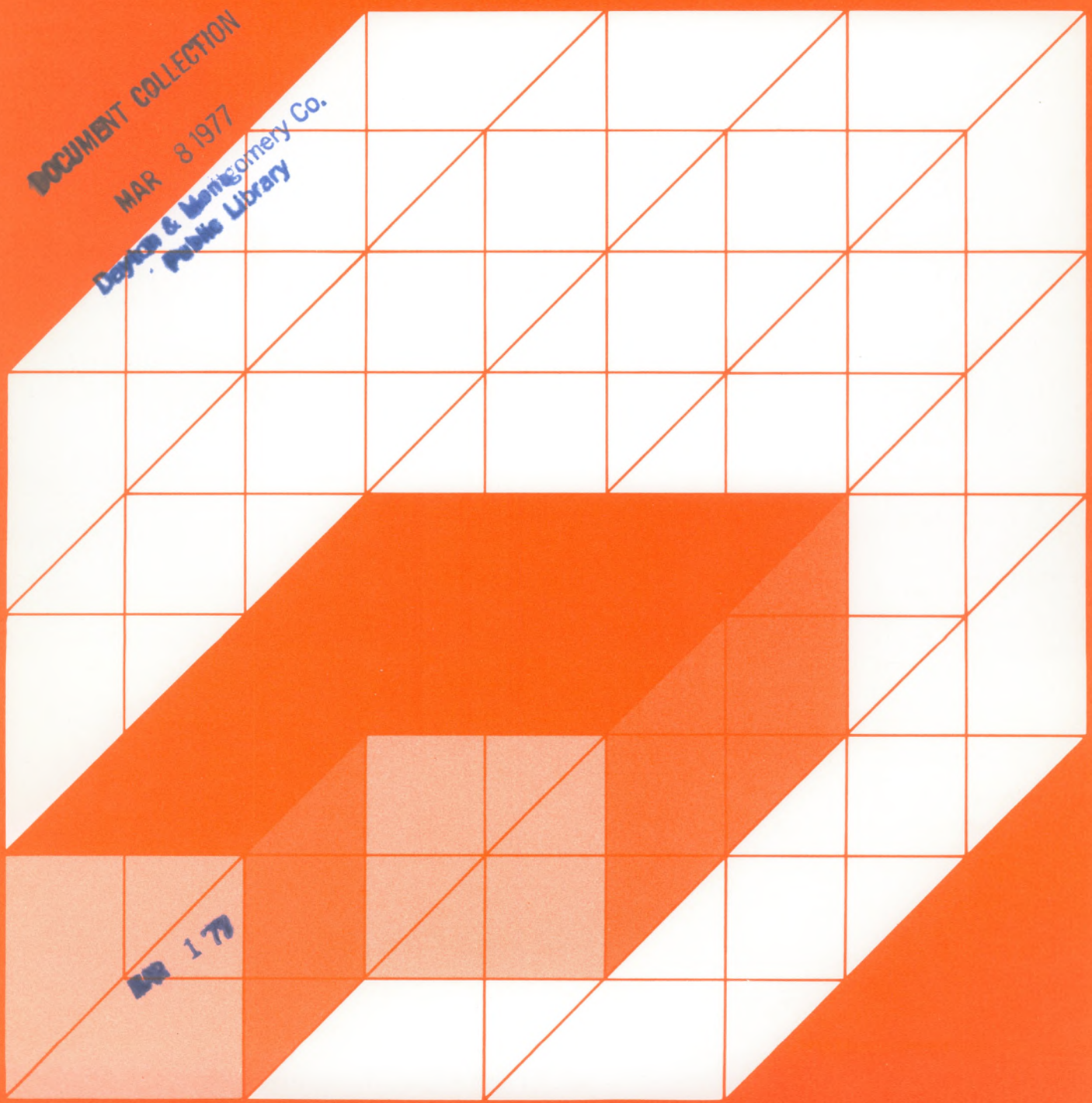
Productivity: A Selected, Annotated Bibliography, 1971-75

U. S. Department of Labor
Bureau of Labor Statistics

Bulletin 1933
1977



Productivity: A Selected, Annotated Bibliography, 1971-75

U. S. Department of Labor
Ray Marshall, Secretary

Bureau of Labor Statistics
Julius Shiskin, Commissioner

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Stock No. 029-001-01982-3

Preface

Productivity—the relation between physical output and input—has been studied for many years in the Bureau of Labor Statistics. Such studies and research are conducted in the Bureau's Office of Productivity and Technology. The interest in productivity derives from a number of concerns—the pace of technological change and its effects on employment and skills; the trend in prices and costs; and the rate at which additional goods and services become available. Thus, the study of productivity is essential to understand the factors giving rise to variations in income and wealth, and to determine economic policy.

This bibliography, the fourth in a series, is intended to facilitate such study. It covers a large selection of books and articles that were published between 1971 and 1975. It provides annotated references for nearly 1,000 publications dealing with concepts and methods, measurement of levels and trends, the sources of productivity change (such as technology and economic growth), and the relation of productivity to the economy as a whole and to economic variables such as wages and prices. The previous BLS bibliographical bulletins on productivity include Bulletin 1226 (1958), Bulletin 1514 (1966), and Bulletin 1776 (1971).

Major sources drawn upon were the U.S. Department of Labor Library accessions list; the *Journal of Economic Literature*; and *Dissertation Abstracts International–Humanities and Social Sciences*, published by Xerox University Microfilm, Ann Arbor, Michigan.

Barbara Koch and James Urisko, under the supervision of Horst Brand, in the Division of Industry Productivity Studies, performed most of the work on this bibliography. Mary Robinson, James York, and James Mead also contributed.

Contents

Annotated Listing

Concepts and methods

1.001 Allen, R. G. D. *Index Numbers in Theory and Practice.* Chicago, Aldine, 1975. 278 pp.

A comprehensive text covering the design, construction, and use of index numbers, including detailed discussions of problems encountered, and much illustrative material.

1.002 "Alternative Calculations of Constant Dollar GNP." *Survey of Current Business,* Vol. 52, No. 10, October 1972, p. 6. Also Vol. 54, No. 9, September 1974, p. 6.

Discusses the effect of differing valuation periods on the trend in constant-dollar GNP.

1.003 Ardolini, Charles, and Hohenstein, Jeffrey. "Measuring Productivity in the Federal Government." *Monthly Labor Review,* Vol. 97, No, 11, November 1974, pp. 13-20. (also Reprint 3009)

The authors present the background of the current program of productivity measurement in the Federal sector; concepts; methods used; productivity trends; unit labor costs; measurement problems; and future plans.

1.004 Ardolini, Charles W. "Productivity Measurement in the Federal Sector." In *Selected Papers from the North American Conference on Labor Statistics, June 18-21, 1973.* U.S. Department of Labor, Bureau of Labor Statistics. Washington, U.S. Government Printing Office, 1973, pp. 146-149.

Describes the work performed in measuring productivity in the Federal sector. Discusses the history of the project and the findings. Concludes that future work involves extending the data base, expanding the coverage, and refining procedures.

1.005 Bandurski, Bruce L. "Ecology and Economics–Partners for Productivity." *The Annals of The American Academy of Political and Social Science.* Vol. 405, January 1973, pp. 75-94.

Asserts that when economics and ecology are integrated, they can provide the basic information needed to make astute decisions. Stresses the necessity to align mankind's laws with natural law in order to plan viable lifestyles. Believes that high productivity would result.

1.006 Baldwin, Robert E., and Weisbrod, Burton A. "Disease and Labor Productivity." *Economic Development and Cultural Change,* Vol. 22, No. 2, April 1974, pp. 414-435.

The authors examine the productivity effect of five parasitic diseases, focusing on schistosomiasis in particular. They conclude that parasitic infection has few statistically significant adverse effects on agricultural labor productivity, and offer several explanations for this finding.

1.007 Barr, Terry Noel. *The Constant Elasticity of Substitution Production Function and Its Applicability in Applied Research.* Doctoral dissertation presented to Washington State University, 1971. 140 pp.

Seeks to demonstrate the theoretical superiority of the CES function, and develops a technique for reducing its statistical complexity.

1.008 Beckman, M. J.; Sato, R.; and Shupack, M. "Alternative Approaches to the Estimation of Production Functions and of Technical Change." *International Economic Review,* Vol. 13, No. 1, February 1972, pp. 33-52.

The authors derive various types of production functions assuming neutral technical change, and a linear relationship between growth rates of the capital-labor ratio, the capital-output ratio, the wage rate, the profit rate, and the profit share. They apply these relationships to 2-digit industries.

1.009 Bergson, A. "Index Numbers and the Computation of Factor Productivity." *Review of Income and Wealth,* Vol. 21, No. 3, September 1975, pp. 259-278.

Deals with the problem of representing production possibilities by index number formulas. Focuses on intertemporal measures for a given country and on comparative measures for two countries at a given time.

1.010 Berki, Sylvester, E. *Hospital Economics.* Studies in Social and Economic Process. Lexington, Mass., Toronto, and London, D. C. Heath, 1972. 270 pp.

Analyzes hospital production processes, and reviews the literature on hospital outputs, productivity and efficiency, cost of operations and demand for and utilization of hospital services. Suggests restructuring medical sector to assure high quality and efficiency.

1.011 Boddy, Raford, and Gort, Michael. "Obsolescence, Embodiment, and the Explanation of Productivity Change." *Southern Economic Journal,* Vol. 40, No. 4, April 1974, pp. 553-562.

The authors derive new estimates of embodiment from the Solow-Cobb-Douglas approach. They find embodiment to be an important component of productivity change, contrary to the findings of prominent researchers.

1.012 Bogan, Elizabeth Chapin. *Investment Plans and Their Realization.* Doctoral thesis presented to Columbia University, 1971. 194 pp.

Develops a model of investment behavior to examine the determinants of capital appropriations and to explain deviations between actual and intended capital expenditures.

1.013 Boylan, Myles Gerald, Jr. *The Economics of Changes in the Scale of Production in the U.S. Iron and Steel Industry from 1900 to 1970.* Doctoral dissertation presented to Case Western Reserve University, 1974. 383 pp.

Reviews the concepts and sources of scale economies. Examines various analytical techniques. Designs a model to focus on scale economies at the subplant level.

1.014 Briscoe, Geoffrey, and O'Brien, Peter. "Recent Research on Capacity Utilization in the United Kingdom: A Survey." *Bulletin of Economic Research,* Vol. 24, No. 1, May 1972, pp. 33-41.

The authors outline conceptual difficulties surrounding the measurement of capacity utilization, discuss recently employed statistical methods and the use to which the statistics have been put. They make suggestions for further study.

1.015 Brite, R. L. "Scale and the Elasticity of Substitution in Cross-Section Production Functions." *Journal of Economics and Business,* Vol. 25, No. 2, Winter 1973, pp. 101-106.

Tests the effects of scale on the elasticity of substitution, assuming a constant capital-labor ratio. Estimates of elasticity of substitution for 3-digit SIC's are computed. Concludes that it is impossible to reject the hypothesis that the elasticity of substitution is equal to unity.

1.016 Brody, A., and Carter, A. P. eds. *Input-Output Techniques.* Proceedings of the Fifth International Conference on Input-Output Techniques, Geneva, January 1971. New York, American Elsevier, 1972. 600 pp.

A collection of papers reporting on the developments in, and applications of, input-output techniques throughout the world. Papers stress structural analyses of such areas as demography, occupational transition, and urban problems; international and interregional trade; methods of forecasting technological change; and theoretical aspects of input-output analysis. Applications in various countries are also discussed.

1.017 Carlsson, Bo Axel Wilhelm. *The Measurement of Efficiency in Production: An Application to Swedish Manufacturing Industries, 1968.* Doctoral dissertation presented to Stanford University, 1972. 173 pp.

Discusses various definitions of efficiency. Defines the notion of inefficiency. Offers various efficiency measures.

1.018 Chawdhry, Muhammad Arshad. *Effect of Land Tenure on Resource Use and Productivity in Agriculture: A Case Study of Punjab, Pakistan.* Doctoral dissertation presented to the University of Illinois at Urbana–Champaign, 1974. 149 pp.

Investigates the relationship between land tenure status of farm operators and their level of use of inputs, cropping patterns, average yields, farm income and productivity. Establishes the superiority of owner-operated farms.

1.019 Christensen, Laurits R. "Concepts and Measurement of Agricultural Productivity." *American Journal of Agricultural Economics,* Vol. 57, No. 5, December 1975, pp. 910-915.

Discusses certain measurement issues, including index number procedures, value added vs. gross output, and underlying economic assumptions.

1.020 Cline, Philip Lee. *Sources of Productivity Change in United States Agriculture.* Doctoral dissertation presented to Oklahoma State University, 1975. 185 pp.

Identifies and analyzes sources of productivity change, 1939-1972. Investigates the contribution of research and extension activity, the weather, and farmers' educational level. The role of the public sector in stimulating technical change is also examined.

1.021 Crane, Garry Mitchell. *Economic Effects of an Improved Measurement: Microeconomic Approach to a Technological Change.* Doctoral dissertation presented to The George Washington University, 1971. 166 pp.

Addresses the question as to whether there is a theoretical method for analyzing the economic effects of improved physical measurements, and whether their economic value can be estimated. Investigates the impact of the introduction of quantitative chemical analysis of stainless steel on the reduction of wastage in the industry.

1.022 Creamer, Daniel. "Measuring Capital Input for Total Factor Productivity Analysis: Comments by a Sometime Estimator." *Review of Income and Wealth,* Vol. 18, No. 1, March 1972, pp. 55-78.

Assesses the estimating procedures used to measure capital inputs. Suggests that the stock of capital should be measured so as to exclude the contribution of technological progress to its growth.

1.023 Czamanski, Daniel Zeew. *A Study of Productivity of Expenditures on Municipal Preventive Services, The Case of Fire Departments.* Doctoral dissertation presented to Syracuse University, 1975. 175 pp.

Develops a concept of "preventive efficiency," based on minimizing costs of providing "preventive" services and the probability of damages due to inadequate levels of protection.

1.024 Davis, Karen, and Russell, L. B. "The Substitution of Hospital Outpatients Care for Inpatient Care." *Review of Economics and Statistics,* Vol. 54, No. 2, May 1972, pp. 109-120.

The authors estimate inpatient and outpatient demand for hospital care. They conclude that policymakers of national health insurance plans cannot count on near-zero elasticities.

1.025 Denison, Edward F. "Classification of Sources of Growth." *Review of Income and Wealth,* Vol. 18, No. 1, March 1972, pp. 1-25.

Formulates guidelines for classifying the determining factors in economic growth. Argues that any such classification must identify cause and effect relationships, and that factors which do not change over time do not contribute to economic growth.

1.026 Denison, Edward F. "Final Comments." *Survey of Current Business,* Vol. 52, No. 5, Part II, May 1972, pp. 95-109.

Presents a response to the article by Jorgensen and Griliches, "Issues in Growth Accounting: A Reply to Edward F. Denison," in the same issue.

1.027 Denison, Edward F. "Some Major Issues in Productivity Analysis: An Examination of Estimates by Jorgenson and Griliches." Reprinted from *Survey of Current Business,* Part II, May 1969. In *Survey of Current Business,* Vol. 52, No. 5, Part II, May 1972, pp. 37-63.

Comments on an article by Jorgenson and Griliches in the same issue. Examines reasons why large differences exist between these authors' findings and his own concerning output per unit of input over time.

1.028 Devindra, Sharma, and Ram, Rati. "Suggestions for Treatment of Human Capital in National Accounts, with Illustrations from Indian Data." *The Review of Income and Wealth,* Ser. 20, No. 4, December 1974, pp. 501-514.

The authors argue for the restructuring of the national accounts so that human capital formation is treated as investment rather than consumption. They suggest schooling as a point to start the revision.

1.029 Eisner, Robert. "Components of Capital Expenditures: Replacement and Modernization Versus Expansion." *Review of Economics and Statistics,* Vol. 54, No. 3, August 1972, pp. 297-305.

Analyzes variability and determinants of expenditures for replacement and modernization, and for expansion, using McGraw-Hill survey data. Concludes that expansion expenditures were related to past and expected sales changes, while replacement and modernization expenditures were related to depreciation charges and profits.

1.030 Elkan, P. G. "Protection and Productivity in Manufacturing: A Closer Look." *The Economic Record,* Vol. 48, No. 122, June 1972, pp. 161-180.

Examines the influence of manufactured imports on domestic manufacturing productivity. Develops a model where productivity is a function of demand, the level of industry output and the level of competing imports. Concludes that the optimal rate structure of tariffs can be derived on the basis of these variables.

1.031 Else, P. K. "The Demand for Factors of Production: A Graphical Analysis." *Bulletin of Economic Research,* Vol. 23, No. 1, May 1971, pp. 24-34.

Explores the implications of the downward sloping demand curve for factor inputs in a two-factor model. Analyzes the effect of changing factor prices, output levels, and competitive conditions on the demand for the factors of production. Concludes that when there is imperfect competition in the factor market, no general statement can be made about the shape of the firm's demand curve for inputs.

1.032 Emanuel, Carlos J. *Input-Output Analysis in Underdeveloped Countries: The Case of Ecuador.* Doctoral thesis presented to the University of South Carolina, 1972, 218 pp.

Develops input-output tables for practical application in economic planning.

1.033 Fabricant, Solomon. "Perspective on Productivity Research." *Review of Income and Wealth,* Vol. 20, No. 3, September 1974, pp. 235-249.

Raises questions about the significance of the current revisions in economic growth attributable to gains in productivity. Highlights the data, concepts, and methods that underlie the productivity estimates and offers suggestions for further research.

1.034 Finn, John Joseph. *Hospital Cost Analysis/ A Simulation Model of an Obstetrical Unit.* Doctoral dissertation presented to the State University of New York at Albany, 1975. 186 pp.

Views the hospital as producing varied intermediate goods, combined by the physician to produce a final output-needed medical care. Develops a cost model for the maternity unit to demonstrate his method, and finds that economies of scale exist in such units.

1.035 Fischer, S. "Money and the Production Function." *Economic Inquiry,* Vol. 12, No. 4, December 1974, pp. 517-533.

Constructs a model in which money is treated as a factor of production. Discusses the implications of putting real balances into the production function.

1.036 Fisk, Donald M., and Winnie, Richard E. "Output Measurement in Urban Government: Current Status and Likely Prospects." *Social Science Quarterly,* Vol. 54, No. 4, March 1974, pp. 725-740.

The authors find that the state of the art varies greatly in the collection of both quantitative and qualitative data on local government output. Solid waste collection and recreation are two examples cited for the problems involved. Increased interest by various groups may lead to better, affordable methods of data collection by local government.

