

AUTOMATIC TECHNOLOGY AND ITS IMPLICATIONS

A Selected Annotated Bibliography



Bulletin No. 1198

UNITED STATES DEPARTMENT OF LABOR
James P. Mitchell, Secretary

BUREAU OF LABOR STATISTICS
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AUTOMATIC TECHNOLOGY AND ITS IMPLICATIONS

A SELECTED ANNOTATED BIBLIOGRAPHY

Introduction

The growing importance of automatic equipment and processing in American industry and business is attracting worldwide attention. There is a general awareness that recent technological developments are likely to have important implications for employment, occupational requirements, training and education, labor relations, and, in fact, the stability of the economy. Because the ramifications of these changes may affect many of its operations, the Department of Labor has taken an active role in research work in this field.

The U. S. Department of Labor's Bureau of Labor Statistics in presenting this bibliography seeks to enable research workers to make use of the growing volume of published material concerning the progress of automatic technology and its social and economic effects. It is planned as a research tool for economists, union and management officials, labor relations experts, journalists, university teachers, and students. It was compiled as part of the Bureau's research program on productivity trends and current technological developments. By fostering research in this area, the Department of Labor seeks to promote a better understanding of this increasingly important force in the American economy.

Scope and Limitations

The bibliography lists 359 references. These references consist of periodical articles, books, reports, speeches, pamphlets, conference proceedings, and other readily available materials. They present more or less nontechnical descriptions of the operations of automated equipment in business and industry, analyses of the conditions for their use, and discussions of the implications for labor, management, government, and the economy.

The sources searched in compiling the bibliography included the reference files of materials in the Bureau's Division of Productivity and Technological Developments; the Department of Labor Library; and the Scientific Library of the U. S. Patent Office. The Industrial Arts Index and the Labor Personnel Index were consulted for listings of periodical articles on the subjects covered.

The broad standard for selecting references was their value to persons primarily interested in the social and economic aspects of current developments in automation. Technical material addressed chiefly to engineers was excluded. For the most part, the references selected were published during 1955 and the first 5 months of 1956. A number of important books and articles published earlier, however, are also included.

Special efforts have been made to cover the most significant contributions and to limit repetition. No attempt has been made to include items from the daily press or to cover the literature published in other countries. Materials on general subjects related to automation, such as technological changes, and productivity statistics, are considered outside the scope of the bibliography.

In view of the large volume of published material on the subjects covered, it is highly probable that some important references may have been overlooked. Every effort will be made in future revised editions to incorporate omissions that are brought to the Bureau's attention.

Using the Bibliography

To facilitate the most effective use of the bibliography, special attention is directed to certain features that were incorporated to assist researchers.

Subject Matter Divisions: References are classified under 14 broad subdivisions of the general subject. When a reference relates to more than one subdivision, it is listed only once, under the division to which a major portion of the article, book, etc., relates.

Alphabetical Arrangement of Titles: References within each subdivision are arranged alphabetically by title. The titles of books, pamphlets, papers, and speeches are underlined. In the citation of periodical articles, the name of the periodical is underlined.

Brief Annotations: To give the user the gist of the subjects covered, each reference is briefly annotated, but no evaluation of the reference is intended.

Index to Authors: Appendix A presents an alphabetical listing of the names of authors, with the numbers of all references cited in the bibliography. Writers of articles that are included in collections are not listed unless these articles have been shown separately.

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

Lists of Periodicals and Publishers: Users of this bibliography should write directly to the periodical or publisher concerning any item listed. Appendixes C and D present the names and addresses of all periodicals and publishing firms cited in the bibliography. The Bureau of Labor Statistics cannot provide reprints of articles, etc., except those prepared in the Bureau itself.

This bibliography was planned and prepared by Edgar Weinberg of the Bureau's Division of Productivity and Technological Developments. Herman J. Rothberg assisted in compiling and annotating the references.

SECTION I

GENERAL SURVEYS

(This section covers references on background, development, principles, definition, and examples of various types of automation.)

1. America's Needs and Resources--A New Survey. J. Frederick Dewhurst and Associates. Twentieth Century Fund, New York, 1955. 1148 pp.

Chapter on Technology: Primary Resource describes some new developments in automation and electronics. (pp. 868-875.)

2. Automatic Control. Editors of Scientific American. Simon and Schuster, New York, 1955. 148 pp.

A collection of articles by 13 scientists on the principles, examples, and implications of automatic controls.

3. The Automatic Factory--A Critical Examination. Stephen A. June and Associates. Instrument Publishing Co., Pittsburgh, 1955. 88 pp.

Distinction between complete automaticity and progressive mechanization, obstacles to automatic factory, examples of contemporary automaticity, case studies of costs, and briefly, social implications.

4. The Automatic Factory--A Fortune Round Table. Fortune, October 1953, Vol. 43 (pp. 168-171; 178-180).

Experts in metalworking and electronics discuss rate of progress, jobs suitable to automate, role of electronics and computers.

5. Automatic Machines at Work--Present and Future. Philip R. Marvin. Automation, August 1954, Vol. 1 (pp. 34-37).

Definition of automation, some conditions for use.

