documents
 U.S. Government Printing Office
 Washington 25, D.C.

Organisation for Economic Cooperation
 and Development
 O.E.C.D. Regional Office
 Suite 1223
 1346 Connecticut Ave. NW.
 Washington 6, D.C.

Pennsylvania Department of Public
Instruction
Harrisburg, Pa.

Personnel

American Management Association, Inc.
1515 Broadway, Times Square
New York 36, N.Y.

Personnel Administration

Journal of the Society for
Personnel Administration
1221 Connecticut Ave. NW.
Washington 6, D.C.

The Personnel Administrator

American Society for Personnel
Administration
725 Cherokee Drive
Fort Collins, Colo.

The Personnel and Guidance Journal

American Personnel and Guidance
Association, Inc.
1605 New Hampshire Ave. NW.
Washington 9, D.C.

Personnel Journal

The Personnel Journal, Inc.
100 Park Ave.
Swarthmore, Pa.

Personnel Practice Bulletin

Personnel Practice Section
Department of Labor and
National Service
Australia

Prentice-Hall, Inc.
Englewood Cliffs, N.J.

The President's Committee on
Employment of the Handicapped
Washington 25, D.C.

Princeton University Press
Princeton, N.J.

Proceedings of the IRE

The Institute of Radio Engineers, Inc.
1 East 79th St.
New York 21, N.Y.

Public Administration Review

The American Society for Public
Administration
6042 Kimbark Ave.
Chicago 37, Ill.

Public Affairs Institute
312 Pennsylvania Ave. SE.
Washington 3, D.C.

Public Affairs Press
419 New Jersey Ave. SE.
Washington, D.C.

The Quarterly Review of Economics
and Business

University of Illinois
Champaign, Ill.

The Reader's Digest

The Reader's Digest Association, Inc.
Pleasantville, N.Y.

The Reporter

660 Madison Ave.
New York 21, N.Y.

Roxbury Press, Inc.
Sweet Springs, Mo.

The Saturday Evening Post

The Curtis Publishing Co.
Independence Square
Philadelphia 5, Pa.

Saturday Review

The Saturday Review, Inc.
25 West 45th St.
New York 36, N.Y.

Science

American Association for the
Advancement of Science
1515 Massachusetts Ave. NW.
Washington 5, D.C.

Scientific American

Scientific American, Inc.
415 Madison Ave.
New York 17, N.Y.

Small Business Bulletin

Small Business Administration
Available from:
Superintendent of Documents
U.S. Government Printing Office
Washington 25, D.C.

Social Order

The Institute of Social Order
3908 Westminister Pl.
St. Louis 8, Mo.

State Government

The Council of State Governments
1313 East 60th St.
Chicago 37, Ill.

Sterling Publishing Company

419 Park Ave. South
New York 16, N.Y.

Systems and Procedures Association

817 Penobscot Building
Detroit, Mich.

Systems and Procedures Journal

Systems and Procedures Association
817 Penobscot Building
Detroit, Mich.

Systems Management

Data Processing Publishing Co.
200 Madison Ave.
New York 16, N.Y.

Textile World

McGraw-Hill Publishing Co., Inc.
330 West 42nd St.
New York 36, N.Y.

Think

IBM Corp.
590 Madison Ave.
New York 22, N.Y.

The Tool and Manufacturing Engineer

American Society of Tool and
Manufacturing Engineers
Magazine Publication Office
5400 West Good Hope Rd.
Milwaukee 1, Wis.

Union Review

Western Labor Foundation
1600 Holoway Ave.
San Francisco, Calif.

United Steelworkers of America

1500 Commonwealth Bldg.
Pittsburgh 22, Pa.

University of California Press

Publications of the Institute of
Business and Economic Research
Berkeley and Los Angeles, Calif.

University of Chicago

Graduate School of Business
5750 Ellis Ave.
Chicago 37, Ill.

University of Illinois Bulletin

University of Illinois
49 Administration Bldg. (West)
Urbana, Ill.

University of Pennsylvania Press

3436 Walnut St.
Philadelphia 4, Pa.

University of Washington
 College of Business Administration
 103 Mechanzia Hall
 Seattle 5, Wash.

John Wiley and Sons, Inc.
 440 Fourth Ave.
 New York 16, N.Y.

W. E. Upjohn Institute for
 Employment Research
 709 South Westnedge Ave.
 Kalamazoo, Mich.

The H. W. Wilson Co.
 950 University Ave.
 New York 52, N.Y.

U.S. Army Ordnance Computing
 Laboratory
 Ballistic Research Laboratories
 Aberdeen Proving Ground
 Aberdeen, Md.

U.S. Army Ordnance Weapons
 Command Headquarters
 Joliet, Ill.

U.S. Department of Labor
 Bureau of Employment Security (and)
 Bureau of Labor Statistics (and)
 Office of Manpower, Automation,
 and Training (and)
 Office of Manpower Development
 and Training (and)
 Women's Bureau
 Washington 25, D.C.

U.S. Government Printing Office
 Superintendent of Documents
 Washington 25, D.C.

U.S. Industries, Inc.
 250 Park Ave.
 New York 17, N.Y.

Vend

Billboard Publishing Co.
 2160 Patterson St.
 Cincinnati 14, Ohio

Vintage Books, Inc.
 33 West 60th St.
 New York 23, N.Y.