1.037 Førsund, F. R., and Hjalmarsson, L. "On the Measurement of Productive Efficiency." *Swedish Journal of Economics,* Vol. 76, No. 2, June 1974, pp. 141-154.

The authors seek to clarify the notion of efficiency derived from production functions. They consider static efficiency measures in conditions of structural change based on putty-clay production structures and embodied technical progress.

1.038 Gay, David Edward Ryan. *Capital and the Production Process: A Critical Evaluation of the Boehm-Bawerk–Clark Debate and Its Relation to Capital Theory.* Doctoral dissertation presented to Texas A&M University, 1973, 237 pp.

Presents a model of the capital theory of each protagonist in the debate. Discusses the significance of the debate.

1.039 Griliches, Zvi, and Rindstad, Vidar. *Economies of Scale and the Form of the Production Function: An Econometric study of Norwegian Manufacturing Establishment Data.* Amsterdam and London, North-Holland, 1971. 204 pp.

The authors explore the potential for utilizing microeconomic data as a basis for econometric analyses of production functions.

1.040 Greenfield, Harry I. *Hospital Efficiency and Public Policy.* Praeger Special Studies in U.S. Economic, Social, and Political Issues. New York, Praeger, in cooperation with the Center for Policy Research, Inc., 1973. 80 pp.

Reviews the meaning and measurement of efficiency in hospitals. Suggests ways of promoting this efficiency.

1.041 Gutierrez-Sanchez, Elias Ruben. *Factor Proportions, Technology Transmission, and Unemployment in Puerto Rico.* Doctoral thesis presented to Cornell University, 1973. 183 pp.

Examines the relation between factor endowments and changing factor prices under the pressure of the U.S. Federal minimum wage, and the effects on the employment-generating capacity of the manufacturing sector.

1.042 Halstead, Donald Paul. *An Analysis of the Economic Effects of Free Trade between Canada and the United States.* Doctoral dissertation presented to The Florida State University, 1974. 169 pp.

Constructs a measure of U.S.-Canadian comparative advantage. Presents estimates consistent with the cost and productivity findings of previous studies. Develops a model to estimate the effect of free trade agreements.

1.043 Hansen, B. "A Proposed Real Net Output Index: A Comment." *Review of Economics and Statistics,* Vol. 56, No. 3, August 1974, pp. 415-416.

Finds Paul A. David's value-added index to be a good supplement to, but not a substitute for, the double-deflation method. David's index includes terms of trade gains and losses for the enterprise or industry studied, while the double-deflation method separates terms of trade gains or losses from changes in physical production, allowing measurement of physical productivity of primary factors. Concludes that the two indexes are not contradictory, and are relevant for different purposes.

1.044 Hatry, Harry P., and Fisk, Donald M. *Improving Productivity and Productivity Measurement in Local Governments.* Prepared for the National Commission on Productivity. Washington, D.C., June 1971. 73 pp.

The authors survey the major technical problems in measuring local government productivity, as well as current measurement practices. They present illustrative productivity improvement possibilities.

1.045 Hertzberg, Marie P., and others. "The Utilization of Manufacturing Capacity, 1965-1973." *Survey of Current Business,* Vol. 54, No. 7, July 1974, pp. 47-57.

The authors introduce a new statistical series on capacity utilization. They discuss the uses of capacity utilization measures, and their meaning and measurement.

1.046 Hsiao, F. S. T. "On the Social and Private Laws of Diminishing Returns." *Zeitschrift für die Gesante Staatswissenschaft*, Vol. 131, No. 1, January 1975, pp. 106-112.

Derives the relationship between diminishing returns in different sectors and diminishing returns for the economy as a whole. Shows that the relation between the two depends on the proportion of capital used in each sector, the distributive shares of labor, and the elasticities of substitution. Concludes that the balanced growth theory is valid.

1.047 Hu, S. C. "On Embodiment and Disembodiment." *Australian Economic Papers,* Vol. 11, No. 19, December 1972, pp. 210-219.

Explores the long-run implications of the embodiment hypothesis. Contrasts the short-run behavior of an economy with embodied technical progress and one with disembodied technical progress. Concludes that investment is not more profitable in the embodied case.

1.048 Jarkovsky, V. "The Dynamic Determination of Economically Efficient Capital Investment and New Technology." *Eastern European Economics,* Vol. 11, No. 4, Summer 1973, pp. 86-112.

Discusses the relation between centralized planning of the economy and the efficiency requirements of the individual production unit. Sets up criteria for these requirements, taking the influence of price levels and international economic developments into account. Proposes certain efficiency indicators, especially computed interest.

1.049 Jorgenson, Dale W., and Griliches, Zvi. "Divisia Index Numbers and Productivity Measurement." *The Review of Income and Wealth,* Vol. 17, No. 2, June 1971, pp. 227-229.

The authors attack criticisms of Divisia index numbers. They conclude that these indexes provide a satisfactory basis for measurement of total factor productivity.

1.050 Jorgenson, Dale W., and Griliches, Zvi. "Issues in Growth Accounting: A Reply to Edward F. Denison." *Survey of Current Business,* Vol. 52, No. 5, Part II, May 1972, pp. 65-94.

The authors present further explorations on the relation of input and output, and the productivity "residual," comparing their approach to Denison's.

1.051 Jorgenson, Dale W., and Griliches, Zvi. "The Explanation of Productivity Change." Reprinted with corrections from *The Review of Economic Studies,* Vol. 34, No. 99, July 1967. In *Survey of Current Business,* Vol. 52, No. 5, Part II, May 1972, pp. 3-36.

The authors examine the hypothesis that growth in total output is largely explained by growth in total input, and that if real product and real factor input are accurately accounted for, the observed growth in total factor productivity is negligible.

1.052 Jorgenson, Dale W.; Griliches, Zvi; and Denison, Edward F. *The Measurement of Productivity.* Washington, D. C., The Brookings Institution, 1972. 111 pp.

The authors continue the debate whether postwar economic growth resulted from increased productivity or increased factor inputs. Revised estimates bring the two theories closer together but substantial differences remain on the treatment of capital.

1.053 Kelley, A. C., and Williamson, J. G. "Sources of Growth Methodology in Low Income Countries: A Critique." *Quarterly Journal of Economics,* Vol. 87, No. 1, February 1973, pp. 138-147.

The authors criticize the sources of growth methodology for determining the importance of capital formation in economic growth. They find capital formation to be an important element in economic growth. They conclude that low income countries should not be misled into believing that capital accumulation is of minor importance.

1.054 Kendrick, John W. "The Treatment of Intangible Resources as Capital." *Review of Income and Wealth,* Vol. 18, No. 1, March 1972, pp. 109-125.

Describes the results of his research on total investment and capital stock, tangible as well as intangible, and its implications for the growth of factor productivity and real GNP. Summarizes some preliminary findings.

1.055 Klein, R. W. "A Dynamic Theory of Comparative Advantage." *American Economic Review,* Vol. 63, No. 1, March 1973, pp. 173-184.

Incorporates into the conventional production function the comparative advantage resulting from research and development.

1.056 Kretzmann, Al. "Productivity and the Balance of Trade: Conditions for Improvement." *The American Economist,* Vol. 18, No. 2, Fall 1974, pp. 113-117.

Provides a framework for analyzing probable balance-of-trade effects of various types of productivity increases. Derives guidelines for selecting industries where productivity gains should be stimulated to enhance the terms of trade.

1.057 Lind, R. C., and Lipsky, J. P. "The Measurement of Police Output: Conceptual Issues and Alternative Approaches." *Law and Contemporary Problems,* Vol. 36, No. 4, Autumn 1971, pp. 566-588.

The authors discuss the conceptual and practical difficulties of defining and measuring police output. They argue that police services are not a final output but are intermediate to the overall production of law enforcement. A number of approaches to the measurement of police output are examined.

1.058 Lovell, C. A. Knox. "CES and VES Production Functions in a Cross-Section Context." *Journal of Political Economy,* Vol. 81, No. 3, May-June 1973, pp. 705-720.

Tests the usefulness of CES vs. VES production functions. Finds both to be unnecessary generalizations of the Cobb-Douglas form for industries with stable relative factor shares. Finds that, for industries requiring generalization of the Cobb-Douglas form, the CES specification appears more useful.

1.059 Lundberg, Erik. "Simon Kuznets' Contribution to Economics." *The Swedish Journal of Economics,* Vol. 73, No. 4, December 1971, pp. 444-461.

Reviews the scientific methods and achievements of Simon Kuznets.

1.060 McDevitt, Paul Killian. *A Theoretical and Empirical Analysis of Returns to Scale, Total Cost Determination, and Labor Productivity Change in Urban Mass Transit, with Special Reference to New Orleans.* Doctoral dissertation presented to Tulane University, 1974. 129 pp.

Constructs a Cobb-Douglas production function model to analyze factors affecting the performance of a mass transit system. Comments on the factors influencing unit costs and labor productivity.

1.061 Madduri, V. B. "An Empirical Investigation of Jorgenson's Hypothesis." *Economic Development and Cultural Change*, Vol. 22, No. 3, April 1974, pp. 485-488.

Tests the Jorgenson hypothesis that the increase in the share of savings depends on a significant increase in the agricultural surplus but not on the presence or absence of disguised unemployment. Studies such a relationship in the Indian economy for 1953-65, upholding the Jorgenson hypothesis.

1.062 Matluck, Edward Mark. *Factor Demand Functions in the Manufacturing and Nonmanufacturing Industries: A Dynamic Approach.* Doctoral dissertation presented to New York University, 1974. 207 pp.

Investigates the demand for labor and capital. Formulates a set of demand functions which depict the input accumulation process. Finds that input adjustment behaves differently in various industries as a result of each industry's particular characteristics.

1.063 Mehay, S. L. "Police and Productivity: Can the Invisible Hand of Competition Extend the Long Arm of the Law?" *Federal Reserve Bank of Philadelphia Business Review,* May 1973, pp. 3-12.

Recommends that police resources be allocated on the basis of cost weights, reflecting the social costs of crime. Also discusses the contracting-out of police functions to private firms.

1.064 Merrilees, William John. *The Measurement and Explanation of Biased Technical Progress.* Doctoral thesis presented to the University of Toronto, 1973. (No page numbers given.)

Surveys existing measures and theories bearing on the subject. Attempts to rectify paucity of empirical tests by developing such tests for selected Canadian manufacturing industries, 1940-69.

1.065 Minguet, A. "Substitution and Output Effects in the Neoclassical Theory of the Firm under Imperfect Competition." *European Economic Review,* Vol. 6, No. 1, January 1975, pp. 39-57.

Attemps to show how imperfect product markets affect factor substitution and output levels. Derives implications for defining substitutability and complementarity between inputs.

1.066 Mundel, Marvin E. *Measuring and Enhancing The Productivity of Service and Government Organizations.* Tokyo, Asian Productivity Organization, 1975. 296 pp.

Discusses ways of determining and measuring outputs, and other managerial questions, including the quantification of service outputs, work measurement, and work load forecasting. Presents applications to hospitals, legal firms, meat inspections, and other service units or organizations.

1.067 Murthy, N. R. Vasudeva. *Output and Sources of Economic Growth in the Indian Economy: 1950-51 to 1964-65.* Doctoral dissertation presented to the State University of New York at Binghamton, 1974. 163 pp.

Analyzes the performance of the economy in relation to potential output. Develops capital-output ratios for aggregate and sectoral production functions. Identifies the sources of growth in terms of total factor productivity and factor accumulation.

1.068 Nadiri, M. Ishaq, and Rosen, Sherwin. *A Disequilibrium Model of Demand for Factors of Production.* New York, N.Y., Columbia University Press for the National Bureau of Economic Research, 1974. 200 pp.

The authors analyze interdependent adjustment among factor input stocks and utilization rates to test lagged responses of input stocks to output changes. They find consistent lag patterns for spceific inputs or utilization rates across industries. They demonstrate that sales dominate over factor-cost ratios in the short run in explaining input response to output changes.

1.069 National Bureau of Economic Research. *Economic Growth. Economic Research: Retrospect and Prospect.* New York, Columbia University Press, 1972. 92 pp.

Presents a discussion of the measurement of economic growth in terms of welfare-oriented concepts, rather than in terms of production or activity.

1.070 Nath, S. K. "Estimating the Seasonal Marginal Products of Labour in Agriculture." *Oxford Economic Papers,* Vol. 26, No. 3, November 1974, pp. 375-387.

Argues that busy-season and slack-season labor inputs must be treated as distinct variables in developing production functions for backward agricultural economies. Using data from the Punjab, the author estimates seasonal marginal productivity coefficients of labor. Finds productivity of busy-season labor is always positive, while slack-season labor productivity seldom differs from zero.

1.071 National Commission on Productivity. *Conference on an Agenda for Economic Research on Productivity*. April 1973, Washington, D.C., 1973. 67 pp.

Presents papers on such subjects as the measurement of productivity; the relation of productivity and research; managing adjustments to technological change; and the relation of productivity to economic growth and inflation.

1.072 National Commission on Productivity. *Opportunities for Improving Productivity in Police Services.* Report of the Advisory Group on Productivity in Law Enforcement. Washington, D.C., 1973. 76 pp.

Discusses problems of measuring police services, as well as such subjects as the measurement of patrol productivity, productivity in crime prevention programs, and the managing of police personnel.

1.073 National Commission on Productivity. *Opportunities for Improving Productivity in Solid Waste Collection.* Report of the Solid Waste Management Advisory Group. Washington, D.C., 1973. 46 pp.

Discusses the measurement of collection productivity, major collection problems, and tools for productivity improvement. Presents recommendations.

1.074 National Commission on Productivity and Work Quality. *Improving Municipal Productivity: Work Measurement for Better Management.* Washington, D.C., November 1975. 34 pp.

Describes analytical techniques for methods improvement and work measurement. Outlines applications and implementation.

1.075 Newland, Chester A., editor, and others. "Productivity in Government: A Symposium." *Public Administration Review,* Vol. 32, No. 6, November/December 1972, pp. 739-852.

Presents articles on such subjects as the meaning and measures of productivity; productivity measures in the Federal Government; management effectiveness in the Federal Government; productivity measures for local governments; public capital expenditures and productivity advance; etc.

1.076 Nishimizu, Mieko. *Total Factor Productivity Analysis: A Disaggregated Study of the Post-War Japanese Economy with Explicit Consideration of Intermediate Inputs, and Comparison with the United States.* Doctoral dissertation presented to The Johns Hopkins University, 1975. 270 pp.

Presents total factor productivity measures for ten industries with the labor input adjusted for quality change. Disaggregates the contributions to growth from productive inputs and technological change.

1.077 Ohta, Makoto. "Production Technologies of the U.S. Boiler and Turbo-generator Industries and Hedonic Price Indexes for Their Products: A Cost Function Approach." *Journal of Political Economy,* Vol. 83, No. 1, February 1975, pp. 1-26.

Analyzes production technologies as part of computing hedonic price indexes for the industry.

1.078 Ostrom, Elinor. "Exclusion, Choice and Divisibility: Factors Affecting the Measurement of Urban Agency Output and Impact." *Social Science Quarterly,* Vol. 54, No. 4, March 1974, pp. 691-699.

Discusses how the costs of excluding potential beneficiaries, the degree of choice in whether to consume the product or not, and the divisibility of the product all affect the availability and validity of agency records for use in measuring output.

1.079 Peet, Richard. "Von Thuenen Theory and the Dynamics of Agricultural Expansion." *Explorations in Economic History,* Vol. 8, No. 2, Winter 1970-71, pp. 181-201.

Presents a detailed theoretical account of the formation and movement of systems of concentric agricultural zones around markets. Applies the von Thuenen model to the expansion of American agriculture in the northern United States.

1.080 Police Foundation. *National Conference on Productivity in Policing.* Co-sponsored by the

National Commission on Productivity and Work Quality. Washington, D.C., no date. 13 pp.

Summarizes statements concerning police productivity made at the conference.

1.081 "Productivity." *Defense Management Journal,* Vol. 8, No. 3, October 1972, pp. 1-35.

Features articles dealing with the measurement of productivity in the Federal Government, means of applying productivity analysis to improving efficiency, work measurement, etc.

1.082 "Productivity in the Federal, State, and Local Community." *The Federal Accountant.* (Proceedings of the Williamsburg Symposium, December, 1974.) Vol. 24, No. 1, March 1975, pp. 1-64.

Presents articles on productivity issues in government, and summaries of symposium workshops.

1.083 Rawski, T. G. "Chinese Industrial Production, 1952-1971." *Review of Economics and Statistics*, Vol. 55, No. 2, May 1973, pp. 169-181.

Discusses methodological and statistical problems confronted in measuring China's industrial output. Computes an average annual growth rate of 12 percent for mining, manufacturing, and utilities between 1952 and 1971.

1.084 Ringstad, Vidar. *Estimating Production Functions and Technical Change from Micro Data: An Exploratory Study of Individual Establishments. Time-Series from Norwegian Mining and Manufacturing 1959-1967.* Oslo, Central Bureau of Statistics of Norway, 1971. 226 pp.

Investigates the potential for using microeconomic data in production function estimation. Examines possible sources of bias and errors of measurement, and assays econometric methods to correct for them.

1.085 Ross, John P., and Burkhead, Jesse. *Productivity in the Local Government Sector.* Lexington, Mass., D. C. Heath & Co., 1974. 170 pp.

The authors discuss the problems of defining productivity and related concepts for public services. They survey the scope of the public sector and examine approaches to measuring outputs and inputs. A number of case studies are introduced.

1.086 Ross, John Perry. *Toward a Measure of Quality and Productivity in the Local Government Sector.* Doctoral dissertation presented to Syracuse University, 1973. 357 pp.

Examines concepts of productivity and problems of public sector productivity measurement. Reviews existing studies, which he finds faulty as to their appraisal of quality changes. Develops techniques for analyzing work load, costs, and quality, testing them by applying them to New York State and New York City.

1.087 Rymes, F. K. "The Measurement of Capital and Total Factor Productivity in the Context of the Cambridge Theory of Capital." *Review of Income and Wealth,* Vol. 18, No. 1, March 1972, pp. 79-108.

Argues against neoclassical measures of total factor productivity which do not consider the increasing efficiency of capital goods. Argues for measures which do not exhibit this deficiency.

1.088 Sargent, Thomas J., and Wallace, Neil. "The Elasticity of Substitution and Cyclical Behavior of Productivity, Wages, and Labor's Share." *American Economic Review,* Vol. 64, No. 2, May 1974, pp. 257-263.