6. Automation. Elmer W. Engstrom. Tech Engineering News, February 1956, Vol. 37 (pp. 12-22).

Evolution; its new contribution to technology, and present and future importance.

7. Automation. Time, March 19, 1956, Vol. 68 (pp. 98-106).

Illustrations of the latest developments in the field of automation.

8. Automation and Industrial Development. (Minutes of conference, May 12, 1954, at Syracuse, N. Y. Sponsored by New York State Department of Commerce.) New York Department of Commerce, Albany, 1954. 133 pp.

Papers by experts and company officials on definition, economic aspects, and applications in office and plant.

9. Automation and Technological Change; Hearings. Joint Committee on the Economic Report, ... Congress of the United States, 84th Cong., 1st sess. ... October 14-28, 1955. U. S. Government Printing Office, Washington, 1955. 644 pp.

Statements by 26 industrialists, labor leaders, and scientific experts on current examples and implications for living standards, employment, displacement, occupations, training, etc.

10. Automation: News Behind the Noise. Herbert Solow. Fortune, April 1956, Vol. 53 (pp. 150-155).

Examples of more automatic production in various industries. Some problems and advantages.

11. Automation of Industry. Martin Packman. Editorial Research Reports, Washington, January 5, 1955. 18 pp.

Definitions and use in various industries, evolution and potentialities, and economic and social effects.

12. Automation: Special Report. Business Week, October 1, 1955 (pp. 75-102).

Definitions, industries producing and using equipment, implication for employment, consumers, prospects for automatic factory.

13. Automation--The Advent of the Automatic Factory. John Diebold. D. Van Nostrand Co., Inc., New York, 1952. 18 pp.

Possibilities, limitations of automatic control; need for redesign of methods, products, and machines. Social Implications.

14. Automation--The New Technology. John Diebold. Harvard Business Review, November-December 1953, Vol. 31 (pp. 63-71).

Meaning, need for rethinking design, applications of new equipment, limiting factors, effect on economy.

15. Automation--Today. P. H. Alspach. (Paper to American Institute of Electrical Engineers Conference on Machine Tools, October 25, 1954, Detroit, Mich.) General Electric Corp., Schenectady, 1955. 12 pp.

Progressive development of automation from manual to mechanized stage and to continuous automatic production.

16. Challenge of Automation. Papers Delivered at the CIO National Conference on Automation. Public Affairs Press, Washington, 1955. 110 pp.

Papers on applications and uses, technological considerations, industrial significance and labor's stake, by J. Diebold, D. P. Campbell, W. S. Buckingham, and W. Reuther. (Papers also reprinted in part in Monthly Labor Review, May 1955, pp. 519-527).

17. Electronics and Automatic Production. (Proceedings and Symposium, held August 22-23, 1955, at San Francisco, Calif.) Jointly Sponsored by National Industrial Conference Board, New York, and Stanford Research Institute, Menlo Park, Calif. 1955.

Papers by company officials, covering automotive, steel, chemical, electronics industries, business data processing, and economic and social implications.

18. A Functional Morphology of Mechanisms. E. W. Leaver and J. J. Brown. Automation, July 1955, Vol. 2 (pp. 37-41).

A conceptual system for classifying various methods of production.

19. How Much Automation for Your Plant? Annesta R. Gardner. Dun's Review and Modern Industry, February 1954. Reprint. 7 pp.

Examples in container, chemical, copper, auto industries.

20. How to Evaluate Automation. James R. Bright. Harvard Business Review, July-August, 1955, Vol. 33 (pp. 101-111).

Automation as a higher level of mechanization. Method of charting levels of mechanization.

21. Keeping Pace With Automation: Practical Guides for the Company Executive. Special Report No. 7. American Management Association, New York, 1956. 136 pp.

Various experts on basic concept and approaches, company experiences and outlook.

22. Looking Around: Automation for Management. Joseph L. Massie. Harvard Business Review, March-April 1956, Vol. 34 (pp. 139-152).

A review of various interpretations of the term, "automation."

23. Orders and Degrees of Automaticity. George Amber. Electrical Manufacturing, January 1955, Vol. 55 (pp. 64-69).

Describes different degrees of automaticity in machinery, from replacement of manual skill to mental skills of workers; brief bibliography.

24. Principles of Mass and Flow Production. Frank G. Woollard. Philosophical Library, Inc., New York, 1955. 195 pp.

Historical development of transfer machines, applicability, illustrations, advantages, and limitations.

25. The Push Button Factory. Frank K. Shallenberger. The Engineering Journal, November 1952 (pp. 1194-1198).

Historical development of automation, principles, and outlook.

26. A Review of Automatic Technology. Edgar Weinberg. Monthly Labor Review, June 1955, Vol. 78 (pp. 637-644).

Basic principles, some leading examples, factors in its growth and some general implications.

27. Special Automation Handbook. American Management Association,
New York, 1955. 99 pp.

Reprints of eight articles on various aspects of automation and its implications, from professional and management journals.

28. Stop Coining Words! J. J. Brown. Control Engineering, March 1955,
Vol. 2 (pp. 48-49).

Distinctions between automation and mechanization.