The authors argue that the behavior of time series of output, capital, and labor has strong implications concerning the elasticity of substitution between capital and labor. They develop an econometric model in which output per employee-hour increases or decreases with employee-hours per unit of capital, depending on the range within which the straight-time real wage moves.

1.089 Smith, Anthony D. *The Measurement and Interpretation of Service Output Changes.* London, National Economic Development Office, March 1972. 181 pp.

Discusses conceptual and other difficiulties in measuring real output changes in service industries. Also discusses productivity changes in services, and intersectoral labor productivity changes.

1.090 Sveikauskas, Leo. "Bias in Cross-Section Estimates of the Elasticity of Substitution." *International Economic Review,* Vol. 15, No. 2, June 1974, pp. 522-528.

Argues that estimates of the elasticity of substitution from labor productivity-wage rate relationships are upwardly biased, and that after such bias is corrected, the elasticity of substitution is considerably less than one.

1.091 Sveikauskas, Leo. "The Productivity of Cities." *Quarterly Journal of Economics,* Vol. 89, No. 3, August 1975, pp. 393-413.

Argues that productivity is higher in large cities because of the dynamic effects of urban concentration. Develops a production function model which shows that increased city size is associated with gains in labor productivity. Concludes that modern economies are highly urbanized because of relatively high returns to scale in cities.

1.092 "Symposium on Productivity in Government." *Public Administration Review,* Vol. 32, No. 6, November/December 1972. Entire issue.

Features articles on productivity measurement problems, productivity management in the Federal Government generally, as well as in defense supply, and in certain States and localities and their agencies.

1.093 "The Push to Boost Government Productivity." *Business Week*, May 13, 1972, pp. 160-164.

Discusses the difficulties involved in measuring productivity in the government sector, and the new measurement efforts being undertaken.

1.094 Thirwall, A. P. "A Cross Section Study of Population and the Growth of Output and Per Capita Income in a Production Function Framework." *Manchester School of Economics and Social Studies,* Vol. 40, No. 4, December 1972, pp. 339-356.

Criticizes studies analyzing the effects of population control on per capita income when total factor productivity growth is held constant. Suggests that total productivity growth and population growth are positively related and if there is a decline in population growth there would be a lower rate of growth of output.

1.095 Tinbergen, Jan. "Substitution between Types of Labour in Production." *Giornale degli Economisti e Annali di Economia,* Vol. 32, No. 11-12, November-December 1973, pp. 933-939.

Discusses the need for production function theory to differentiate between types of labor. Derives elasticities of substitution between types of labor based on job performance required and education received.

1.096 Triplett, Jack E., and McDonald, Richard J. *Assessing the Quality Error in Output Measures: The Case of Refrigerators.* BLS Working Papers. Washington, U.S. Department of Labor, Bureau of Labor Statistics, July 1975. 42 pp.

The authors compute indexes of output of refrigerators using hedonic methods to adjust for quality change. They find that price indexes rise more slowly when this method is applied.

1.097 U.S. Congress, Joint Economic Committee. *Federal Productivity.* Hearings Before the Sub-Committee on Priorities and Economy in Government, December 17 and 18, 1973. Washington, U.S. Government Printing Office, 1974. 99 pp.

Contains testimony on measuring and enhancing productivity in the government sectors by members of a task force and the National Commission on Productivity.

1.098 U.S. General Accounting Office. *Can Federal Productivity Be Measured?.* Washington, January, 1975. 23 pp.

Explains what productivity is, why its application can make government better, and how improvement of Federal productivity is being accomplished.

1.099 U.S. General Accounting Office and others. *Case Studies in Federal Productivity Change, FY 1967-1972.* Special Report No. 2, Washington, November 1973. 152 pp.

Presents analyses of such functions as citizens' records, loans and grants, reference services, overhaul and repair, etc. Also presents case studies of mail processing in certain agencies; internal revenue service branches; and others.

1.100 U. S. General Accounting Office, Joint Financial Management Improvement Program. *Proceedings of the Quality Measurement Workshop.* December, 1973. 90 pp.

Discusses approaches to quality measurement used by various private and government organizations, and the problems involved in developing measures of quality.

1.101 U.S. General Accounting Office and others. *Special Studies of Measurement Problems.* Vol. 1, *Measuring Research and Development and Grant Administration Programs.* Washington, October 1970. 270 pp.

Presents the results of a study by the Committee on Federal Laboratories of performance measures related to R & D output. Also reviews the pertinent literature, and presents an annotated

bibliography. In addition, the volume presents a discussion of methods for determining internal productivity measures of grants and awards administration, with applications to specific agencies.

1.102 U.S. General Accounting Office and others. *Special Studies of Measurement Problems.* Vol. 2, *Improving Work Measurement Systems in the Federal Sector.* Washington, October 1973. 134 pp.

Sets forth characteristics common to work measurement applications. Also provides guidance for the implementation and utilization of work measurement systems.

1.103 Omitted.

1.104 Ward, Richard A. *The Economics of Health Resources.* Reading, Mass., Addison-Wesley, 1975. 150 pp.

Summarizes the existing knowledge of health care delivery. Dicusses factors influencing medical care demand, and measurement of output and productivity.

1.105 Watrin, Christian. "On the Question of Measuring the Efficiency of Economic Systems." *The German Economic Review,* Vol. 11, No. 2, 1973, pp. 89-107.

Reviews the difficulties encountered in attempts to measure the static efficiency of economic systems. Highlights the theoretical models and the empirical results.

1.106 Weinrobe, Maurice. "Household Production and National Production: An Improvement of the Record." *Review of Income and Wealth,* Vol. 20, No. 1, March 1974, pp. 89-102.

Argues that economic growth is overstated because externalities are not accounted for, and no distinction is made between intermediate and final output. Also, nonmarket behavior is not measured. Presents estimates of housewives' production, concluding that its inclusion in the GNP would lower the growth rate.

Measures

Total economy and private sectors

2.001 Bieler, Thomas Albert. *The Contributions of the Primary Inputs to the Growth of the Tennessee Economy with a Partial Analysis of the Residual, 1950-1967.* Doctoral dissertation presented to The University of Tennessee, 1971. 168 pp.

Estimates the contributions of capital and labor to the aggregate growth of the State using a Cobb-Douglas production function and marginal productivity analysis. Finds the major factors contributing to productivity gains were the labor inputs, and the shift from agricultural to industrial employment. Asserts that the contributions of technology to growth were small.

2.002 Bosworth, Barry, and others. *Capital Needs in the Seventies.* Washington, D.C., The Brookings Institution, 1975. 85 pp.

The authors present estimates of future capital requirements in the American economy. They analyze the claims on output by sectors, as well as the financial market implications.

2.003 Calvo, G. A. "Efficient and Optimal Utilization of Capital Services." *American Economic Review,* Vol. 65, No. 1, March 1975, pp. 181-186.

Studies capacity utilization in the context of the one-sector neoclassical growth model. Demonstrates that efficient utilization is a decreasing function of the economy's capital-labor ratio.

2.004 Denison, Edward F. *Accounting for United States Economic Growth 1929-1969.* Washington, D.C., The Brookings Institution, 1974. 355 pp.

Extends the estimates and analysis of his earlier work. Finds that the postwar sources of growth have resided chiefly in more rapid capital accumulation, and acceleration in the growth of knowledge.

2.005 Denison, Edward F. "Has the Potential Output of the U.S. Economy Been Misstated?" *Monthly Labor Review,* Vol. 97, No. 12, December 1974, pp. 34-42.

Presents some results of a new approach to the estimation of potential output.

2.006 Denison, Edward F. "The Shift to Services and the Rate of Productivity Change." *Survey of Current Business,* Vol. 53, No. 10, October 1973, pp. 20-35.

Examines the shift in employment to the service sector and the possible retarding effect on U.S. productivity. Specific attention is given to households, government and institutions. Finds the concern over retarded productivity due to the employment shift to be exaggerated.

2.007 Gorman, John A. "Nonfinancial Corporations: New Measures of Output and Input." *Survey of Current Business,* Vol. 52, No. 3, March 1972, pp. 21-27, 33.

Studies productivity and costs of nonfinancial corporations. Reviews trends in output, input, and productivity since 1948 and discusses concepts and methodology.

2.008 Grossman, M., and Fuchs, V. R., "Intersectoral Shifts and Aggregate Productivity Change." *Annals of Economic and Social Measurement,* Vol. 2, No. 3, July 1973, pp. 227-243.

The authors analyze the effects of shifts in sector employment shares on secular trends and cyclical fluctuations in productivity. They find that the shift from industrial to service employment affects aggregate productivity changes in the short run rather than in the long run.

2.009 Humphrey, David Burras, and Moroney, J. R. "Substitution Among Capital, Labor, and Natural Resource Products in American Manufacturing." *Journal of Political Economy,* Vol. 83, No. 1, February 1975, pp. 57-82.

The authors present estimates of partial elasticities of substitution among reproducible capital, labor, and an input aggregate of natural resource products.

2.010 Interindustry Economics Division. "The Input-Output Structure of the U.S. Economy: 1967." *Survey of Current Business,* Vol. 54, No. 2, February 1974, pp. 24-56.

Presents detailed results, including extensive tables, of the study of input-output relations by the Bureau of Economic Analysis, Department of Commerce.

2.011 "Is the Shift to the Services Really a Drag?" *Business Week,* No. 2245, September 9, 1972, pp. 84-87.

Examines the productivity performance of the service sector. Examines factors which contribute to the low productivity in services.

2.012 Kendrick, John W. *Postwar Productivity Trends in the United States, 1948-1969.* National Bureau of Economic Research General Series 98. New York, Columbia University Press, 1973. 369 pp.

Presents and analyzes output, input, and productivity data for the economy as a whole and for major industry groups. Relates productivity change to changes in output, capital, education, R & D, etc. Discusses the extent to which postwar trends represent a continuation of earlier trends of a break with the past.

2.013 Kendrick, John W. "U.S. Productivity Trends." *The Conference Board Record,* Vol. 10, July 1973, pp. 45-49.

Discusses movements in total factor productivity and labor productivity in the U.S. for the post-World War II period. Presents data for major industries. Discusses the outlook.

2.014 Kutscher, Ronald E., and others. *The Structure of the U.S. Economy in 1980 and 1985,* BLS Bulletin 1831. U.S. Department of Labor, Bureau of Labor Statistics. Washington, U.S. Government Printing Office, 1975. 495 pp.

The authors present projections of gross national product, income and demand composition, input-output relations, productivity, and employment.

2.015 Kutscher, Ronald E. "The United States Economy in 1985: Projections of GNP, Income, Output, and Employment." *Monthly Labor Review,* Vol. 96, No. 12, December 1973, pp. 27-42.

Provides projections of the size and composition of the labor force; productivity; hours of work; gross national product and its sectoral distribution; industry output and employment.

2.016 Lambert, Leland Don. *Regional Trends in the Productivity of American Agriculture.* Doctoral dissertation presented to Michigan State University, 1973. 176 pp.

Describes the construction of new regional input data series and their combination with existing farm output series to generate regional productivity series. Considers major technologies as factors in productivity improvement.

2.017 Lianos, T. P. "The Relative Share of Labor in United States Agriculture, 1949-68." *American Journal of Agricultural Economics,* Vol. 53, No. 3, August 1971, pp. 411-422.

Analyzes the declining relative share of labor in the agricultural sector. Attributes the decline to the increasing capital-labor ratio adjusted for changing efficiency of factors, and to an elasticity of substitution greater than unity.

2.018 Moody, C. E., Jr. "The Measurement of Capital Services by Electrical Energy." *Oxford Bulletin of Economics and Statistics,* Vol. 36, No. 1, February 1974, pp. 45-52.

Argues the use of electrical energy data as a measure of capital services.

2.019 Moore, Geoffrey H. "New Developments in Labor Statistics." *Monthly Labor Review,* Vol. 95, No. 3, March 1972, pp. 3-13.

Reports on new or improved BLS statistical programs in the areas of prices, wages, employment, construction, productivity, occupational health and safety, and some prospective initiatives in these areas.

2.020 Moroney, J. R. *The Structure of Production in American Manufacturing.* Chapel Hill, University of North Carolina Press, 1972. 174 pp.

Presents an empirical analysis of American manufacturing, taking economies of scale, rate of technological progress, degree of factor substitution, and allocation of mobile resources into account.

2.021 Musgrave, John C. "Alternative Measures of Price Change for GNP, 1971-74." *Survey of Current Business,* Vol. 54, No. 8, August 1974, pp. 46-48.

Discusses revisions in the three measures of price change of the GNP used by the Bureau of Economic Analysis.

2.022 Musgrave, John C. "New Estimates of Fixed Nonresidential Business Capital in the United States, 1925-73." *Survey of Current Business,* Vol. 54, No. 3, March 1974, pp. 23-27.

Presents revised estimates of the nonresidential capital stock of U.S. business for 1966-70, and new estimates through 1973.

2.023 Niemi, A. W. "Structural and Labor Productivity Patterns in United States Manufacturing, 1849-1899." *Business History Review,* Vol. 46, No. 1, Spring 1972, pp. 67-84.

Examines the argument that American manufacturing shifted towards heavier industries of metals and machinery in the latter half of the 19th century. Uses empirical evidence to support this claim and to show that labor productivity growth closely coincided with the industry patterns of growth.

2.024 Nordhaus, William D. "The Recent Productivity Slowdown." *Brookings Papers on Economic Activity,* No. 3, 1972, pp. 493-535.

Develops a model of productivity for 12 sectors of the economy. Concludes that the slowdown in productivity growth is due to a shift in the composition of output toward low-productivity sectors, and that the dominant effect is the shift between industries of high and low levels of productivity rather than between industries with high and low rates of productivity growth.

2.025 Norsworthy, J. Randolph, and Fulco, Lawrence J. "Productivity and Costs in Perspective." *Monthly Labor Review,* Vol. 98, No. 11, November 1975, pp. 44-48.

The authors discuss recent trends in terms of postwar cycles. Trends for economic sectors and nonfinancial corporations are analyzed separately.

2.026 Ogg, Clayton Wallace. *Sources of Agricultural Productivity Differences in North America.* Doctoral thesis presented to the University of Minnesota, 1974. 134 pp.

Employs Cobb-Douglas production functions to account for national and regional gaps in farm productivity, and to analyze the efficiency of regional resource allocation.

2.027 Perry, George L. "Capacity in Manufacturing." *Brookings Papers on Economic Activity,* No. 3, 1973, pp. 743-756.

Compares the predictive performance of measures of capacity and operating rates in manufacturing—the FRB index, the Wharton School index, and two McGraw-Hill survey measures.

2.028 Perry, George L. "Labor Force Structure, Potential Output, and Productivity." *Brookings Papers on Economic Activity,* No. 3, 1971, pp. 533-65.

Explores the relation between the GNP and its proximate determinants—labor productivity, and potential man-hours of labor input.

2.029 Simon, Nancy W., and Ritz, Philip M. "Producers' Durable Equipment in the 1963 and 1967 Input-Output Studies." *Survey of Current Business,* Vol. 55, No. 2, February 1975, pp. 25-32.

The authors provide detailed information on the industry composition of producers' durable equipment output, including the trade and transportation costs associated with marketing the products of each industry category.

2.030 Söderström, H. T. "Cyclical Fluctuations in Labor Productivity and Capacity Utilization Reconsidered." *Swedish Journal of Economics,* Vol. 74, No. 2, June 1972, pp. 220-237.

Deals with the relation between output changes and movements in labor productivity. Derives from theoretical arguments and empirical data a "model pattern" of aggregate cyclical productivity behavior for Swedish industry.

2.031 Spielman, Heinz, and Weeks, Eldon E. "Inventory and Critique of Estimates of U.S. Agricultural Capacity." *American Journal of Agricultural Economics,* Vol. 57, No. 5, December 1975, pp. 922-927.

The authors assess the current status of research on agricultural capacity and the difficulties of estimating it. They offer suggestions for measuring capacity and capacity utilization in agriculture.

2.032 Taubman, P., and Gottschalk, P. "The Average Workweek of Capital in Manufacturing." *Journal of the American Statistical Association,* Vol. 66, No. 335, September 1971, pp. 448-455.

The authors derive a quarterly series on the workweek of capital in manufacturing on an SMSA basis from 1951 through 1968. They find that this series displays behavior different from that of the available capacity utilization indices.

2.033 Toevs, Alden Louis. *Input Substitution and Technological Change in U. S. Manufacturing Industries Using Natural Resource Products.* Doctoral dissertation presented to Tulane University, 1975. 180 pp.

Presents estimates of input substitution among capital, labor and natural resources. Computes the rates of technological change. Finds that, in many industries, capital is less readily substitutable than labor for natural resource products.

2.034 U.S. Department of Commerce, Bureau of Economic Analysis. *Fixed Nonresidential Business Capital in the United States, 1925-73.* A Supplement to the *Survey of Current Business.* Washington, National Technical Information Service, January 1974. 502 pp.

Presents annual estimates of gross and net capital stocks, depreciation, discards, and average ages of gross and net stocks by major industries and detailed types of equipment and structures.

2.035 U.S. Department of Labor, Bureau of Labor Statistics. *Productivity and the Economy.* Prepared for the National Commission on Productivity. Washington, U.S. Government Printing Office, 1973. 65 pp.

Presents graphs together with text covering output per employee-hour trends; the relation between productivity growth, prices, and costs; and some factors affecting productivity growth.

2.036 U.S. Department of Labor, Bureau of Labor Statistics. *The U.S. Economy in 1985: A Summary of BLS Projections.* Bulletin 1809. Washington, U.S. Government Printing Office, 1974. 64 pp.

Projects population, the labor force, changes in occupation, and gross national product, together with income and employment, to 1985. Discusses underlying assumptions, and certain implications for policy.

2.037 Uselding, P. J. "Factor Substitution and Labor Productivity Growth in American Manufacturing, 1839-1899." *Journal of Economic History,* Vol. 32, No. 3, September 1972, pp. 670-681.

Presents evidence on the proportion of observed labor productivity that can be attributed to factor substitution. Casts doubt on the validity of the simple version of the labor scarcity hypothesis which states that increasing capital intensity is responsible for observed productivity growth.

2.038 Walderhaug, Albert J. "The Composition of Value Added in the 1963 Input-Output Study." *Survey of Current Business,* Vol. 53, No. 4, April 1973, pp. 34-43.

Presents estimates of the composition of value added, by industry. Also shows how these data can be used to assay the impact of changes in GNP on the industrial composition of value added.

Industries

3.001 Almon, Clopper, Jr., and others. *1985: Interindustry Forecasts of the American Economy.* Lexington, Heath, 1974. 250 pp.