SECTION II

AUTOMATION IN METALWORKING

(This section covers references on principles of operations and examples of automatic equipment recently introduced in machining, stamping, founding, finishing, assembling, and other operations of metalworking plants.)

29. The American Factory and Automation. John I. Snyder. The Saturday Review, January 22, 1955 (pp. 16-17).

Industrialist describes highly automatic Rockford, Ill., ordnance plant. Also cites automation in refineries.

30. Automatic Engine Assembly on a Transfer Machine. Charles Wick. Machinery, December 1955, Vol. 62 (pp. 166-172).

Use of automatic equipment in engine assembly plant.

31. The Automatic Factory? D. S. Harder and D. J. Davis. (Paper presented at SAE National Production Meeting, March 25, 1953, Series No. 66) Society of Automotive Engineers, New York, 1953. 14 pp.

Automation equipment at Ford Motor Co. and its advantages for quality, safety, cost, increased machine speed, implications for plant maintenance, management, and labor.

32. Automatic Presses. T. W. Bannon. Instruments and Automation, December 1954, Vol. 27 (pp. 1951-1952).

Examples of transfer feed presses.

33. Automatic Units in an Automatic Factory. F. R. Swanson. National Safety News, May 1955, Vol. 71 (pp. 22-23).

Influence of automation on design of machine tools, with stress on safety features for operators and maintenance

34. Automation and Its Requirements. G. G. Murie. (Paper presented to SAE Annual Meeting, January 1955, at Detroit Mich.) Society of Automotive Engineers, Inc., New York, 1955. 8 pp.

Ford Motor Co. engineer on development of automation at Ford. Covers machine tooling, preventive maintenance, and need for indirect labor.

35. Automation Compounds Maintenance Problems. Walter Rudolph. Mill and Factory, October 1953, Vol. 53 (pp. 93-95).

Need for skilled maintenance workers at Cleveland Engine Plant.

36. Automation Devices Tie in Machining Operations. Iron Age, August 4, 1955, Vol. 176 (pp. 75-78).

Continuous production on different machine tools at gear plant.

37. Automation Facts— Not Fancies. H. B. Osborn, Jr. Machinery, March 1956, Vol. 62 (pp. 144-167).

Results of survey of plants made by American Society of Tool Engineers to determine potential impact of automation in metalworking industries.

38. Automation in Foundry. Automation, October 1955, Vol. 2 (pp. 71-72).

Automatic movement of a sand mold.

39. Automation in the Foundry. William E. Dougherty. Foundry, May 1954, Vol. 82 (pp. 140-145).

Mechanization of molding, problems, and costs.

40. Automation--Its Development in Metalworking. Anderson Ashburn. Mechanical Engineering, November 1955, Vol. 77 (pp. 958-963).

Historical development of automatic machine tools.

41. Automation--Key to the Future. D. S. Harder. (Address to Quad City conference on automation, Davenport, Iowa, August 27, 1954.) Ford Motor Co., Detroit, 1954. Pamphlet.
- Originator of word reviews definition, where and when practicable, effect on production, problems of control, and maintenance in auto industry.
42. Automation of Crankshafts Speeds Plymouth V-8 Production. Charles H. Wick. Machinery, January 1956, Vol. 62 (pp. 123-133).
- Automatic loading, positioning, conveying in automobile plant.
43. Automation Opens New Vistas in Stamping. Francis J. Sehn. Automation, December 1954, Vol. 1 (pp. 19-26).
- Automatic unloading to eliminate handling bottlenecks in large and small plants.
44. Automation--the Metalworking Industry's Philosophy for Increasing Productivity. Charles H. Wick. Machinery, March 1955, Vol. 61 (pp. 143-147).
- Need, advantages, and disadvantages.
45. Automation, What It Means to Foundries. W. R. Jennings. Foundry, July 1955, Vol. 83 (pp. 115-117).
- Forecasts greater use of continuous operation for closer tolerances, complex design, and greater productivity.
46. Chicago Show Issue. American Machinist, August 29, 1955, Vol. 99.
- Latest models of machine tools described.
47. The Economics of Automation. W. C. Newburg. (Paper presented to SAE Annual Meeting, January 1955, Detroit, Mich.) Society of Automotive Engineers, Inc., New York, 1955. 8 pp.
- President, Dodge Division, Chrysler Corp., on cost, reliability, and savings considered in adopting automation equipment in auto industry.

48. 1574 Companies Report 56 Plans. Special Report No. 402. American Machinist, August 29, 1955, Vol. 99 (pp. 145-160).

Report on plans for buying new equipment; amount, type, by industry and by area.

49. Ford Expands Cleveland Operation. Edgar Altholz. Machinery, April 1956, Vol. 62 (pp. 190-195).

A stamping plant and second engine plant feature latest techniques of automation, materials handling, and quality control.

50. GE Meets Competition With Automation. Philip J. Klass. Aviation Week, August 8, 1955 (pp. 61-64).

Mechanized assembly machines for small production runs of aviation equipment.

51. Latest Developments in Ford Automation Techniques. Joseph Geschelin. Automotive Industries, February 1, 1956, Vol. 114 (pp. 54-58).

Most advanced manufacturing methods developed by Ford Motor Co.

52. Latest Developments in Plating Automation. Automotive Industries, March 1, 1956, Vol. 114 (pp. 40-43).

Automatic electroplating at various automobile manufacturing plants.

53. Maintaining the Automated Plant. N. K. Conrad. Instruments and Automation, November 1955, Vol. 28 (p. 1927).

Ford Co.'s experience in decentralizing maintenance activities. Planning of productive maintenance.

54. Mechanization of Small-Batch or Step-By-Step Production. Ray H. Sullivan. American Management Association. Manufacturing Series No. 205 (pp. 10-13).

Need for study of practices, difficulty of materials handling, application to large and small companies.

55. Method of Automation. C. F. Hautau. Cleveland Engineering, March 5, 1953, Vol. 46 (pp. 15-20).

Automation in metalworking using specialized equipment.

56. Modern Trends in Machine Tools. Automation, September 1955, Vol. 2 (pp. 40-51).

Illustrations and descriptions of the latest types of automatic machine tools shown at the September 1955 Machine Tool Show in Chicago, Ill.

57. New Ford Assembly Plant. Thomas MacNew. Automotive Industries, December 15, 1955, Vol. 113 (pp. 60-64).

Latest materials-handling equipment used in assembling cars and trucks.

58. Newly-Designed Transfer Machines in Ford Engine Plant. Joseph Geschelin. Automotive Industries, March 1, 1956, Vol. 114 (pp. 28-31).

Newly designed transfer machines in the newest of Ford Motor Co.'s engine plants.

59. Parts Handling-Key to Grinder Automation. Rex Stevenson. Automation, January 1956, Vol. 3 (pp. 53-57).

Handling devices for feeding. Small parts link standard machines for automated operation.

60. The Plymouth Qualimatic V-8 Engine. Tooling and Production, October 1955, Vol. 21.

Detailed account of the conception, implementation, and successful functioning of Plymouth's new automatic engine assembly plant.

61. Pushbutton Manufacturing. Clarence Tice. Automation, October 1954, Vol. 1 (pp. 18-27).

Examples of automatic handling of parts in automotive parts, from machining to plating.

62. Revolution in Processing. Automobile Facts, January 1954, Vol. 13, (pp. 1, 4-5).

Changes in processing automotive parts, from machining to plating.

63. Small Shops Can Use Automation, Too. J. B. Cunningham. American Machinist, April 12, 1954, Vol. 98 (pp. 177-187).

Use of special transfer units and loading devices in smaller plants.

64. Transfer Machines Boost Output of Hydromatics. Reuben R. Jensen. Machinery, April 1956, Vol. 62 (pp. 164-172).

Operation of transfer machines for inspecting and assembling, as well as machining various components.

65. Trends in Machine Tool Automation. R. E. Cross. Instruments and Automation, May 1954, Vol. 27 (pp. 768-770).

Evolution of transfer machines.

66. True Automation: Its Competitive Advantages. Charles F. Hautau. Automatic Control, July 1954, Vol. 1 (pp. 28-33).

Need for revising machine tools, production methods, and products for automatic production of parts.

67. Vibratory Feeding of Parts. George H. Kendall and Jerry A. Host. Automation, November 1955, Vol. 2 (pp. 67-70).

Bowl-type vibratory feeder useful in storage, orientation, and movement of parts.

68. What Does Automaticity Cost? American Machinist, August 29, 1955, Vol. 99 (pp. 751-753).

Survey of cost of electronic hydraulic and pneumatic elements on machine tool models.

SECTION III

MECHANIZED BULK MATERIALS HANDLING

(This section covers references on principles and examples of the use of moving conveyors, automatic weighers and meters, and related materials-handling equipment in processing grain, flour, coal, and other bulk materials.)

69. Automatic Barrel Cleaning Solves a Dirty Problem. Carl J. Schroeder. Automation, December 1955, Vol. 2 (pp. 45-50).

Specialized machinery used in a refinery.

70. Automatic Materials Handling. Leonard J. Bishop. American Management Association. Manufacturing Series No. 209 (pp. 29-32). New York, 1953.

Factors in installing materials-handling equipment, some typical operations.

71. Automatic Weighing of Bulk Materials. John K. Rudd. Industry and Power, May 1955, Vol. 68 (pp. 44-46).

Uses of automatic weighing machines, conveyors, etc., to provide continuous flow of bulk materials such as feed and coal.

72. Automation in the Milling Industry. E. D. Gladow. The Northwestern Miller, September 13, 1955, Vol. 254 (pp. 1a, 5a-7a).

New packing, loading, and processing equipment.

73. Blast Furnace Automation. W. W. Robinson. Instruments and Automation, February 1955, Vol. 28 (pp. 266-269).

Automatic control of charging program.

74. Control Components Provide New Ways to Handle Materials. Automatic Control, May 1955, Vol. 2. (pp. 27-31).

Examples of automatically controlled handling systems in two warehouses.

75. From Egg Beaters to Automation. Automatic Control, December 1954, Vol. 1 (pp. 8-11).

Integration of chemical and fabricating plant in production of foam rubber through mechanized materials handling. Advantages and savings.