The authors refine the University of Maryland's model of the U.S. economy to project demand for specific products. Projections are based on input-output matrices, projections of productivity growth, and government fiscal policy.

3.002 Ardolini, Charles W. "Productivity Gains in 1972 in Selected Industries." *Monthly Labor Review*, Vol. 96, No. 7, July 1973, pp. 43-45.

Presents data on, and discusses, 1971-1972 movements in output per employee-hour indexes in selected industries. Notes a decelerating productivity growth in more than half of the industries studied.

3.003 Ball, Robert; Ludwig, Larry; and Finn, Joseph T. *Labor and Material Requirements for Construction of Private Single-Family Houses*, BLS Bulletin 1755. U.S. Department of Labor, Bureau of Labor Statistics, 1972. 30 pp.

The authors report on changes in onsite and offsite requirements of employee-hours, and analyze the occupational patterns of onsite requirements, as well as the characteristics of houses. They also examine the distribution of costs, and indirect employment requirements.

3.004 Ball, Robert. "Labor and Material Requirements for Apartment Construction." *Monthly Labor Review,* Vol. 98, No. 1, January 1975, pp. 70-73.

One in a series of construction labor requirement studies designed to evaluate the employment-generating effects of various types of construction activities. Presents data on employee-hours and jobs generated, onsite and offsite, per dollar of construction expenditure, and per square foot of space.

3.005 Ball, Robert. "Labor and Materials Required for Highway Construction." *Monthly Labor Review,* Vol. 96, No. 6, June 1973, pp. 40-45.

Estimates onsite and offsite manhours required per $1,000 of highway expenditures from 1958 to 1970. Finds that employee-hour requirements have dropped 30 percent.

3.006 Boylan, Myles G., Jr. *Economic Effects of Scale Increases in the Steel Industry; The Case of U.S. Blast Furnaces.* New York, Praeger, in cooperation with the Research Program in Industrial Economies of Case Western Reserve University, 1975. 218 pp.

Develops input-output relationships to show the effects of changes in scale, technology, and factor supplies on the costs of production. Demonstrates how large-scale operations result in cost savings and are applicable to other industries.

3.007 Brand, Horst. "Problems of Measuring Railroad Productivity." *Monthly Labor Review,* Vol. 97, No. 10, October 1974, pp. 26-32.

Presents a critical review of the report issued by the Task Force on Railroad Productivity. Emphasizes the measurement of

labor productivity change, the study of technological trends, and their impact on employment.

3.008 Brand, Horst. "Productivity in the Pharmaceutical Industry." *Monthly Labor Review,* Vol. 97, No. 3, March 1974, pp. 9-14.

Assesses productivity in the pharmaceutical industry, 1963-72. Discusses output and demand, employment, research, product development, technology, capital expenditures, and the outlook for the industry. Includes tables which compare output per employee-hour and related data, and occupational distribution in the pharmaceutical industry.

3.009 Brand, Horst, and Carnes, Richard B. "Productivity in Intercity Trucking: A Rejoinder." *Monthly Labor Review,* Vol. 97, No. 10, October 1974, pp. 45-47.

The authors refute certain criticisms of the BLS intercity trucking productivity measure.

3.010 Brand, Horst. "Productivity in Telephone Communications." *Monthly Labor Review,* Vol. 96, No. 11, November 1973. pp. 3-9.

Examines productivity trends and the factors affecting productivity change in the telephone communications industry. Argues that growth of demand for the services of the industry, and technological innovations have been major factors in productivity change over time.

3.011 Blair, Roger D.; Jackson, Jerry R.; and Vogel, Ronald J. "Economies of Scale in the Administration of Health Insurance." *Review of Economics and Statistics,* Vol. 57, No. 2, May 1975, pp. 185-189.

The authors argue that the administrative costs of health insurers decrease with firm size. They draw implications for national health insurance.

3.012 Canning, B. W. "Raising Productivity in Typing." *Industrial and Commercial Training,* Vol. 7, No. 1, January 1975, pp. 14-21.

Discusses the subject in light of possible improvements in typewriter machine design; design of inputs used by typists (such as the manuscript or audio cassette); improvements in letter layouts and layout of other typed documents; and relation of executive to typist.

3.013 Carey, John L. "Productivity in the Metal Cans Industry." *Monthly Labor Review,* Vol. 95, No. 7, July 1972. pp. 28-31.

Measures productivity growth in the metal cans industry from 1947 to 1971. Discusses factors contributing to this growth such as changing patterns in demand, improvements in technology and increases in capital expenditures.

3.014 Carey, John L. "Productivity in the Steel Foundries Industry." *Monthly Labor Review,* Vol. 96, No. 5, May 1973, pp. 8-11.

Traces the growth of output per employee-hour in the industry, 1954-1971. Reports that increased emphasis on quality control, the inability to mechanize many of the key production operations, and frequent changes in product specifications contributed to low productivity growth during the period.

3.015 Carnes, Richard B. "Productivity Trends in Intercity Trucking." *Monthly Labor Review,* Vol. 97, No. 1, January 1974, pp. 53-57.

Introduces two measures of productivity for the intercity trucking industry, 1954-72. Discusses key factors affecting demand for the industry's services, and major technological developments.

3.016 Christenson, C. L., and Andrews, W. H. "Physical Environment, Productivity, and Injuries in Underground Coal Mines." *Journal of Economics and Business,* Vol. 26, No. 3, Spring 1974, pp. 182-190.

The authors examine productivity and safety in relation to seam thickness in underground bituminous coal mines.

3.017 Contractors Mutual Association. *Projected Manpower Requirements for Power Plant Construction by Area and Craft, 1974-1980.* Washington, April 1975. 80 pp.

Presents detailed projections, by craft. Peak requirements are considered. Procedures are explained in detail.

3.018 Cuskaden, Charles M. *An Analysis of Worker Productivity in Apple Picking.* Doctoral dissertation presented to Michigan State University, 1971. 210 pp.

Investigates factors in the productivity of workers picking apples by hand, and being paid on a piece-work basis. Finds residence and experience to be the characteristics which differentiate slow from fast pickers.

3.019 Cuskaden, Charles M. "Labor Productivity in Apple Harvesting." *American Journal of Agricultural Economics,* Vol. 55, No. 4, November 1973, pp. 633-636.

Analyzes factors related to the productivity of workers being paid on a piecework basis for hand harvesting apples. Argues that by identifying worker characteristics associated with higher labor productivity, growers could recruit the more productive workers.

3.020 Daicoff, Darwin W. "Analyzing 'Productivity Trends in Intercity Trucking.'" *Monthly Labor Review,* Vol. 97, No. 10, October 1974, pp. 41-45.

Criticizes and attempts to refine the BLS's measure of productivity trends in intercity trucking.

3.021 Doyle, Phillip M. "Wages and Productivity Rise in Flour Mills as Employment Declines." *Monthly Labor Review,* Vol. 96, No. 10, October 1973, pp. 51-52.

Reports that output over the 1967-1972 period remained practically unchanged while man-hours dropped due to automation and improved materials-handling systems.

3.022 Ebert, Robert R. "Economies of Scale in the Automobile Industry: A Case Study of Studebaker." *Bulletin of Business Research,* Vol. 67, No. 7, July 1972, pp. 4-8.

Finds that frequent styling changes prevent a small manufacturer from achieving economies of scale in differentiated products. Predicts that as styling changes diminish in importance, small producers will benefit.

3.023 Edmonson, N. "Capacity Utilization for Major Materials: Revised Measures." *Federal Reserve Bulletin,* Vol. 60, No. 4, April 1974, pp. 246-251.

DIscusses the computation of an index of capacity, and revised procedures for computing aggregate utilization for major materials.

3.024 Edmonson, N. "Capacity Utilization in Major Materials Industries." *Federal Reserve Bulletin,* Vol. 59, No. 8, August 1973, pp. 564-566.

Discusses recent trends and underlying reasons, after briefly introducing the index from which the trend measure has been derived.

3.025 Evans, R. G.; Parish, E. M. A.; and Scilly, F. "Medical Productivity, Scale Effects, and Demand Generation," *Canadian Journal of Economics,* Vol. 6, No. 3, August 1973, pp. 376-393.

The authors investigate the impact of group practice on output per physician and on the degree to which physicians are able to generate demand for their own services. They find that physicians exert strong control over their own output.

3.026 Finger, Diane S. "Labor Requirements for Federal Highway Construction." *Monthly Labor Review,* Vol. 98, No. 12, December 1975, pp. 31-36.

Documents a continuing decline in onsite employee requirements per $1,000 of highway construction expenditures since 1970. Also computes direct and indirect employment engendered by highway construction.

3.027 Finn, Joseph T. *Labor and Material Requirements for Public Housing Construction, 1968,* BLS Bulletin 1821. U.S. Department of Labor, Bureau of Labor Statistics. Washington, U.S. Government Printing Office, 1974. 20 pp.

Examines public housing expenditures in terms of labor and materials requirements. Presents analysis of onsite and offsite labor requirements and distribution of costs.

3.028 Finn, Joseph T. "Labor Requirements for Public Housing." *Monthly Labor Review,* Vol. 95, No. 4, April 1972, pp. 40-42.

Compares changes in unit labor requirements, average size and cost of apartments, distribution of onsite man-hours, and average construction time in public housing projects from 1960 to 1968. Estimates that onsite employee-hours declined over 2 percent a year.

3.029 Frankel, Ernst G., and Marcus, Henry S. *Ocean Transportation.* Cambridge, Massachusetts, MIT Press, 1973. 822 pp.

The authors present an economic analysis of the ocean transportation industry. Topics covered include demand and supply, technology, labor relations, and productivity.

3.030 Friedman, Brian L., and Carey, John L. "Productivity in Gasoline Stations, 1958-73." *Monthly Labor Review,* Vol. 98, No. 2, February 1975, pp. 32-37.

The authors discuss trends in output and productivity, changes in size and structure of the industry, manpower trends, factors influencing productivity, and the outlook for the industry.

3.031 George, K. D., and Ward, T. "Productivity Growth in the Retail Trade." *Oxford Bulletin of Economics and Statistics,* Vol. 35, No. 1, February 1973, pp. 31-47.

The authors investigate the influence of labor scarcity, and of changes in sales volume, on labor productivity.

3.032 Hellinger, Fred Joseph. *Hospital Production Functions.* Doctoral dissertation presented to The Ohio State University, 1973. 90 pp.

Estimates economies of scale in hospital production, and the effect of intern and residency programs. Selects an index of hospital output, and develops estimation techniques.

3.033 Herman, Arthur S. "Productivity Increased in 1973 in Most Industry Studies." *Monthly Labor Review,* Vol. 97, No. 8, August 1974, pp. 69-71.

Discusses average annual rates of change in output per employee-hour in selected industries. Notes slower growth in 1973 than in 1972.

3.034 Herman, Arthur S. "Productivity in the Paints and Allied Products Industry." *Monthly Labor Review,* Vol. 96, No. 11, November 1973, pp. 10-13.

Discusses trends in productivity and output, industry structure, technology, capital expenditures, and employment, in the industry.Reports that productivity growth between 1958 and 1972 was relatively low due to slow introduction of improved technology and slackening demand.

3.035 Herman, Arthur S. "Rapid Productivity Gains in Selected Industries." *Monthly Labor Review,* Vol. 95, No. 8, August 1972, pp. 41-43.

Presents indexes of productivity growth for selected industries for 1967-1971. Comments on industries which experienced the more notable productivity movements.

3.036 Howe, Eric C., and Handy, Charles R. "Inventory and Critique of Productivity Estimates in the U.S. Food and Fiber Sector." *American Journal of Agricultural Economics,* Vol. 57, No. 5, December 1975, pp. 916-921.

Proposes methods for developing a total factor productivity measurement system that allows monitoring of changes in the efficiency of input uses.

3.037 Huffstutler, Clyde, and Broad, Michael. "Productivity in Structural Clay Products." *Monthly Labor Review,* Vol. 98, No. 10, October 1975, pp. 29-33.

The authors discuss long-term trends in the industry, together with output and employment. Changes in technology, capital expenditures, and industry structure, as they bear upon productivity change, are also analyzed.

3.038 Huffstutler, Clyde E., and Riche, Martha Farnsworth. "Productivity in the Bakery Products Industry." *Monthly Labor Review,* Vol. 95, No. 6, June 1972, pp. 25-28.

The authors examine some of the determinants of productivity improvements in the industry, including output and technological changes. They present statistics of output per employee-hour over time and of related variables.

3.039 Interstate Commerce Commision. *Productivity Measurement Conference, Nov. 26, 1974.* Proceedings. Washington, D.C. 179 pp.

Presents papers on the measurement of productivity in motor carrier and railroad transportation, data needs, and concepts.

3.040 Jack Faucett Associates. *Development of Capital Stock Series by Industry Sector.* Washington, March 1973.

Presents annual measures of capital stock of plant and equipment, 1947-1966.

3.041 Kallek, S. "Potential Applications of Census Bureau Economic Series in Microdata Analysis." *American Economic Review,* Vol. 65, No. 2, May 1975, pp. 257-262.

Illustrates the value of microdata by analyzing the relationship between productivity and firm size for all establishments within 42 manufacturing industries.

3.042 Ladenson, M. L., and Stoga, A. J. "Return to Scale in the U.S. Trucking Industry." *Southern Economic Journal,* Vol. 40, No. 3, January 1974, pp. 390-396.

The authors hypothesize that the returns to scale parameter in a Cobb-Douglas production function varies with firm size in the trucking industry. Firms with fifty or fewer employees exhibited constant returns to scale; firms with more employees exhibited increasing returns to scale.

3.043 Lampman, Robert J. "Reflections on a Productivity Rule for a University's Budget." *Monthly Labor Review,* Vol. 97, No. 9, September 1974, pp. 30-33.

Comments on a new innovative "base budget cut for productivity" rule recently incorporated in the University of Wisconsin's legislative appropriation, which reduced the base by 2.5 percent in the first year of the biennium, and 5.0 percent in the second.

3.044 Liaropoulos, Lycurgus. *A Measure of Productive Efficiency With Incentive Reimbursements for Hospital Care.* Doctoral thesis presented to Michigan State University, 1973. 226 pp.

Examines the relation between costs of producing hospital services and the efficiency of producing them, based on a sample of hospitals.

3.045 Mak, J., and Walton, G. M. "Steamboats and the Great Productivity Surge in River Transportation." *Journal of Economic History,* Vol. 32, No. 3, September 1972, pp. 619-640.

Measures the rate of total factor productivity growth in the steamboat industry and examines its sources. Concludes that the initial shift to steampower has been overemphasized in explaining the productivity growth rate.

3.046 Manning, Willard Graham. *Comparative Efficiency in Short-Term General Hospitals.* Doctoral thesis presented to Stanford University, 1973. 170 pp.

Argues that the high cost of operating hospitals arises from institutional factors, such as the separation of physicians from hospitals, nonprofit status, and third-party medical insurance.

3.047 Mark, Jerome A. *Current Developments in Productivity,* BLS Report 436, U.S. Department of Labor, Bureau of Labor Statistics, 1975. 33 pp.

Reviews productivity in the total private economy, 1973-74: Current developments, long-term perspective, variation among industries, and productivity developments in six industrialized countries.

3.048 National Commission on Productivity and Work Quality. *Measuring Productivity in the Construction Industry.* Washington, D.C., September 14, 1972. 101 pp.

Contains papers from a conference, including workshop reports. Subjects covered include the measurement of labor requirements in construction; interproject comparisons; measurement of productivity in specific craft occupations; and measurement of the productivity of masons.

3.049 NAHB Research Foundation. *Pilot Study of Productivity in the Residential Building Trades.* An Industrial Engineering Study for the National Association of Home Builders. Rockville, Md. No date. 43 pp.

Seeks to determine the proportionate amounts of production time spent by selected building trades working on typical single-family and low-rise apartment con-

struction. Also analyzes productive and nonproductive time spent by several building trades. Presents recommendations for improved productivity.

3.050 Ofer, G. "Returns to Scale in Retail Trade." *Review of Income and Wealth,* Vol. 19, No. 4, December 1973, pp. 363-384.

Based on a cross-section of retail stores in Israel, the study estimates the effects of scale in retail trade, using a Cobb-Douglas production function.

3.051 Otto, Phyllis F. "Productivity in the Copper Rolling and Drawing Industry." *Monthly Labor Review,* Vol. 98, No. 12, December 1975, pp. 27-30.

Presents long-term productivity growth rates for the industry, discussing differences between subperiods influenced by cyclical factors.

3.052 "Plain Talk About Manufacturing Productivity." *Chemical Week,* March 22, 1972, pp. 43-48.

Presents managers' opinions about the appropriate relations between productivity, capacity, and profitability, as well as about various measures of productivity.

3.053 Rafferty, J. "Hospital Output Indices." *Economic and Business Bulletin,* Vol. 24, No. 2, Winter 1972, pp. 21-27.

Argues the need for information on the proportions of the different illnesses which constitute a hospital patient census. Examines approaches to the weighting of outputs. Shows that detailed utilization data by diagnostic categories can be readily employed along with the more common hospital use measures.

3.054 Rhys, D. G. "Economies of Scale in the Motor Industry." *Bulletin of Economic Research*, Vol. 24, No. 2, November 1972, pp. 87-97.

Derives the long-run cost curve for British automobile producers and shows the optimal level of least-cost production. Notes that U.S. labor productivity is twice that of the U.K., because of technical economies from high output levels. Shows that firms with the largest output volumes are the most efficient.

3.055 Ridgon, D. S. "Wages and Productivity Rise as Employment Falls in Cigar Plants." *Monthly Labor Review,* Vol. 96, No. 6, June 1973, pp. 56-57.

Reports on a rise in productivity and wages. Attributes the rise in productivity to the continued use of automated machines.

3.056 Robinowitz, Robert S., and Riche, Martha Farnsworth. "Productivity in the Ready-Mixed Concrete Industry," *Monthly Labor Review,* Vol. 96, No. 5, May 1973, pp. 12-15.

The authors discuss changes in output, demand, employment, technology, and output per employee-hour for the years 1958 to 1971. They find modest productivity growth, related to the level of overall activity in the construction industry.

3.057 Seitz, Wesley D. "Productive Efficiency in the Steam-Electric Generating Industry." *Journal of Political Economy,* Vol. 79, No. 4, July-August 1971, pp. 878-886.

Uses linear programming techniques to estimate an industry frontier production function. Calculates measures of technical, price, and economic efficiency.