76. Heavy Material Handling Uses Automation. E. H. Abbe. Automation, February 1955, Vol.2 (pp. 26-30).

Controls used with high-speed conveyors in handling ore and coal.

77. How Automation Applies to the Baking Industry. Clelio Brunetti. Baking Industry, February 25, 1956, Vol. 105 (pp. 57-59).

Mechanization of flour and dough handling.

78. Mechanized Bread Making. Food Engineering, July 1951, Vol. 23 (pp. 102-105).

Automatic machinery used in processing and materials handling in modern bakeries.

79. Metering Bulk Materials. I. H. Richardson. Automation, August 1955, Vol. 2 (pp. 26-31).

Various automatic devices for weighing and moving with high degree of accuracy.

80. New Automatic Plant Gives Them Quantity and Quality Plus. A. J. Faulhaber and M. Eisenstaedt. Food Engineering, July 1952, Vol. 24 (pp. 77-85).

Advanced materials-handling equipment, high speed in-line production machines at new bread baking plant.

81. New Potentials of Materials Handling. James R. Bright. Harvard Business Review, July-August 1954, Vol. 32 (pp. 79-91).

Extent of handling activity in factory, objectives, important trends, management approach.

82. Retooling for Materials Handling. James R. Bright. Advanced Management, July 1955, Vol. 20 (pp.17-21).

Methods of analyzing the level and span of automation of plant operations.

83. Status of Automation in the Rubber and Plastic Industries. G. V. Kullgren. Rubber World, June 1955, Vol. 132 (pp. 347-399).

Examples of automation or mechanization in various processes of rubber and plastics industries and some future possibilities.

84. Trend Toward Automation in Automatic Weighing and Bulk Materials Handling. I. H. Richardson. Mechanical Engineering, November 1953, Vol. 75 (pp. 865-870).

Examples in grain, flour, and sugar mills; types of scales, systems in glass, foundry, feed, and rubber mill.

85. Warehousing System Unified to Improve Handling Efficiency. Automation, May 1956, Vol. 3 (pp. 49-51).

System of conveyors to move cases from packaging to shipping.

86. Weight Control of Bulk Materials. S. E. Gluck. Automation, December 1955, Vol. 2 (pp. 26-33); January 1956, Vol. 3 (pp. 42-47).

Various types of conveyor scales and weight control feeders for moving material and controlling its flow to processing equipment.

SECTION IV

AUTOMATIC PRODUCTION OF ELECTRONIC GOODS

(This section covers references on the use of printed circuitry and machines for assembling electronic equipment).

87. Automatic Manufacture of Electronic Equipment. L. P. Lessing.
Scientific American, August 1955, Vol. 192 (pp. 29-33).

A description of the AEF plant in Alexandria, Va., now producing components on the modular principle.

88. Automatic Production in the Electronics Industry. (A Status Report.)
Clede Brunetti, T. R. James, R. F. Mauther. General Mills, Inc.,
Mechanical Division, Engineering Research and Development Department,
Minneapolis, July 1955. 62 pp.

Descriptions of various types of automation fabrication processes, printed circuits, and design of electronic components. Bibliography and illustrations.

89. Electronics Goes Modern. Edmund L. Van Deusen. Fortune, June 1955,
Vol. 51 (pp. 132-135).

Trends in mechanization of electronic-goods assembly.

90. IBM Tackles the Problem of Job Shop Automation. N. E. Armstrong.
Automation, March 1956, Vol. 3 (pp. 37-40).

Specially built equipment developed for automatic production of parts.

91. Is the Automatic Factory Practical for the Smaller Electronic Manufacturer?
E. R. Gamson. (Paper presented to West Coast Electronic Manufacturers'
Association, San Francisco, May 1954.) Stanford Research Institute,
Stanford. October 1954. 6 pp.

A method of mechanical assembling of electronics described.

92. Machine Automates Assembly of Printed Electronic Circuits. Automation, April 1955, Vol. 2 (pp. 65-68).
Operation of autofab machine on IBM circuits.
93. Manufacturing Cost Determination of an Automatic Electronic Factory. National Bureau of Standards Technical News Bulletin, May 1954, Vol. 38 (pp. 77-79).
Summary of report on comparative costs of manually and mechanically producing an item based on modular principle, compared with cost of conventional equipment. Cites lower cost of modular design of electronics.
94. Mechanized Production of Electronic Equipment. John Markus. Electronics, September 1955, Vol. 28 (pp. 137-160).
Report on etched wiring, component preparation, machine assembly, dip soldering, automatic testing.
95. Modern Developments in Automation for Electronics. Wilbur R. Ellis. Automation, May 1956, Vol. 3 (pp. 34-47).
Examples of wiring board techniques, components for automatic production, automated assembly, and automatic testing.
96. Now, Assembly by Machine for TV Sets. Business Week, June 18, 1955 (pp. 56-60).
Examples of automatic assembling equipment on market.
97. Proceedings of the Symposium on Printed Circuits. (Held by the Radio-Electronic-Television Manufacturers of America at University of Pennsylvania, January 1955.) Engineering Publishers, New York, 1955. 122 pp.
Papers on automatic production of electronic equipment.
98. Producing Circuits for Mechanized Electronics Assembly. P. L. Anderson and J. A. Zagusta. Automation, November 1955, Vol. 2 (pp. 71-74).
Development of printed circuit techniques. Advantages of mechanical pattern forming versus graphic arts.