3.058 Shukla, B. D., and Mishra, S. D. "High Yielding Varieties—An Analysis," *Economic Affairs*, Vol. 17, No. 1-2, January-February 1972, pp. 101-104.

The authors analyze inputs and outputs of high-yielding rice and wheat for different size farms. They show that costs and yields per hectare rise as farm size rises.

3.059 Swan, C. "Labor and Material Requirements for Housing." *Brookings Papers on Economic Activity,* No. 2, 1971, pp. 374-377.

Presents estimates of labor, material, and mortgage requirements for building 500,000 housing units.

3.060 U.S. Department of Labor, Bureau of Labor Statistics. *Indexes of Output per Man-Hour, Selected Industries, 1974 Edition*, BLS Bulletin 1827, Washington, U.S. Government Printing Office, 1974. 186 pp. (Annually since 1953.)

Presents measures reflecting the relationship between output and related labor time,

and the changes from year to year in the amount of labor time required to produce a unit of output. Contains indexes of output per employee-hour and output per employee.

3.061 Urisko, James A. "Productivity in Hotels and Motels, 1958-73." *Monthly Labor Review*, Vol. 98, No. 5, May 1975, pp. 24-28.

Discusses trends in output and demand; employment; factors affecting productivity; industry structure; and the outlook for the lodging industry. Presents data on productivity, output and hours for 1958 to 1973.

3.062 Worthington, Paul N. *Capital-Labor Ratios in Short-Term Voluntary Hospitals: An Empirical Study of 38 Voluntary Hospitals in New York City.* Doctoral dissertation presented to The City University of New York, 1972. 165 pp.

Measures capital-labor substitution, with emphasis on the roles of wages and cost of capital. Also examines the relation between size of hospital and capital in terms of capital per bed.

Public sector

4.001 Eisenstein, James, and Jacob, Herbert. "Measuring Performance and Outputs of Urban Criminal Courts." *Social Science Quarterly*, Vol. 54, No. 4, March 1974, pp. 713-724.

The authors discuss the obstacles to obtaining reliable and valid measures of output of urban criminal courts, in terms of defining outputs, outcomes of the criminal process and the present and future availability of data. They argue that computerization may decrease the availability of data.

4.002 "Government Gross Fixed Capital Formation." *Survey of Current Business*, Vol. 53, No. 2, pp. 7-9.

Discusses recent trends in Federal, State and local purchases of equipment and structures, in current and constant dollars.

4.003 Mark, Jerome A. "Progress in Measuring Productivity in Government," *Monthly Labor Review*, Vol. 95, No. 12, December 1972, pp. 3-6.

Discusses how and why productivity in the Federal sector is being measured. Estimates the effect of a government measure on the rate of productivity growth in the entire economy.

4.004 Pier, William J.; Vernon, Robert B.; and Wicks, John H. "An Empirical Comparison of Government and Private Production Efficiency." *National Tax Journal*, Vol. 27, No. 4, December 1974, pp. 653-666.

The authors estimate production functions for public and private collection of garbage. They find the public sector had greater labor productivity at all output levels but that capital productivity was less at small scales of operation, higher at large scales.

4.005 Schneiderman, Paul. "State and Local Government Gross Fixed Capital Formation: 1958-73," *Survey of Current Business*, Vol. 55, No. 10, October 1973, pp. 17-26.

Presents detailed estimates of investment financing and spending, by function.

4.006 Stern, Irving. "Industry Effects of Government Expenditures: An Input-Output Analysis," *Survey of Current Business*, Vol. 55, No. 5, May 1975, pp. 9-23.

Measures the industry effects of government transfer payments and grants-in-aid. Also compares these effects with the industry effects of government purchases.

4.007 U.S. General Accounting Office and others. *Measuring and Enhancing Productivity in the Federal Government*. Washington, June 1973, 180 pp.

Describes the design of the Federal Government's permanent measurement system. Reports on the research into the factors of recent productivity change. Analyzes the use of productivity measures in employment and budget planning. Also features a study of capital investment as a means to improving productivity. Presents appendices detailing the organizational background of the measurement system.

4.008 U.S. General Accounting Office and others. *The Permanent Measurement System. Methods, Measures, Results.* Special Report No. 1, Vol. 1. Washington, Dec. 1973. 197 pp.

Describes the nature of the Federal workload in terms of certain classification structures and associated employee-years, and the measured sample of Federal employee-years for which pro-

ductivity indices were constructed. Defines the techniques used.

4.009 U.S. General Accounting Office and others. *The Permanent Measurement System. Methods, Measures, Results.* Special Report No. 1, Vol. 2. Washington, October 1973. 221 pp.

A directory of Federal organizational elements and outputs for fiscal year 1972. Features mission statements, and description of work, and of the measure of output used.

4.010 U.S. General Accounting Office, Joint Financial Improvement Program. *Productivity Programs in the Federal Government, FY 1974.* Annual Report to the President and the Congress. Volume 1: *Current Efforts and Future Prospects*, June 1975, 226 pp. Volume 2: *Case Studies*, June 1975, 159 pp. Supplement to Volume 1: *The Measurement Data Base*, August 1975, 144 pp. Washington.

The volumes represent the second annual report. Vol. 1 presents data on Federal productivity trends, FY 1967-74, and the reasons for changes. It also comments on current activities in the program and future needs for productivity improvement. Vol. 2 discusses human resource management and management systems and their relation to productivity improvement, as well as techniques and technologies to attain it. The supplement, compiled by the Bureau of Labor Statistics, details the bases for the output data and measurements.

4.011 U.S. General Accounting Office, Joint Financial Management Improvement Program. *Report on Federal Productivity*. Volume 1: *Productivity Trends, FY 1967-1973*, June 1974, 191 pp. Volume 2: *Productivity Case Studies*, June 1974, 142 pp. Supplement to Volume 1: *The Measurement Data Base*; October 1974, 155 pp. Washington.

Volume 1 reports on recent Federal productivity trends and reasons for changes, covering such functions as citizens' records, agriculture and natural resources, postal service, loans and grants, etc. Volume 2 presents studies of such topics as the development of productivity measures for Air Force medical services, the Defense Supply Agency, the Farmers Home Administration, and other agencies. The supplement, compiled by the Bureau of Labor Statistics, represents a description of the elements and outputs included in the measurement data base.

4.012 Vanagunas, Stanley. *Assessment of Productivity and Cost of Municipal Police Patrol Services.* Doctoral dissertation presented to Michigan State University, 1975. 196 pp.

Develops a systematic classification of outputs, inputs and costs, and measures their interactions.

International

5.001 Alamad, Q. K., and Anwarugzaman, C. "Productivity Trends in the Manufacturing Sector of Bangladesh: A Case Study of Selected Industries." *Bangladesh Economic Review*, Vol. 1, No. 2, April 1973, pp. 119-148.

Discusses productivity trends in the jute, cotton textile, match, and cigarette industries. Finds capital resources misused, with the process of capital-labor substitution extended beyond profitable substitution possibilities.

5.002 Armstrong, Alan. *Structural Change in the British Economy 1948-1968*. New York, Halsted Press, 1974. 169 pp.

Uses input-output tables to examine changes in demand, output, and input between 1948 and 1968. Analyzes productivity at industry and aggregate economy levels, and relates it to growth rates.

5.003 Asher, E. "Relative Productivity and Factor-Intensity in the Manufacturing Sectors of the U.S. and the U.K. during the Nineteenth Century." *De Economist*, Vol. 119, No. 4, July-August 1971, pp. 440-475.

Examines causes for America's superior industrial efficiency in the textile sectors. Concludes that higher capital intensity was favored in the U.S.

5.004 Burley, H. T. "Production Functions for Australian Manufacturing Industries." *Review of Economics and Statistics*, Vol. 55, No. 1, February 1973, pp. 118-122.

Estimates a production function in terms of technical rather than monetary measures of capital. Uses a horsepower measure of capital to derive the elasticity of substitution. Concludes that Australian industry is becoming more energy intensive over time.

5.005 Capdeville, Patricia, and Neef, Arthur. "Productivity and Unit Labor Costs in the United States and Abroad." *Monthly Labor Review*, Vol. 98, No. 7, July 1975, pp. 28-32.

The authors review and analyze comparative trends in manufacturing in the U.S., Canada,

France, Germany, and the United Kingdom, emphasizing the patterns in recent years.

5.006 Carlsson, B. "The Measurement of Efficiency in Production: An Application to Swedish Manufacturing Industries 1968." *Swedish Journal of Economics*, Vol. 74, No. 4, December 1972, pp. 468-485.

Measures and analyzes efficiency in 26 Swedish manufacturing industries. Elaborates on the effects of tariffs and 4-firm concentration ratios on efficiency, economies of scale, and specialization.

5.007 Chandrasekar, K. "U.S. and French Productivity in 19 Manufacturing Industries." *Journal of Industrial Economics*, Vol. 21, No. 2, April 1973, pp. 110-125.

Compares levels of productivity in the United States and France for 1958-1963. Shows that on the average U.S. productivity was twice that of France. Finds that differences in size of markets mostly account for higher productivity in the U.S.

5.008 Chen, Nai-Ruenn. "Agricultural Productivity in a Newly Settled Region: The Case of Manchuria." *Economic Development and Cultural Change*, Vol. 21, No. 1, October 1972, pp. 87-95.

Uses empirical data from Manchuria to show that when farmers are limited to traditional factors of production, growth and productivity stagnate. Concludes that this holds true in the long run under any market conditions.

5.009 Cockerill, Anthony. *The Steel Industry: International Comparisons of Industrial Structure and Performance*. New York, N.Y., Cambridge University Press, 1974. 130 pp.

Examines international differences in efficiency in the steel industry. Analyzes these differences with a view to variations in industrial structure and scale of production.

5.010 Daly, D. J., editor. *International Comparisons of Prices and Output*. Studies in Income and Wealth, Vol. 37 by the Conference on Research in Income and Wealth. New York, Columbia University Press (for the National Bureau of Economic Research), 1972. 417 pp.

Presents papers on such subjects as international comparisons of real income and prices; uses of data; comparative national incomes of the U.S. and the Soviet Union; economic integration; and others.

5.011 Davies, David G. "The Efficiency of Public Versus Private Firms: the Case of Australia's Two Airlines." *Journal of Law and Economics*, Vol. 14, No. 1, April 1971, pp. 149-165.

Compares several measures of productivity derived for Australia's public and private airlines and shows that the measures derived for the private firms uniformly exceed those for the public firm.

5.012 Dienes, L. "Regional Variations of Capital and Productivity in Soviet Industry." *Journal of Regional Science*, Vol. 12, No. 3, December 1972, pp. 401-406.

Estimates and compares the marginal productivity of capital in 18 Soviet regions between 1960 and 1968. Also compares regional wage bills and labor productivity indexes. Concludes that investment policy in the 1960's was dominated by a desire to develop the Asian hinterland.

5.013 Dittrich, Scott R., and Myers, Ramon H. "Resource Allocation in Traditional Agriculture: Republican China 1937-1940." *Journal of Political Economy*, Vol. 79, No. 4, July/August 1971, pp. 887-896.

The authors discuss and measure the efficiency of resource allocation by peasants in three villages located in the grain-producing area of North China. They show that, despite increasing market uncertainty, peasants were allocating their land and labor efficiently.

5.014 Donges, J. B. "Returns to Scale and Factor Substitutability in Spanish Industry." *Weltwirtschaftliches Archiv*, Vol. 108, No. 4, 1972, pp. 597-608.

Estimates Cobb-Douglas and CES functions for twenty industries in 1968. Finds that the relative importance of increasing, constant, and decreasing scale returns is fairly balanced, and substitution elasticities between labor and capital are relatively high.

5.015 Dougherty, C., and Selowsky, M. "Measuring the Effects of the Misallocation of Labour." *Review of Economics and Statistics*, Vol. 55, No. 3, August 1973, pp. 386-390.

The authors examine the effect on output of severe imperfections in the Colombian labor market. They suggest that reallocation would give a maximum increase in output of 2 percent.

5.016 Farley, Noel J. "Capital Formation, Technical Change and Labour Productivity Improve-

ment: An Analysis of a Cross-Section of Irish Manufacturing Industries 1953-1967." *Economic and Social Review*, Vol. 3, No. 1, October 1971, pp. 25-52.

Analyzes 44 Irish manufacturing industries from 1953 to 1967 using labor, capital and output series to examine the course of improved labor productivity. Discusses patterns of technical change in groupings of industries.

5.017 Gaaithon, A. L. *Economic Productivity in Israel.* London and New York, Praeger in cooperation with the Bank of Israel, 1971. 280 pp.

Presents a detailed analysis and measurement of Israeli capital stock from 1950 to 1965. Utilizes his capital stock measures to estimate total factor productivity.

5.018 Garston, Gordon J. "Productivity Measurement in the Canadian Non-Commercial Industries" in *Selected Papers from North American Conference on Labor Statistics, June 18-21, 1973.* U.S. Department of Labor, Bureau of Labor Statistics. Washington, U.S. Government Printing Office, 1973, pp. 164-170.

Discusses Canada's productivity measures for nonprofit industries (education, hospitals, welfare organizations, private households, and public administration and defense). Discusses problems in constructing such measures.

5.019 Harvey, Andrew S. *Manufacturing in Northeastern Nova Scotia.* Study No. 88, Institute of Public Affairs, Dalhousie University, Halifax, 1971. 142 pp.

Analyzes the extent of dependence of manufacturing on regional resources, degree of regional diversification, locational advantages, and comparative productivity of manufacturing industries.

5.020 Hettich, Walter. *Expenditures, Output and Productivity in Canadian University Education.* Special Study, No. 14, Ottawa, Economic Council of Canada, 1971. 123 pp.

Examines the effective use of resources in Canada's educational sector based on a study of 49 universities for the period 1956-57 to 1967-68. Focuses on the problems of calculating total output and total inputs. Presents a measure of productivity change.

5.021 Hoogvliet, W. "Production Adjustments and Productivity in the Australian Sheep Industry." *Quarterly Review of Agricultural Economics*, Vol. 26, No. 4, October 1973, pp. 239-252.

Investigates the adjustment of the sheep industry in response to changing economic conditions and new technology. Estimates productivity growth, and deals with the effects of changing factor prices and output prices on the profitability of sheep properties.

5.022 Kawahito, Kiyoshi. *The Japanese Steel Industry. With an Analysis of the U.S. Steel Import Problem.* New York, Praeger, 1972. 203 pp.

Discusses the development of Japan's steel industry. Also covers its current structure of production, distribution system, pricing, finance, labor costs, and productivity.

5.023 Krengel, Rolf. "Measurement of Total Factor Input, Technical Change and Output by Industry in the Federal Republic of Germany 1958-1968." *The Review of Income and Wealth*, Vol. 18, No. 2, June 1972, pp. 173-183.

Calculates Cobb-Douglas production functions for 29 sectors of manufacturing. Finds that high rates of output growth result in high rates of technical change.

5.024 "Labor Productivity in Italian Manufacturing: 1961-1967." *Quarterly Economic Review*, Vol. 3, June 1972, pp. 13-21.

Presents productivity trends in 42 industries. Investigates inter-industry differences in growth rates and evaluates factors influencing productivity change.

5.025 LaTourette, John E. "Private and Public Capital and the Capital Coefficient in Canada." *Quarterly Review of Economics and Business*, Vol. 12, No. 2, Summer 1972, pp. 53-75.

Examines changes in the structure of capital and output in the Canadian economy, 1926-67. Finds that the net effect of these changes has been a considerable decline in the business and economy-wide capital coefficients.

5.026 Lenti, Libero. "Productivity and the Italian Economic System." *Review of Economic Conditions in Italy*, Vol. 28, No. 2, March 1974, pp. 89-101.

Develops total factor and labor productivity indexes for the years 1951-72. Comments on the results and the factors influencing productivity.

5.027 Longworth, John W., and McLeland, W. J. "Economies of Size in Wheat Production." *Review of Marketing and Agricultural Economics*, June 1972, pp. 53-66.

The authors investigate the relationship between the costs of producing wheat and the size of the wheat-growing enterprise in certain regions of Australia. They examine the impact of seasonal variations and new technologies. They calculate the optimal size for a wheat farm.

5.028 McDougall, D. M. "Canadian Manufactured Commodity Output, 1870-1915." *Canadian Journal of Economics*, Vol. 4, No. 1, February 1971, pp. 21-36.

Presents estimates of the growth rates of commodity output from 1870 to 1915 in Canada.

5.029 Merrett, Stephen. "Snares in the Labour Productivity Measure of Efficiency." *Journal of Industrial Economics*, Vol. 20, November 1971, pp. 71-84.

Examines the manufacture of fertilizer in India by companies with the same basic production organization. Analyzes the productivity of each firm, and explains differences in the level of output per employee-hour.

5.030 Moody, C. E., and Kessel, N. "Productivity Change in Zambian Mining." *South African Journal of Economics*, Vol. 40, No. 1, March 1972, pp. 61-71.

The authors examine the trend in productivity in the Zambian mining industry for 1954-1966. They explain the derivation of total factor productivity, and consider implications for Zambian economic growth.

5.031 Nadiri, M. Ishaq. "International Studies of Factor Inputs and Total Factor Productivity: A Brief Survey." *Review of Income and Wealth*, Vol. 18, No. 2, June 1972, pp. 129-154.

Discusses the results of studies on total factor productivity over the period 1950-1965 in twenty-five countries. Also discusses explanations of acceleration and retardation of the growth rate of economies.

5.032 O'Malley, Patrick. *Irish Industry: Structure and Performance*. New York, Barnes and Noble, 1972. 141 pp.

Uses regression analysis to relate various industry characteristics (location, plant size, concentration, and market structure) to each other and to performance indicators (changes in output, labor productivity, and costs).

5.033 Paish, F. W. "The Prospects for Increasing Output." *Lloyds Bank Review*, No. 107, January 1973, pp. 1-18.

Discusses productivity, potential output, and the margin of unused resources in the British economy. Explains factors contributing to the productivity growth rate, and discusses the problems of measuring productivity.

5.034 Phelps Brown, E. H. "Levels and Movements of Industrial Productivity and Real Wages Internationally Compared, 1860-1970." *Economic Journal*, Vol. 83, No. 329, March 1973, pp. 58-71.

Presents and compares indexes of industrial productivity and real wages in France, Germany, Sweden, the U.K., and the U.S.A. Shows substantial agreement in relative movements, except for France.

5.035 Omitted.

5.036 Porta, Pier Luigi. "Patterns of Association of Output and Employment in the Industrially Advanced Countries." *Rivista Internazionale di Scienze Economiche e Commerciali*, no. 5, May 1973, pp. 449-468.