99. **Project Tinkertoy: Modular Design of Electronics and Mechanized Production of Electronics.** National Bureau of Standards Technical News Bulletin, November 1953, Vol. 37 (pp. 161-171).

Description of operations and materials.

100. **Television Sets Cost Less Because of Automation.** C. S. Rossate. Machinery, December 1955, Vol. 62 (pp. 156-161).

Admiral Corp. experience with dip soldering, printed circuitry and automatic assembly equipment, TV production; cites cost savings.

SECTION V

AUTOMATIC CONTROL IN PROCESSING

(This section covers references on principles and uses of feedback control devices in chemical, petroleum refining, and other process industries.)

101. Advancing Continuous Malting. Automation, October 1955, Vol. 2 (pp. 66-68).

Operation of automatically controlled malting plant.

102. Are the Processing Industries Going Electronic? Joseph Yanak and Len Axelrod. Automatic Control, June 1955, Vol. 2 (pp. 18-23).

Growing use of electrical control instead of pneumatic devices in refineries.

103. An Automatic Chemical Plant. Eugene Ayres. Scientific American, September 1952, Vol. 187 (pp. 82-96).

Use of control instruments in petroleum refineries, goal of end-point control for greater automaticity, need for systems engineers.

104. Automatic Control Fundamentals. C. W. Worley. Automation, April 1955, Vol. 2 (pp. 37-42).

Development of theory; basic principles of open- and closed-loop control.

105. Automatic Control in the Steel Industry. R. W. Holman. Blast Furnace and Steel Plant, April 1950, Vol. 44 (pp. 391-397).

Status of automatic controls in gaging and processing. Various types used.

106. Automatic Control--When? Chemical and Engineering News, January 16, 1956, Vol. 34 (pp. 286-287).

Initial applications seen in petroleum and organic chemical industries.

107. Automatic Testing Devices Keep Pace With Production. K. W. Patrick. Automatic Control, March 1955, Vol. 2 (pp. 16-17).

Need for automatic testing as processes become faster and more complex.

108. Automation. The National Confectioners' Association Bulletin, April-June 1955, Vol. 40 (pp. 17-18).

Automation in candy making processes of cooling and cooking.

109. Automation in Hosiery Finishing. Modern Textiles Magazine, May 1955, Vol. 36 (pp. 53 and 69).

A new machine for automatically setting, dyeing, and chemically finishing women's nylon hosiery in a continuous operation.

110. Automation in the Chemical Industry. Carl F. Prutton. American Management Association. Manufacturing Series No. 209 (pp. 25-29). New York, 1953.

Background, development, and outlook.

111. Automation in the Iron and Steel Industry. Instruments Publishing Co., Pittsburgh, 1956. 100 pp.

A collection of papers presented at 1954 and 1955 conferences on Instrumentation for the Iron and Steel Industry. Covers control in blast furnaces, rolling mills, etc.

112. Automation--New Impact and Challenge. Ted F. Silvey. Looking Ahead, October 1954, Vol. 2 (pp. 4-5).

Explanation of closed-loop control.

113. Automation Pays Off. J. O. Scott. The Oil and Gas Journal, September 19, 1955, Vol. 54 (pp. 114-116).

Automatic equipment on oil wells and storage tanks saves men and materials.

114. Automation's Challenge. Chemical and Engineering News, February 20, 1956, Vol. 34 (pp. 864-866).
Process industries lag in use of up-to-date instrumentation.
115. A Case for Electronics in Process Control. Robert A. Duncan. Automation, February 1956, Vol. 3 (pp. 67-71).
Advantages of electronics over pneumatic control systems.
116. Control Systems. Gordon S. Brown and Donald P. Campbell. Scientific American, September 1952, Vol. 187 (pp. 56-64).
Examples and advantages of feedback controls in various industrial processes and military uses. Some implications for technical training of systems engineers.
117. Electronically Controlled Refinery. Leon Stewart. Instruments and Automation, December 1954, Vol. 27 (pp. 1948-1951).
Refinery at Indianapolis controlled by electronic instruments.
118. Electronics in the Atlantic Refinery: An Operational Report. Automatic Control, July 1955, Vol. 3 (pp. 14-19).
Advantages, costs, and operation of electronic control of refinery.
119. Feedback. Arnold Tustin. Scientific American, September 1952, Vol. 187 (pp. 48-55).
Concept of open- and closed-loop systems in engineering and nature.
120. Feedback Control Systems for Automatic Operation. Paul Lindholm. Automation, September 1954, Vol. 1 (pp. 57-63).
Principles of automatic control; role of computers.
121. Feedback Systems: A Basis for Self-Regulation. Alan Block. Automatic Control, July 1954, Vol. 1 (pp. 16-22).
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APPENDIX A

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NAMES AND ADDRESSES OF PERIODICALS CITED IN

BIBLIOGRAPHY

Periodicals Concerned Principally With Automation

Automatic Control
Reinhold Publishing Corp.
430 Park Ave.
New York 22, N. Y.