Presents cross-country studies, by sector, to determine patterns of relationships.

5.037 Postner, Harry H. *An Analysis of Canadian Manufacturing Productivity: Some Preliminary Results*. Ottawa, Economic Council of Canada, 1971. 131 pp.

Develops a model and method to measure sources of industrial productivity and inter-industry productivity growth differentials for two periods—1947-56 and 1957-67.

5.038 Roman, Z. "Productivity Growth in the Hungarian Economy." *Review of Income and Wealth*, Vol. 18, No. 2, June 1972, pp. 201-232.

Uses four types of index numbers, relating output, labor, capital, and depreciation allowances to analyze productivity growth.

5.039 Ruckman, Paul Edward. *An Analysis of the Effects of the Common Agricultural Policy on Productivity and Wages in the European Economic Community*. Doctoral dissertation pre-

sented to The University of Kansas, 1975. 152 pp.

Evaluates the success of the E.E.C. in increasing productivity and raising farm incomes. Calculates productivity for owner labor, hired labor, land, and capital.

5.040 Rushing, F. W. "Growth, Capital-Output Ratios, and the Soviet Chemical Industry." *Economia Internazionale*, Vol. 25, No. 4, November 1972, pp. 731-743.

Focuses on the rising capital-output ratio of the Soviet chemical industry. Finds that the Soviet Union faces a dilemma of either increasing the rate of investment, or decreasing the incremental capital-output ratio in order to sustain high growth rates. Concludes that poor planning is one of the primary causes of the slackening of economic growth in the Soviet Union.

5.041 Sidhu, Suryk S. "Relative Efficiency in Wheat Production in the Indian Punjab." *American Economic Review*, Vol. 64, No. 4, September 1974, pp. 742-751.

In contrast to earlier studies, the author finds no differences in economic efficiency or price between small and large wheat farms.

5.042 Teitel, S. "Economies of Scale and Size of Plant: The Evidence and the Implications for the Developing Countries." *Journal of Common Market Studies*, Vol. 13, No. 1-2, 1975, pp. 92-115.

Investigates whether economies of scale favor common markets among developing countries attempting to industrialize. Finds a correlation between size of plant and labor productivity in a sample of developed and developing countries. Concludes that developing countries are able to pool markets to achieve economies of scale in industrial production and in size-biased technical change.

5.043 Tuckman, Barbara Hauben. *The Green Revolution, Agricultural Productivity and the Income Distribution in Mexico*. Doctoral dissertation presented to The Florida State University, 1974. 174 pp.

Examines the increased output flowing from the high-yielding seed varieties. Finds a large segment of the rural population has not shared in the gains of the new technology. Develops a production function model for agriculture. Traces the income effects of the Green Revolution and summarizes its effectiveness.

5.044 U.S. Department of Labor, Bureau of Labor Statistics. *Productivity: An International Perspective*. BLS Bulletin 1811, Washington, U.S. Government Printing Office, 1974. 81 pp.

Chartbook showing productivity trends in the United States and five other industrial countries; the effect of productivity on costs and living standards; and the trends in sources of productivity growth. Data cover selected years, 1950-72.

5.045 Watanabe, T. "A Note on Measuring Sectoral Input Productivity." *Review of Income and Wealth*, Vol. 17, No. 4, December 1971, pp. 335-340.

Examines the relation between total factor productivity derived from national income accounts and total input productivity based on input-output accounts, on a sectoral basis, for the Japanese economy.

5.046 Yoshihara, K., and Ratcliffe, T. "Productivity Change in the Japanese Economy, 1905-65." *Economics Studies Quarterly*, Vol. 23, No. 1, May 1972, pp. 55-74.

The authors investigate input-output relations as factors in productivity change, and calculate the contribution of inputs to such change.

5.047 Young, R., and Crestani, I. "Productivity Change and Farm Income." *Quarterly Review of Agricultural Economics*, Vol. 26, No. 3, July 1973, pp. 198-209.

The authors estimate the productivity of purchased factors of production. They find the rate of increase to be less than the rate of increase in total factor productivity. They note changes in scale of operation, intensity of production, managerial efficiency, and a changing output mix.

5.048 Young, R. "Productivity Growth In Australian Rural Industries." *Quarterly Review of Agricultural Economics*, Vol. 24, No. 4, October 1971, pp. 185-205.

Computes an index of average productivity, using a ratio method based on the Solow approach for the period 1948-1968. Analyzes factors contributing to productivity growth.

Factors affecting productivity

Labor, education, and hours

6.001 Adiseshiah, Malcolm S. *It is Time to Begin. The Human Role in Development: Some Further Reflections for the Seventies.* New York, UNESCO, 1972. 182 pp.

Outlines ideas on the educational tasks for the 1970's, the brain drain, and the role of education in economic development and politics.

6.002 Allenspach, Heinz. *Flexible Working Hours.* Geneva, International Labour Office, 1975. 64 pp.

Basing himself on experiments made in Swiss enterprises, the author examines the main features of the flexible working day, including prescribed hours of work and make-up time, and how absences and overtime are dealt with. Advantages and drawbacks are also discussed.

6.003 Bailey, Duncan, and Schotta, Charles. "Private and Social Rates of Return to Education of Academicians." *The American Economic Review*, Vol. 62, No. 1, March 1972, pp. 19-31.

The authors compare the costs and returns of graduate education, using salaries of college and university faculty members. They conclude that the social and private real rates of return to graduate education in general are either zero or less than one percent.

6.004 Barkai, H., and Levhari, D. "The Impact of Experience on Kibbutz Farming." *Review of Economics and Statistics*, Vol. 55, No. 1, February 1973, pp. 56-63.

The authors attempt to measure the contribution of experience to productivity. Using cross-section data from Israeli kibbutzim, they use the age of each collective as a proxy for experience. They present evidence that experience contributed to the growth of productivity in kibbutz farming, although its effect diminished over time.

6.005 Baum, Stephen J., and Young, McEwan W. *A Practical Guide to Flexible Working Hours.* London, Kogan Page Ltd., 1973. 186 pp.

The authors examine advantages and disadvantages of flexible working hours; time recording; design and installation of a scheme; experience with such schemes; and trade union attitudes.

6.006 Beatty, Richard W., and Morgan, Cyril P. "Influence of Labor Force and Job Design Changes on Productivity." *The Personnel Administrator*, Vol. 20, No. 5, September 1975, pp. 38-41.

The authors demonstrate the increasing role of management in meeting individual needs through job redesign. They conclude that the major impact has been on absenteeism, turnover, tardiness, and product quality.

6.007 Becker, Gary S. *Human Capital. A Theoretical and Empirical Analysis, With Special Reference to Education.* National Bureau of Economic Research. Second edition. New York, Columbia University Press, 1975. 268 pp.

Surveys the effects on earnings of schooling, on-the-job training and other knowledge. Examines rates of return and the incentive to invest. Analyzes pertinent data.

6.008 Bellante, Donald M. "A Florida Example: Measuring the Productivity Loss from Labor Force Disability." *Growth and Change*, Vol. 4, No. 1, January 1973, pp. 38-42.

Discusses a case study in Florida where disabled persons were rehabilitated to become productive work force members. Finds that the cost to rehabilitate is much less than the person subsequently adds to output flow.

6.009 Bellante, Donald M. "A Multivariate Analysis of a Vocational Rehabilitation Program." *Journal of Human Resources*, Vol. 7, No. 2, Spring 1972, pp. 226-241.

Estimates benefit-cost relationships for various groups of disabled persons, using regression analysis. Concludes high-productivity groups benefit most from rehabilitation services.

6.010 Blinder, Alan S., and Weiss, Yoram. *Human Capital and Labor Supply: A Synthesis.* Working Paper No. 55, Industrial Relations Section, Princeton University,

Princeton, N.J. November 1974. 51 pp. plus appendix.

The authors present a life-cycle model of investment in human capital with leisure choices explicitly incorporated.

6.011 Bolweg, Joep F. *Job Design and Industrial Democracy: The Case of Norway*. Doctoral dissertation presented to The University of Wisconsin-Madison, 1975. 221 pp.

Evaluates a union-management project designed to increase shop floor participation of workers. Notes that the diffusion of new forms of work organization in Norway has been disappointing, and analyzes the reasons, including the basically management-oriented practice of job redesign.

6.012 Bowles, S., and Gintis, H. "The Problem with Human Capital Theory—A Marxian Critique." *American Economic Review*, Vol. 65, No. 2, May 1975, pp. 74-82.

The authors argue that the theory of human capital is based on technical relationships which exclude the relevance of class conflict and other social phenomena. They urge that reference be made to the social requirements needed to reproduce the capitalist class structure from period to period. They discuss implications for growth theory, income distribution, and public policy.

6.013 Bowman, Mary Jean. "Postschool Learning and Human Resource Accounting." *The Review of Income and Wealth*, Ser. 20, No. 4, December 1974, pp. 483-500.

Addresses the treatment of human resources in the application of capital and growth accounting. Argues that conventional national income accounting is biased against considering human resources as a form of capital. Calls for experimentation with measures that correct for such biases and provide a more adequate base for assessment of long term economic performance.

6.014 Braverman, Harry. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*. New York, Monthly Review Press, 1974. 465 pp.

Explores the implications of technological change for the nature of work, and the composition and differentiation of the working class. Covers such topics as labor and management, science and mechanization, and the increasing number of blue-collar occupations.

6.015 Brown, Julius S. "How Many Workers Enjoy Discretion on the Job?" *Industrial Relations*, Vol. 14, No. 2, May 1975, pp. 196-202.

Attempts to quantify the number of U.S. workers who hold jobs which permit discretion. Finds more than half of the labor force hold challenging jobs but the proportion has remained stable for 20 years.

6.016 Burney, Robert Earl. *The Role of Florida A & M University in the Development of Human Capital*. Doctoral dissertation presented to The Florida State University, 1971. 194 pp.

Estimates net social and private returns to education for a selected list of black college graduates. Finds college education to be more profitable to blacks than to whites. Also finds that colleges such as Florida A & M are comparatively efficient in developing human capital.

6.017 Catanese, Anthony Vincent. *Outputs of Higher Education, Productivity, and the Distribution of Earnings*. Doctoral dissertation presented to Southern Illinois University, 1972. 138 pp.

Analyzes the effects of general education and occupational training on the productivity of students after they have left college, and on the distribution of earnings in society at large.

6.018 Chuang, Liu-Hsiung. *The Role of Human Capital in the Process of Economic Development: A Case Study of Japan*. Doctoral dissertation presented to Stanford University, 1975. 166 pp.

Estimates the contribution of human capital to Japan's economic growth by the use of a Cobb-Douglas production function, and compares it with the growth of physical capital. Defines human capital to include education, medical care and nutritional improvements. Notes the importance of joint strategies of investment in both human and physical capital.

6.019 Clark, Robert Louis. *The Impact of Trade Unionism on Labor Productivity and its Rate of Growth*. Doctoral dissertation presented to Duke University, 1974. 137 pp.

Analyzes union practices that retard and stimulate productivity. Finds that unions can significantly affect productivity but that labor productivity does not vary systematically with union strength.

6.020 Clayman, Jacob, and Hannigan, Thomas. "Union Spokesmen Cite Fatigue. Eroding of Labor Standards, Health Hazards." In "The 4-40 Workweek: Two Views," *Manpower*, Vol. 4, No. 1, January 1972, pp. 14-19.

Part of a debate on the pro's and con's of the 4-day, 40-hour workweek (see the entry under Hunter Simpson, W. for the position in favor). The authors discuss the reasons for the 8-hour day, and stress the impact of a longer workday on workers' private lives. They argue that loss of overtime resulting from the 4-40 workweek spells a reduced share of labor in the gains from productivity improvement.

6.021 Contreras Uzcategui, Ascander. *Investment in Human Resources: A Case Analysis of the Steel Industry in Venezuela*. Doctoral thesis presented to Stanford University, 1974. 293 pp.

Examines the effects of investment in education from a sample of workers employed at a Venezuelan steel plant, applying theories developed by Becker, Reder, Doeringer, and Piore. Finds decreasing returns for increasing education. Also finds human resource investment to be competitive with physical investment.

6.022 Dalton, Gene W., and Thompson, Paul H. "Accelerating Obsolescence of Older Engineers." *Harvard Business Review*, Vol. 49, No. 5, September-October 1971, pp. 57-67.

The authors discuss the individual performance of engineers, using data from six companies. They conclude that the most productive years occur early in an engineer's career and that engineering productivity thereafter declines because of new educational advances. They suggest ways to keep the engineer's productivity high.

6.023 Danielsen, Albert N., and Katsuji Okachi. "Private Rates of Return to Schooling in Japan." *The Journal of Human Resources*, Vol. 6, No. 3, Summer 1971, pp. 391-397.

The authors estimate private internal rates of return to formal schooling in Japan, using cross-sectional data for 1966. They find that Japanese rates of return are similar to U.S. estimates.

6.024 Davis, Louis E., and Cherns, Albert B., editors. *The Quality of Working Life.* Vol. I: *Problems, Prospects, and The State of The Art*. New York, The Free Press, 1975. 450 pp.

A collection of papers on the enhancement of the quality of working life; defining and measuring it; changing it; technology affecting it; and as a central issue in industrial relations.

6.025 Davis, Louis E., Cherns, Albert B., and Associates. *The Quality of Working Life*. Vol. II. New York, N.Y., The Free Press, 1975. 387 pp.

The authors present case studies on such subjects as Swedish experiments in industrial democracy; joint worker-management consultation; changes in organizational structure; participative management; and job design. The case study methods are thoroughly assessed.

6.026 Deans, Ralph C. "Productivity and the New Work Ethic." *Editorial Research Reports*, Vol. 1, No. 15, April 19, 1972, pp. 293-310.

Examines reasons for the decline in the rate of productivity growth in the U.S. Discusses such factors as changes in worker attitudes, changing composition of the work force, the arms race, and environmental concerns. Also describes efforts to increase productivity growth, including job enrichment and a shorter workweek.

6.027 De Canio, S. "Productivity and Income Distribution in the Post-Bellum South." *Journal of Economic History*, Vol. 34, No. 2, June 1974, pp. 422-446.

Tests hypotheses concerning the treatment and performance of the work force in the post-Civil War South.

6.028 Deutermann, William V. "Educational Attainment of Workers, March 1972." *Monthly Labor Review*, Vol. 95, No. 11, November 1972, pp. 38-42.

Discusses the results of the March 1972 survey of educational attainment of workers 16 years old and over. Reports that the proportion of workers who completed at least 4 years of high school more than doubled in the preceding 30 years–from 32 to 69 percent.

6.029 Deutermann, William V. "Educational Attainment of Workers, March 1973." *Monthly Labor Review*, Vol. 97, No. 1, January 1974, pp. 58-62.

Reports that the educational gap in average years of school completed by workers, both by sex and race, has narrowed steadily since 1940.

6.030 Diwan, R. K. "Impact of Education on Labor Efficiency." *Applied Economics*, Vol. 3, No. 2, June 1971, pp. 127-135.

Formulates a learning-by-schooling function and tests it on U.S. data for the 1909-60 period. Finds that a 1 percent increase in schooling produces a 1.6-percent increase in labor efficiency.

6.031 Dudley, Leonard. "Learning and Interregional Transfer of Technology." *Southern Economic Journal*, Vol. 40, No. 4, April 1974, pp. 563-570.

Offers a two-region model in which the distribution of production between regions over time is determined by interregional differences in learning rates.

6.032 Dudley, Leonard. "Learning and Productivity Change in Metal Products." *American Economic Review*, Vol. 62, No. 4, September 1972, pp. 662-669.

Examines learning by the worker and the firm as a factor in productivity increase. Finds that time and experience are needed to acquire knowledge. Concludes that subsidies during the learning period may be advisable.

6.033 Elkan, Walter. "On the Apparent Benefits of Higher Productivity: An Arithmetical Illustration." *The Journal of Development Studies*, Vol. 7, No. 4, July 1971, pp. 435-439.

Seeks to show through a hypothetical example that increased productivity due to mechanization in a low-income country can be detrimental.

6.034 Evenson, James Albert. *An Economic and Statistical Analysis of Human Capital Flows In the United States.* Doctoral dissertation presented to Colorado State University, 1974. 358 pp.

Quantifies stocks and flows of human capital for 9 Census divisions, 1955-60 and 1965-70. Determines migration of human capital by age and level of education, and by sex and race.

6.035 Fabozzi, Frank Joseph. *Demand for Education in Production.* Doctoral dissertation presented to The City University of New York, 1972. 152 pp.

Investigates why the relative wage rates of educated workers did not fall between 1939 and 1960 despite the rise in their number relative to less educated workers.

6.036 Fabrycy, Mark Z. "Determinants of Total Factor Productivity." *Western Economic Journal*, Vol. 9, No. 4, December 1971, pp. 408-418.

Examines experience, formal education, and aggregate demand as determinants of productivity in 20 countries. Concludes that experience is most important by far.

6.037 Fairfield, Roy P., editor. *Humanizing The Workplace.* Buffalo, N.Y., Prometheus Press, 1974. 265 pp.

Presents essays on such subjects as worker discontent, worker participation in decision-making, job enrichment, the implications of a "service society" for meaningful work, together with various case studies. Also includes essays on women in the work place, child care, and worker exchange programs.

6.038 Fallon, P. R., and Layard, P. R. G. "Capital-Skill Complementarity, Income Distribution, and Output Accounting." *Journal of Political Economy*, Vol. 83, No. 2, April 1975, pp. 279-301.

The authors argue that previous estimates of elasticities of substitution between educated and less educated labor are too high. They present evidence that physical capital

is more complementary to educated labor. They also show that inter-country differences in productivity are due more to differences in physical capital than in human capital.

6.039 Fareed, A. E. "Human-Capital Intensity of U.S. Trade: A Cost Approach." *Economic Journal*, Vol. 82, No. 326, June 1972, pp. 629-640.

Hypothesizes that U.S. exports are more human-capital intensive than import replacements when human capital represents the educational investment embodied in the labor force. Tests this hypothesis for the years 1947-1951.

6.040 Fiss, Barbara L. *Flexitime*. Washington, D.C. U.S. Civil Service Commission, 1974. 17 pp.

Seeks to acquaint organizations with the concept of Flexitime, and to help them determine its feasibility. Offers guidance in instituting Flexitime schedules.

6.041 Flanagan, Robert J., and others. *Worker Discontent and Work Place Behavior*. Institute of Industrial Relations, University of California, Berkeley, 1974. 23 pp.

The authors argue that workers' desires for nonpecuniary rewards increase as fast as for pecuniary rewards, and that if the "mix" is not satisfied, the resulting "disequilibrium" expresses itself in employee dissatisfaction, and hence lower productivity, more absenteeism, and greater frequency of strikes.

6.042 Fleuter, Douglas L. *The Workweek Revolution, A Guide to the Changing Workweek*. Reading, Mass., Addison-Wesley Publishing Co., 1975. 167 pp.

After briefly discussing the pressures towards a shorter workweek, the author offers suggestions as to the kind of shorter workweek to choose, and how to convert to a shorter workweek. The advantages and disadvantages of "flexible work time" are also discussed.

6.043 Form, William H. "Technology and Social Behavior of Workers in Four Countries: A Sociotechnical Perspective." *American Sociological Review*, Vol. 37, No. 4, August 1972, pp. 727-738.

Seeks to explain the behavior of industrial workers in terms of the technical constraints of work operations in four automobile plants differing in the degree of technical complexity.

6.044 Fossum, J. A. "Urban-Rural Differences in Job Satisfaction." *Industrial and Labor Relations Review*, Vol. 27, No. 3, April 1974, pp. 405-409.

Compares the ability and job satisfaction of urban and rural women performing repetitive clerical tasks. Finds no difference in ability, but less satisfaction on the part of the urban women.

6.045 Freeman, Richard, and Holloman, Herbert J. "The Declining Value of College Going." *Change*, Vol. 7, No. 7, September 1975, pp. 24-31.

After reviewing the decline in college enrollments and the financial problems this poses for institutions of higher learning, the authors discuss trends in the relative starting salaries and incomes of college graduates, as well as in their employment opportunities. Some of the long-term factors impinging on higher education, and possible responses of public policy also are discussed.

6.046 Gahtan, David. *Education and Production: A Manpower Requirement Model*. Doctoral dissertation presented to New York University, 1974. 194 pp.

Focuses upon the relationship between the educational system and the targets of a given economy. Projects demand for different levels of educated labor based upon the target of minimum unemployment. Develops a model for forecasting the manpower and technological structure of a given economy.

6.047 Gannon, Martin J. "Four Days, Forty Hours: A Case Study." *California Management Review*, Vol. 17, No. 2, Winter 1974, pp. 74-81.

Argues that the new workweek concept has been accepted without critical analysis. Cites disadvantages, such as increased fatigue and lower levels of productivity. Suggests alternative approaches centered around flexible time, optimum workforce mix, and job enrichment.

6.048 Gellerman, Saul W. "Doing Dull Work Well." *The Conference Board Record*, Vol. 11, No. 9, September 1974, pp. 28-32.

Predicts that dull work is likely to increase in the forseeable future. Suggests that routinized jobs can be made more productive through the strategies of better personnel selection and job redesign. Concludes that the solution rests with imaginative supervision.

6.049 Gilroy, Curtis Lloyd. *Investment in Human Capital, and the Nonwhite-White Unemployment Differential.* Doctoral thesis presented to the State University of New York at Binghamton, 1973. 161 pp.

Examines the higher nonwhite unemployment rate in terms of education and occupation variables. Finds that higher nonwhite unemployment is largely due to educational differentials.

6.050 Glaser, Edward M. *Improving the Quality of Worklife . . . and in the Process, Improving Productivity. A Summary of Concepts, Procedures and Problems, with Case Histories.* Los Angeles, Human Interaction Research Institute, 1975. 356 pp.

Examines the current state-of-the-art on work systems designed to improve the quality of life at work which will yield greater productivity and job satisfaction. Discusses problems encountered in developing such work systems and offers guidelines for successful implementation.

6.051 Gomberg, William, "Job Satisfaction: Sorting out the Nonsense." *American Federationist*, Vol. 80, June 1973, pp. 14-19.

Takes issue with some of the claims of behavioral scientists concerning the productivity-raising effects of job redesign.

6.052 Grandjean, Burke D. "The Division of Labor, Technology, and Education: Cross-National Evidence." *Social Science Quarterly*, Vol. 55, No. 2, September 1974, pp. 297-309.

Explores the empirical links between social variables and reports the evidence from 29 countries. Finds that higher education is influenced by social structure and largely unaffected by economic development.

6.053 Greenblatt, Alan D. "Maximizing Productivity Through Job Enrichment." *Personnel*, Vol. 50, No. 2, March-April 1973, pp. 31-39.

Theorizes that the factors which motivate a worker the most are derived from work itself. Argues that money is not the prime motivator and that workers rather want more responsibility and a sense of accomplishment.

6.054 Hansen, W. Lee, and Weisbrod, Burton, A. *Human Investment, Schooling, and Earnings: 'The Role of Experience.'* Institute for Research on Poverty Discussion Papers. Madison, Wis., University of Wisconsin, October 1973. 24 pp.

The authors investigate the role of experience in relation to earnings. They discuss various concepts of experience, and their significance in quantitative terms.

6.055 Haulman, C. A. "A Note on Human Capital Concepts in Pre-Classical Economic Thought." *The Indian Economic Journal*, Vol. 18, No. 3, January-March 1971, pp. 371-376.

Reviews the concept of human capital as viewed by Petty, Cantillion, and Darjes.

6.056 Healy, Robert G. "Effects of Improved Housing on Worker Performance." *The Journal of Human Resources*, Vol. 6, No. 3, Summer 1971, pp. 297-308.

Investigates the impact of housing improvement on worker productivity, health, and absenteeism. Rehousing changed workers' marginal productivity in household work, and raised the opportunity cost of working, bringing about substantial changes in absenteeism and a short-run increase in on-the-job productivity.

6.057 Hedges, Janice Neipert. "How Many Days Make a Workweek?" *Monthly Labor Review*, Vol. 98, No. 4, April 1975, pp. 29-36.

Reports on the first national survey of the number of days usually worked by wage and salary employees who typically work full time. Discusses overall patterns, current developments, workers on shorter workweeks, the 4-day workweek by industry and major occupational group, growth of 5-day workweeks, and extended workweeks.

6.058 Hedges, Janice Neipert. "New Patterns for Working Time." *Monthly Labor Review*, Vol. 96, No. 2, February 1973, pp. 3-8.

Discusses the new arrangements or "patterns" of working time appearing in many industrialized nations, and their expected impact on management, workers, and family life.

6.059 Heim, John, and Perl, Lewis. *The Educational Production Function: Implications for Educational Manpower Policy*. Ithaca, Cornell University, 1974. 38 pp.

The authors discuss the mix of educational resource inputs which will best assure higher student achievement. They consider the input factors of teacher characteristics, class size, administration, and educational technology. They conclude that the major manpower implications relate to salary schedules and teacher selection.

6.060 Herrick, Neal Q. *The Quality of Work and Its Outcomes: Estimating Potential Increases in Labor Productivity*. Columbus, The Academy for Contemporary Problems, September 1975. 73 pp.

Seeks to provide a conceptual framework for estimating productivity increases in manufacturing occurring through improvements in the quality of work. Provides measures for such productivity-retarding factors as absenteeism, tardiness, grievances, machine repair, etc.

6.061 Hoffman, Eileen B. "The Four-Day Week Raises New Problems." *The Conference Board Record*, Vol. IX, No. 1, January 1972, pp. 21-26.

Summarizes the main problems encountered in establishing a 4-day week. Discusses the results of union-management sponsored pilot programs; union and employee attitudes; scheduling difficulties; pay problems; overtime, holiday and vacation scheduling; and legal aspects, particularly those involving wage-hour laws.

6.062 Hu, Teh-wei and others. "Economic Returns to Vocational and Comprehensive High School Graduates." *The Journal of Human Resources*, Vol. 6, No. 1, Winter 1971, pp. 25-50.

The authors compare the costs of education and labor market performances of vocational and comprehensive high school graduates who did not go on to college. They conclude that monetary returns to vocational technical graduates were higher.

6.063 Simpson, W. Hunter. "Electronics Manufacturers Sees Gains in Productivity, Plant Use, and Morale." In "The 4-40 Workweek: Two Views," *Manpower*, Vol. 4, No. 1, January 1972, pp. 14-19.

Part of a debate on the pro's and con's of the 4-day, 40-hour workweek (see the entry under Clayman, Jacob and Hannigan, Thomas for rebuttal). The author recites such advantages of 4-40 as elimination of overtime by use of staggered work schedules; more intensive use of plant and equipment; and more leisure available to employees, discounting the effects of fatigue from a longer (10-hour) workday.

6.064 Institute of Industrial Relations. *Humanization of the Workplace: The Swedish Experience*. University of California at Los Angeles, 1974. 67 pp.

Contains papers presented at a seminar on the quality of working life and worker participation in industry. Covers such topics as the Swedish industrial relations system, reorganization of the workplace, participatory management by government employees, occupational safety and health, and experiments with new-style factories.

6.065 "Job Redesign on the Assembly Line: Farewell to Blue-Collar Blues?" *Organizational Dynamics*, Vol. 2, No. 2, Autumn 1973, pp. 51-67.

Deals with such questions as what the economically feasible conditions for redesigning the assembly line are; whether employees resist job redesign and whether they prefer monotonous work; and what the impact of culture and the political system is on job redesign. Case studies are presented.

6.066 Johnson, Thomas. "Zealots and Malingerers: Results of Firm-Specific Human Capital Investments." *Southern Economic Journal*, Vol. 41, No. 4, April 1975, pp. 613-626.

Explores the employment relationship within a firm when the productivity of an employee whom it would be costly to replace cannot be measured. Develops a model leading to a dichotomization of the labor force into two classes, and rejects conventional labor supply analysis that there is perfect substitution between leisure and income.

6.067 Katzell, Raymond A., and Yankelovich, Daniel, with others. *Work Productivity and Job Satisfaction. An Evaluation of Policy-Related Research.* New York, N.Y., The Psychological Corporation, January 1975. 431 pp.

The authors evaluate studies of job satisfaction and productivity, and examine how both may be enhanced by changing patterns of job responsibility, control, and compensation.

6.068 Katzell, Raymond A., and Yankelovich, Daniel. "Improving Productivity and Job Satisfaction." *Organizational Dynamics*, Vol. 4, No. 1, Summer 1975, pp. 69-80.

Address the problem of how productivity and job satisfaction can be enhanced together.

6.069 Khaldi, Nabil. "Education and Allocative Efficiency in U.S. Agriculture." *American Journal of Agricultural Economics*, Vol. 57, No. 4, November 1975, pp. 650-657.

Shows that productivity growth enhances the comparative advantage of large farms and that rising operator education implies scale economies in the use of information. Presents an empirical model for measuring cost inefficiencies.

6.070 Kendrick, John W. "The Accounting Treatment of Human Investment and Capital." *The Review of Income and Wealth*, Series 20, No. 4, December 1974, pp. 439-468.

Presents estimates of human investment in the U.S. from 1929 to 1969. Develops an economic accounting framework to accommodate human investment, and research and development, in the national and sector capital accounts. Computes rates of return on human, nonhuman, and total capital.

6.071 Kiker, B. F., ed. *Investment in Human Capital.* Columbia, University of South Carolina Press, 1971. 608 pp.

A collection of articles based on the assumption that expenditures on man which lead to future increases in productivity are investments in capital and that it is useful to treat them as capital formation.

6.072 Omitted.

6.073 Kottis, Athena. "Mobility and Human Capital Theory: The Education, Age, Race, and Income Characteristics of Migrants." *The Annals of Regional Science*, Vol. 6, No. 1, June 1972, pp. 41-60.

Presents evidence supporting the hypothesis that the better educated, the younger, and the middle-income groups of migrants are more mobile than the less educated, the older, and the very low, or very high-income groups; also that blacks are less mobile than whites in periods of high unemployment.

6.074 Kranzberg, Melvin, and Gies, Joseph. *By the Sweat of Thy Brow.* New York, N.Y., G. P. Putnam's & Sons, 1975. 248 pp.

The authors trace the evolution of work within the framework of the division of labor. They discuss such aspects as ancient agriculture and industry, the industrial revolution, mass production, and the impact of automation.

6.075 Kuprienko, L. "Influence of the Standard of Living on the Movement of Labor Resources." *Problems of Economics*, Vol. 15, No. 6, September 1972, pp. 61-77.

Addresses improved distribution of personnel as a method of reducing labor turnover, strengthening discipline, and increasing the utilization of labor. Offers suggestions to combat the manpower shortage in the Soviet Union and discusses the factors associated with improved working conditions.

6.076 Layard, P. R. G. "Denison and the Contribution of Education to National Income Growth: A Comment." *Journal of Political Economy*, Vol. 81, No. 4, July-August 1973, pp. 1013-1016.

Criticizes Denison's analysis of the contribution of education to national income growth, citing an error in Denison's index of labor force quality. Argues that Denison exaggerates the contribution of education to growth.

6.077 Levhari, David, and Sheshinski, Eytan. "Experience and Productivity in the Israel Diamond Industry." *Econometrica*, Vol. 41, No. 2, March 1973, pp. 239-253.

The authors examine the skill of workers engaged in the cutting of diamonds, the skill of their managers, and the way these skills vary with experience. They find a strong correlation between productivity and experience.

6.078 Lindsay, C. M. "Measuring Human Capital Returns." *Journal of Political Economy*, Vol. 79, No. 6, November/December 1971, pp. 1195-1215.

Argues that the currently pervasive "income difference" measure of the return on human capital investment is upwardly biased. Attempts to develop tests for "shortage" and "surplus" conditions which correct for this bias.

6.079 Lubitz, Raymond. "A Note on United States Direct Investment and Human Capital." *Journal of Political Economy*, Vol. 79, No. 5, September-October 1971, pp. 1171-1175.

Examines the large human capital outflow involved in United States investment abroad. Determines that the outflow is a result of international factor endowments rather than discrimination against available local personnel.

6.080 McEaddy, Beverly J. "Educational Attainment of Workers, March 1974." *Monthly Labor Review*, Vol. 98, No. 2, February 1975, pp. 64-69.

Reports on educational attainment of the labor force in March 1974, by years of school completed, labor force status, unemployment rate, age, sex, race, ethnic origin (Spanish, all others), and occupation.

6.081 Macut, John J. "Measuring Productivity Under a 4-Day Week." *Monthly Labor Review*, Vol. 97, No. 4, April 1974, pp. 55-56.

Summarizes the results of a pilot study designed to examine the effect of a 4-day workweek on productivity, absenteeism, recruitment, scheduling, use of facilities, and overtime.

6.082 Maikov, A. "Manpower and Labor Productivity." *Problems of Economics,* Vol. 15, No. 3, July 1972, pp. 60-72.

Discusses lagging productivity growth, manpower shortages, unfavorable migration of the population, and new targets of the current five-year plan. Suggests more rational use of the workforce, utilizing labor resources more effectively.

6.083 Manevich, E. "Ways of Improving the Utilization of Manpower." *Problems of Economics,* Vol. 17, No. 2, June 1974, pp. 3-23.

Comments on the manpower shortage in the USSR as a restriction on the growth of labor productivity. Reviews the decline in Russia's birthrate and population growth. Calls for new technologies, improved planning, and better management of enterprises as ways to combat the labor shortage, increase productivity, and enhance output growth.

6.084 Maton, J., and Debbaut, H. "The Comparative Effects of Investments in Human Resources and Physical Investments on Production and Productivity in Iron and Steel. Application of Production Functions on an International Cross Section." *Cahiers Economiques de Bruxelles,* No. 61, First Quarter, 1974, pp. 59-79.

The authors use an international sample of iron and steel industries to consider the quantitative impact of investments in education on production and productivity, and the impact of increased factor inputs and scale economies on wages. They compare the effects of investment in human capital with the effects of physical investments. They find that labor productivity and human capital productivity are significantly influenced by capital intensity and scale economies.

6.085 Morrall, John F., III. *Human Capital, Technology, and The Role of The United States in International Trade.* Gainesville, University of Florida Press, 1972. 130 pp.

Examines the two basic current approaches to international trade theory—human capital, and the product cycle. Tests both approaches statistically, and discusses the future role of the U.S. in international trade.

6.086 Nemchenko, V. S. "Mobility of Labor Resources." *Problems of Economics,* Vol. 17, No. 6, October 1974, pp. 77-88.

Addresses the rapid change in the occupational and skill structure of labor resulting from technological revolution. Argues that increased control over the allocation of labor resources is necessary to avoid slowdowns in productivity growth.

6.087 Nicholls, N. M. "Age, Education, Experience and National Origins of Horticultural Farm Operators: Their Effect on Farm Profitability." *Quarterly Review of Agricultural Economics,* Vol. 24, No. 4, October 1971, pp. 236-244.

Examines the effect of personal attributes of farm operators on profitability. Concludes that factors such as age, experience and education are associated to a significant but limited extent.

6.088 Niland, J. R. "A Human Capital Model for Brain Drain of Foreign Manpower Trained in the U.S." *Journal of Economic Issues,* Vol. 5, No. 3, September 1971, pp. 60-71.

Discusses the welfare effects of international labor migration, focusing on foreign students who enter the United States for study. Argues that students who work temporarily in United States and then return may maximize world welfare.

6.089 Organization for Economic Cooperation and Development. *International Conference on New Patterns for Working Time.* Paris, OECD, 1972. 86 pp.

A collection of conference reports covering such topics as the pattern of working time, the life-time distribution of working time, flexible working time, shift work and length of working day, and working hours per week and day.

6.090 Owen, J. E. "An End to the Work Ethic in America?" *Rivista Internazionale di Scienze Economiche e Commerciali,* Vol. 22, No. 1, January 1975, pp. 33-41.

Presents evidence of changing worker attitudes as reflected in higher rates of absenteeism, society's regard for leisure, declining productivity, and public opinion polls showing worker discontent. Argues that these attitudes must be seen in light of modern conditions involving more education and rising levels of worker expectations.

6.091 Pavlov, P. "Labor Resources and the Intensification of Production (Based on the Example of a Large Industrial Center)." *Problems of Economics,* Vol. 15, No. 5, September 1972, pp. 78-89.

Reports on progress made in Leningrad to increase labor productivity across all lines of industry. Examines efforts to curtail migration to large urban centers.

6.092 Pearson, John W. *The 8-Day Week.* New York, Harper and Row, 1973. 161 pp.

Argues that the current arrangement of work and leisure time contributes to economic stagnation and the strains of urban life. Suggests a revised workweek schedule that increases productivity in capital intensive countries, and improves the quality of life.

6.093 Penzer, William N. *Productivity and Motivation Through Job Engineering.* New York, AMACOM, 1973. 31 pp.

Discusses job design as a tool in the effective use of manpower resources. Offers a theory of job development, together with case studies. Suggests future opportunities for job design programs.