Control Engineering
McGraw-Hill Publishing Co., Inc.
330 West 42d St.
New York 18, N. Y.

Automation
Penton Publishing Co.
Penton Bldg.
1213 West 3d St.
Cleveland 13, Ohio

Instruments and Automation
Instruments Publishing Co., Inc.
845 Ridge Ave.
Pittsburgh 12, Pa.

Professional, Technical, and Other Periodicals

Advanced Management
Society for the Advancement of
Management, Inc.
74 Fifth Ave.
New York 16, N. Y.

American Machinist
McGraw-Hill Publishing Co., Inc.
330 West 42d St.
New York 18, N. Y.

American Aviation
1025 Vermont Ave., NW.
Washington 5, D. C.

The American Statistician
American Statistical Association
1108 Sixteenth St., NW.
Washington 6, D. C.

The American Engineer
1121 Fifteenth St., NW.
Washington 5, D. C.

Automobile Facts
Automobile Manufacturers Association
320 New Center Bldg.
Detroit 2, Mich.

Professional, Technical, and Other Periodicals--Con.

Automotive Industries
Chilton Co.
Chestnut & 56th St.
Philadelphia 39, Pa.

Chemical and Engineering News
American Chemical Society
1155 Sixteenth St., NW.
Washington 6, D. C.

Aviation Week
McGraw-Hill Publishing Co., Inc.
330 West 42d St.
New York 18, N. Y.

Chemical Engineering Progress
American Institute of Chemical
Engineers
15 North Seventh St.
Philadelphia 6, Pa.

Bakers and Confectioners Journal
Bakery and Confectionery Workers'
International Union of America
1145 Nineteenth St., NW.
Washington 6, D. C.

Cleveland Engineering
Cleveland Engineering Society
2136 East 19th St.
Cleveland 15, Ohio

Baking Industry
Clissold Publishing Co.
105 West Adams St.
Chicago, Ill.

Dun's Review and Modern Industry
Dun and Bradstreet Publications Corp.
99 Church St.
New York 8, N. Y.

Blast Furnace and Steel Plant
Steel Publications, Inc.
4 Smithfield St.
Pittsburgh 30, Pa.

Electrical Manufacturing
The Gage Publishing Co.
1250 Sixth Ave.
New York 20, N. Y.

Bulletin of the Atomic Scientist
53 West Jackson Blvd.
Chicago 6, Ill.

The Electrical Workers' Journal
International Brotherhood of Electrical
Workers
1200 Fifteenth St., NW.
Washington 5, D. C.

Business Week
McGraw-Hill Publishing Co., Inc.
330 West 42d St.
New York 18, N. Y.

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

The Carpenter
United Brotherhood of Carpenters and
Joiners of America (AFL)
222 East Michigan St.
Indianapolis 4, Ind.

The Engineering Journal
The Engineering Institute of Canada
2050 Mansfield St.
Montreal, P. Q., Canada

Professional, Technical, and Other Periodicals--Con.

Factory Management and Maintenance
McGraw-Hill Publishing Co.
330 West 42d St.
New York, 18, N. Y.

Food Engineering
McGraw-Hill Publishing Co.
330 West 42d St.
New York 18, N. Y.

Fortune
9 Rockefeller Plaza
New York 20, N. Y.

Foundry
Penton Publishing Co.
Penton Bldg.
Cleveland 13, Ohio

Harper's Magazine
Harper & Bros.
49 East 33d St.
New York 16, N. Y.

Harvard Business Review
Gallatin House
Soldiers Field
Boston 63, Mass.

Industry and Power
The John Paul Taylor Publishing Co.
Commercial Bank Bldg.
St. Joseph, Mich.

The International Chemical Worker
International Chemical Workers' Union
1659 West Market St.
Akron 3, Ohio

International Labor Review
International Labor Office
Geneva, Switzerland

The International Mailer
International Mailers Union
34 South Hight St.
Akron 8, Ohio

The International Woodworker
430 Governor Bldg.
Portland 4, Ore.

Iowa Business Digest
Bureau of Business and Economic
Research
State University of Iowa
Iowa City, Iowa

Iron Age
Chilton Co., Inc.
Chestnut & 56th St.
Philadelphia 39, Pa.

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

Looking Ahead
National Planning Association
1606 New Hampshire Ave., NW.
Washington, D. C.

Machinery
The Industrial Press
93 Worth St.
New York 13, N. Y.

Professional, Technical, and Other Periodicals—Con.

Machinists Monthly Journal
International Association of
Machinists
Machinist Bldg.
Washington 1, D. C.

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Management Magazines, Inc.
141 East 44th St.
New York 17, N. Y.

Machine Design
Penton Publishing Co.
Penton Bldg.
Cleveland 13, Ohio

Mechanical Engineering
The American Society of Mechanical
Engineers
29 West 39th St.
New York 18, N. Y.

Mechanical Translation
Massachusetts Institute of Technology
77 Massachusetts Ave.
Cambridge 39, Mass.

Mill and Factory
Conover-Nast Publishing Co., Inc.
205 East 42d St.
New York 17, N. Y.

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

Monthly Labor Review
U. S. Department of Labor
Bureau of Labor Statistics
Washington, D. C.

The National Confectioners' Association
Bulletin
National Confectioners' Association
1 North La Salle St.
Chicago 2, Ill.

National Safety News
National Safety Council
425 North Michigan Ave.
Chicago 11, Ill.

The Northwestern Miller
P. O. Box 67
Minneapolis 1, Minn.

Office Executive
National Office Management Association
132 West Chelton Ave.
Philadelphia 44, Pa.

The Oil and Gas Journal
211 South Cheyenne Ave.
Tulsa, Okla.

The Packinghouse Worker
United Packinghouse Workers of America
608 South Dearborn St.
Chicago 5, Ill.

Personnel
American Management Association
330 West 42d St.
New York, 18, N. Y.

Personnel Journal
Personnel Journal, Inc.
P. O. Box 239
Swarthmore, Pa.

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McGraw-Hill Publishing Co.
330 West 42d St.
New York 18, N. Y.

The Railway Clerk
Brotherhood of Railway and Steamship
Clerks
1015 Vine St.
Cincinnati 2, Ohio

The Reporter
Fortnightly Publishing Co.
136 East 57th St.
New York 22, N. Y.

Research for Industry
Stanford Research Institute
Menlo Park, Calif.

Rubber World
Bill Bros. Publishing Corp.
1309 Noble St.
Philadelphia, Pa.

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

Scientific American
Scientific American, Inc.
2 West 45th St.
New York 36, N. Y.

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

Steel Labor
United Steel Workers of America
2457 East Washington St.
Indianapolis 7, Ind.

Systems Magazine
315 Fourth Ave.
New York, N. Y.

Taylor Technology
Taylor Instrument Cos.
Rochester 1, N. Y.

Tech Engineering News
Massachusetts Institute of Technology
Walker Memorial
Cambridge 39, Mass.

Technical News Bulletin
National Bureau of Standards
Washington, D. C.

Time
Time, Inc.
Time-Life Bldg.
New York 10, N. Y.

Tooling and Production
Louisville, Ky.

APPENDIX D

NAMES AND ADDRESSES OF PUBLISHING ORGANIZATIONS

CITED IN BIBLIOGRAPHY

American Bankers Association
Bank Management Commission
12 East 36th St.
New York 16, N. Y.

Council for Technological Advancement
120 South La Salle St.
Chicago 3, Ill.

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

D. Van Nostrand Co., Inc.
250 Fourth Ave.
New York, N. Y.

Automation Consultant, Inc.
1450 Broadway
New York 18, N. Y.

Editorial Research Reports
1205 - 19th St., NW.
Washington 6, D. C.

The Bureau of National Affairs, Inc.
1231 - 24th St., NW.
Washington, D. C.

Engineering Publishers
G. P. O. Box 1151
New York 1, N. Y.

Columbia University Press
Morningside Heights
New York, N. Y.

Ford Motor Co.
Detroit, Mich.

Congress of Industrial Organizations
CIO Committee on Economic Policy
718 Jackson Pl., NW.
Washington 6, D. C.

General Electric Corp.
Schenectady, N. Y.

Controllership Foundation, Inc.
2 Park Ave.
New York 16, N. Y.

General Mills, Inc.
Mechanical Division
Engineering Research Dept.
2003 East Hennepin Ave.
Minneapolis 13, Minn.

Division of Research
Graduate School of Business
Administration
Harvard University
Boston, Mass.

Haskins and Sells
67 Broad St.
New York, N. Y.

Industrial Relations Newsletters, Inc.
230 West 41st St.
New York, N. Y.

Industrial Relations Research
Association
University of Wisconsin
Madison 6, Wis.

Instruments Publishing Co.
845 Ridge Ave.
Pittsburgh 12, Pa.

International Brotherhood of Teamsters,
Chauffeurs, Warehousemen & Helpers
of America (AFL),
25 Louisiana Ave., NW.
Washington, D. C.

International Business Machines Corp.
590 Madison Ave.
New York, N. Y.

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

Joint Committee on the Economic
Report
Congress of the United States
(84th Cong.)
Washington, D. C.

League for Industrial Democracy
112 East 19th St.
New York 3, N. Y.

Minneapolis-Honeywell Regulator Co.
Brown Instruments Division
Philadelphia, Pa.

National Association of Manufacturers
2 East 48th St.
New York 17, N. Y.

National Industrial Conference Board
247 Park Ave.
New York 17, N. Y.

New York State Department of
Commerce
Albany, N. Y.

Office of Technical Services
U. S. Department of Commerce
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Public Affairs Press
2162 Florida Ave., NW.
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Society of Actuaries
208 South La Salle St.
Chicago 4, Ill.

Society of Automotive Engineers,
Inc.
29 West 39th St.
New York 18, N. Y.

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Rockefeller Center
630 Fifth Ave.
New York 20, N. Y.

U. S. Department of the Interior
Bureau of Reclamation
Denver Federal Center, Bldg. 53
Denver 2, Colo.

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Menlo Park, Calif.

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Spring Park, Minn.

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

UAW-CIO Education Dept.
Solidarity House
Detroit 14, Mich.

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Washington 9, D. C.

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