6.094 Perez, Jose Ramon. *The Rate of Return to Educational Investments With Special Reference to Puerto Rico.* Doctoral thesis presented to The University of Michigan, 1973. 166 pp.

Critically reviews the pertinent literature. Measures the benefits of schooling by observed earnings differentials of earnings recipients at a given age but with different years of schooling completed. Finds that maximum social rates of return are insufficient, and that public investment in fields other than education might be preferable.

6.095 Price, Charlton R. *New Directions in The World of Work.* A Conference Report. Kalamazoo, Mich., The W. E. Upjohn Institute of Employment Research, 1971. 40 pp.

Explores questions of worker frustration on the job. Discusses changes in worker attitudes, effects of occupational change,

and steps taken by various companies to deal with the problem. Training, new careers, and midcareer development are also discussed.

6.096 Psacharopoulos, George, and Hinchliffe, K. "Further Evidence on the Elasticity of Substitution among Different Types of Educated Labor." *Journal of Political Economy,* Vol. 80, No. 4, July-August 1972, pp. 786-792.

The authors find that high substitution possibilities exist among developed countries and that decreases in the ratio of higher educated to secondary-school educated labor results in narrower earnings differentials for developing countries.

6.097 Psacharopoulos, George. *Earnings and Education in OECD Countries.* Paris, OECD, 1975. 194 pp.

Discusses such topics as the effects of variations in school quality; monopoly elements in earnings from education, and others. Finds that quantity and quality of education have a strong impact on earnings differentials.

6.098 Razin, A. "Optimum Investment in Human Capital." *Review of Economic Studies,* Vol. 39, No. 4, October 1972, pp. 455-460.

Links the theory of investment in human capital to economic growth by measuring returns to a labor function.

6.099 Reinhardt, Uwe E. *Physician Productivity and the Demand for Health Manpower. An Economic Analysis.* Cambridge Mass., Ballinger Publishing Co., 1975. 311 pp.

Reviews health manpower policies and surveys proposals to improve physician productivity. Analyzes health care production in private medical practice. Offers recommendations, bearing particularly on health manpower substitution.

6.100 Revans, R. W. *The Emerging Attitudes and Motivations of Workers.* Report of a Management Experts' Meeting, Paris, 24th-26th May 1971. Paris, Organization for Economic Cooperation and Development, 1972. 57 pp.

Discusses policies management needs to adopt to deal with changing values, attitudes and motivations of workers. Cites many examples.

6.101 Robertson, Paul Howard. *The Distribution of Welfare, the Accumulation of Labor, and the Process of Economic Growth.* Doctoral dissertation presented to Columbia University, 1974. 259 pp.

Outlines a growth model incorporating an endogenously determined index of the quality of labor. Constructs a neoclassical model with a labor reproduction function. Offers an analysis of labor within the tradition of Malthus, Ricardo and Marx.

6.102 Rosow, Jerome M. "Productivity and the Blue-Collar Worker." *Personnel Administration,* Vol. 34, No. 5, September-October 1971, pp. 14-19.

Discusses how the economic and social situation of the lower-middle class worker, as well as attitudes, moonlighting, pension plans, incentive systems, and occupational safety affect productivity.

6.103 Rousham, Sally. *Flexible Working Hours Today.* London, British Institute of Management, 1973. 58 pp.

Presents a survey of fifty British organizations which introduced flexible working hours in an office environment. Discusses the reasons for introducing the scheme and highlights its effects on workers and management.

6.104 Ruttenberg, Harold J., and Wisnewsky, Edward. "Incentives and Productivity in Israel Industry." *Public Administration in Israel and Abroad,* 1971, pp. 93-108.

The authors argue that Israeli (and other) workers adopt practices which lead to inefficiency, and that the attitudes of the work force and not the means of production are the key to productivity. They hold that group incentive systems are the best way to boost productivity.

6.105 Saint, Avice M. *Learning at Work: Human Resources and Organizational Development.* Chicago, Ill., Nelson-Hall Company, 1974. 332 pp.

Discusses training practices within an organization which enhance productivity. Draws upon a comparative analysis of seven large-scale organizations to develop basic

principles. Concludes that productive results occur when training programs are applied to real programs and work goals.

6.106 Schweitzer, Stuart O. "Occupational Choice, High School Graduation, and Investment in Human Capital." *The Journal of Human Resources,* Vol. 6, No. 3, Summer 1971, pp. 321-332.

Measures the economic value of high school graduation in terms of augmented lifetime earnings on an occupational basis. Finds that the value of high school completion is negative for some occupations.

6.107 Schultz, Theodore W. *Investment in Human Capital.* New York, Free Press, 1971. 272 pp.

Summarizes the author's contributions to the field of human capital. Stresses the pervasive and heterogenous nature of human capital, the changing nature of foregone earnings, rates of return to formal education, and research and development expenditures.

6.108 Scoville, James G. *Manpower and Occupational Analysis: Concepts and Measurements.* Lexington, Mass., D. C. Heath, 1972. 136 pp.

Discusses occupational data needs. Provides a concise analysis of the characteristics of existing data and their limitations.

6.109 Searing, Marjorie Ellen. *Education and Its Contribution to Economic Growth Under Socialism: The Experience in Hungary and Poland.* Doctoral dissertation presented to Georgetown University, 1972. 320 pp.

Presents estimates of formal education attained by the population and labor force, and of expenditures on, and real resource costs of, education. Relates educational effort to economic growth, and offers comparisons with the U.S.

6.110 Sedlmeier, Edward John. *American Immigration: An Inflow of Human Capital.* Doctoral thesis presented to Cornell University, 1973. 273 pp.

Presents cost-of-production estimates of the capital embodied in immigrants.

6.111 Sheppard, Harold L., and others. *Where Have all the Robots Gone?* New York, The Free Press, 1972. 222 pp.

The authors deal with the growing dissatisfaction of blue-collar workers with their jobs. They argue that certain types of jobs are undesirable, not only for the individual but also for society as a whole. The relationships between work, authoritarianism, and political attitude are discussed. Different segments of the labor force and their relation to work are considered.

6.112 Shimada, Haruo. *The Structure of Earnings and Investments in Human Resources: A Comparison Between the United States and Japan.* Doctoral thesis presented to the University of Wisconsin, 1974. 234 pp.

Compares the relation between earnings and experience of different labor force segments in the U.S. and Japan. Examines three aspects—aggregate earnings over time; blue- and white-collar occupations; and large- and small-scale industries.

6.113 Solomon, L. C. "Capital Formation by Expenditures on Education in 1960." *Journal of Political Economy,* Vol. 79, No. 6, November-December 1971, pp. 1412-1417.

Presents estimates of capital formation by education. Finds differences between the estimates, which he attributes to different concepts of foregone earnings used.

6.114 Stoikov, Vladimir. *The Economics of Recurrent Education and Training.* Geneva, Switzerland, International Labour Office, 1975. 115 pp.

Evaluates recurrent education as an alternative to existing systems of sequential education. Presents cost-benefit analyses, and discusses recurrent education from the viewpoint of equity and efficiency. Also cites examples from programs of recurrent education.

6.115 Strauss, George. *Job Satisfaction, Motivation, and Job Redesign.* Berkeley, Institute of Industrial Relations, University of California, 1974. 30 pp.

Provides a perspective on the discussion of the subject. Argues that most workers

are satisfied with their work, although they react favorably to more challenging tasks; and that job redesign schemes have limited effects.

6.116 Stromsdorfer, Ernest W. *Review and Synthesis of Cost-Effectiveness Studies of Vocational and Technical Education.* Council of Planning Libraries Exchange Bibliography No. 362. Monticello, Ill., January 1973. 39 pp.

Draws together studies attempting to evaluate vocational and related manpower programs in an economic context.

6.117 Swerdloff, Sol. *The Revised Workweek: Results of a Pilot Study of 16 Firms,* BLS Bulletin 1846. U.S. Department of Labor, Bureau of Labor Statistics, 1975. 31 pp.

Discusses the objectives for adopting the revised workweek schedules. Describes types of schedules adopted by the firms; effects of the revised schedules; employees' attitudes; and the nature and adequacy of the data available.

6.118 Tachibanaki, Toshiaki. *Quality Change in Labor Input and Wage Differentials: A Study of Japanese Manufacturing Industries.* Doctoral thesis presented to the Johns Hopkins University, 1973. 154 pp.

Examines wage differentials in terms of such variables as age, sex, education, and occupation. Compares Japanese with U.S. wage differentials. Quantifies qualitative factors in determining labor quality changes.

6.119 Tillery, Winston L. *Hours, Overtime, and Weekend Work,* BLS Bulletin 1425-15. U.S. Department of Labor, Bureau of Labor Statistics, 1974. 76 pp.

Surveys pertinent provisions of collective bargaining agreements covering 1,000 or more workers. Interprets contract clauses related to the conditions under which employers will pay overtime or weekend premium rates. Presents data by industry.

6.120 Weisbrod, Burton A., and others. *Disease and Economic Development. The Impact of Parasitic Diseases in St. Lucia.* Madison, University of Wisconsin Press, 1973. 218 pp.

The authors measure the impact of parasitic diseases on mortality rates, scholastic performance, and labor productivity. They conclude that diseases' effects on economic development are modest.

6.121 U.S. Department of Labor, Bureau of Labor Statistics. "Seven-Day Production Week Proposed in India." *Monthly Labor Review,* Vol. 96, No. 6, June 1973, p. 64.

Foreign Labor Brief presenting a report on the 7-day production week proposed by the Indian Labor Minister to relieve his country's economic difficulties.

6.122 U.S. Senate, Committee on Post Office and Civil Service. *Flexible Hours Employment.* Hearings, September 26, 1973. Washington, U.S. Government Printing Office, 1973. 152 pp.

Presents position papers by various Federal agencies, including the Department of Labor and the Civil Service Commission, as well as statements by interested parties, and a series of articles dealing with the question under review.

6.123 U.S. Senate, Committee on Labor and Public Welfare, Subcommittee on Employment, Manpower and Poverty. *Worker Alienation, 1972.* Hearings, July 25 and 26, 1972. Washington, D.C., U.S. Government Printing Office, 1972. 354 pp.

Presents statements by experts and others on a bill to provide for research for solutions to the problem of worker alienation; and for pertinent technical assistance to companies and State and local governments.

6.124 Wade, Michael. *Flexible Working Hours in Practice.* New York, John Wiley, 1974. 112 pp.

Describes experience of firms which have adopted flexible working hours. Examines the origins of the practice, varieties, time recording systems, and effects.

6.125 Waldorf, W. H. "Quality of Labor in Manufacturing." *Review of Economics and Statistics,* Vol. 55, No. 3, August 1973, pp. 284-290.

Estimates the quality change per employee-hour for workers in selected U.S. manufacturing industries from 1952 to 1967.

Concludes that much of the quality increase is related to the shift in employment from production to non-production workers.

6.126 Wallace, Robert Bruce. *The Measurement of the Economic Value of Schooling Output.* Doctoral thesis presented to Northwestern University, 1972. 171 pp.

Seeks to develop a measure for the output of high schools and the impact on students' future income.

6.127 Warke, Thomas Wilton. *The Theory and Measurement of Learning-From-Experience and of Externalities in Developing Countries.* Doctoral thesis presented to Princeton University, 1973. 246 pp.

Argues that balanced growth is necessary as between human and physical capital, and that labor-embodied technical progress is of particular importance for the success of economic development, and reductions in discrepancies in per capita income among countries.

6.128 Watanabe, Tsunehiko. "Improvement of Labor Quality and Economic Growth—Japan's Postwar Experience." *Economic Development and Cultural Change,* Vol. 21, No. 1, October 1972, pp. 33-53.

Examines quantitatively the heterogeneity of labor resulting from differences in educational background, skill, etc. Provides a quantitative appraisal of the improvement of labor quality. Proposes development of a "standard efficiency unit" to solve the problem of how to adjust the unweighted sum of man-years for the heterogeneity of labor force participants.

6.129 Wells, Stuart Jay. *Technology, Efficiency, and Educational Production.* Doctoral thesis presented to Stanford University, 1974. 376 pp.

Investigates aspects of the utilization and distribution of educational resources in the context of educational production functions; analyzes efficiency; and examines technological changes.

6.130 Winnick, Andrew Jay. *A Study of the Characteristics, Education and Training of Technicians.* Doctoral dissertation presented to the University of Wisconsin, 1971. 397 pp.

Documents the growth of technician employment. Determines annual salaries, relating them to education. Finds that various types of training programs provide viable alternatives to college education. Examines occupational definitions in detail.

6.131 Wise, D.A. "Academic Achievement and Job Performance." *American Economic Review,* Vol. 65, No. 3, June 1975, pp. 350-366.

Examines the relationship between scholastic achievement and job performance of college graduates working in large corporations. Finds the relationship, as measured by rate of salary increase, to be significant.

6.132 Wolfbein, Seymour L. *Work in American Society.* Glenview, Ill., Scott, Foresman, 1971. 195 pp.

Surveys the characteristics of the American labor force, and its industrial and technological environment. Discusses patterns of mobility and migration, unemployment, and poverty. Also discusses economic policies and manpower policies, as well as their effectiveness. Concludes with a chapter on work and leisure.

6.133 Wolpin, Kenneth I. *Education, Screening and the Demand for Labor of Uncertain Quality.* Doctoral dissertation presented to the City University of New York, 1974. 137 pp.

Addresses the issue of whether formal schooling serves to augment worker productivity as opposed to conveying information to employers about the probable productive capabilities of prospective workers. Develops theoretical models and offers tests. Concludes that the evidence supports the productivity-augmenting view of schooling rather than its use as a screening device.

6.134 *Work in a Changing Industrial Society.* Paris, Organization for Economic Cooperation and Development, 1974. 134 pp.

A collection of policy-oriented papers. Topics addressed are: technology; worker attitudes; responses of industry, government and unions; and future requirements for education and training.

6.135 *Work in America.* Report of a Special Task Force to the Secretary of Health, Educa-

tion, and Welfare. Cambridge, Mass., The MIT Press, 1973. 262 pp.

Analyzes the quality of working life. The central theme is redesign of jobs. Topics addressed are: the functions of work in bringing meaning to life; work problems; physical and mental costs of jobs; training; and Federal manpower policies.

6.136 Zottola, Armand Joseph. *Reverse Migration in Puerto Rico: A Case Study of Human Capital Investment and Technological Transfer.* Doctoral thesis presented to Catholic University of America, 1973. 193 pp.

Presents a survey of return migrants in terms of economic, social, and demographic information. Finds significant occupational upgrading of such migrants. Concludes that the return migration process is related to human capital improvements.

Management and organization

7.001 Bloom, Gordon F. *Productivity in the Food Industry: Problems and Potential.* Cambridge, Mass., and London, MIT Press, 1972. 314 pp.

Employs a systems approach to productivity problems in the food processing industry and examines the many influences—legal, technological, economic and institutional—which impinge upon the distribution system and ultimately determine the rate of productivity improvement.

7.002 Brooks, George. *Negotiating for Productivity in Sanitation.* Washington, D.C., Labor-Management Relations Service, U.S. Conference of Mayors, June 1973. 12 pp.

Examines unionization in municipal sanitation, and the effects of unions upon productivity. Discusses conditions favorable to productivity improvement, bargaining about productivity, and subcontracting.

7.003 Burnham, Donald C. *Productivity Improvement.* New York, Columbia University Press, 1973. 73 pp.

Presents lectures on the effects of recommendations for improving productivity, and the need for continued productivity growth.

7.004 Craig, Charles E., and Harris, R. Clark. "Total Productivity Measurement at the Firm Level." *Sloan Management Review,* Vol. 14, No. 3, Spring 1973, pp. 13-29.

Using a case study approach, the authors develop a measure of total productivity for a firm or industry. They discuss each variable in their model and show the differences from other systems of calculating company productivity.

7.005 Cummings, T. G., and others. "Intervention Strategies for Improving Productivity and the Quality of Work Life." *Organizational Dynamics,* Vol. 4, No. 1, Summer 1975, pp. 52-68.

The authors review and analyze the current state of strategies on job satisfaction, industrial organization, and productivity, based on an examination of the literature.

7.006 De Vany, Arthur S. "The Effect of Price and Entry Regulation on Airline Output, Capacity and Efficiency." *Bell Journal of Economics and Management Science,* Vol. 6, No. 1, Spring 1975, pp. 327-345.

Develops a model of capacity utilization in an industry where price and entry are regulated. Assesses the efficiency of airline regulation.

7.007 Doktor, Robert, and Burger, Philip. "Managerial Behavior and Industrial Strife." *Industrial Relations,* Vol. 14, No. 2, May 1975, pp. 266-269.

The authors relate bargaining behavior of managers in seven industrial countries to working days lost because of industrial disputes. They suggest management behavior is related to patterns of industrial strife.

7.008 Drogichinskii, N. "On Wholesale Trade in the Means of Production." *Problems of Economics,* Vol. 17, No. 6, October 1974, pp. 89-107.

Theorizes on the role of wholesale trade in a socialist economy as a means of planned distribution. Asserts that the development of the wholesaling function presupposes intensification of centralized planning. Incorporates the wholesale trade industry into the framework of the USSR's five-year plans.

7.009 Dunlop, John T., and others. *Industrialism and Industrial Man Reconsidered. Some Perspectives on a Study over Two Decades of the Problems of Labor and Management in Economic Growth.* Princeton, The Inter-University Study of Human Resources in National Development, 1975. 99 pp.

The authors review central themes pertinent to the subject, including the role of industrializing elites, the degree of adaptability of labor, the concept of industrial relations, strategies of human resource development, and costs of industrialization.

7.010 Elzie, Leonard Thomas. *The Evolution of the Scarcity Concept.* Doctoral dissertation presented to The University of Florida, 1974. 172 pp.

Traces the transition of economic theory from the "absolute" scarcity concept, associated with the classics and with value doctrines, and "relative" scarcity, associated with the economizing goals of individuals and societies.

7.011 Eshelman, John Denison. *Resource Allocation in Medical Research.* Doctoral dissertation presented to the University of Washington, 1971. 83 pp.

Develops objective criteria for allocating research funds based on a rate-of-return concept. Estimates the value of medical output; examines consumer demand; and identifies disease areas where underinvestment has occurred.

7.012 FEA Interagency Task Group on Powerplant Reliability. *A Report on Improving the Productivity of Electric Powerplants.* Washington, Federal Energy Administration, March 1975. 85 pp.

Assesses the reliability of nuclear and fossil-fired generator units in terms of availability of service and capacity utilization. Reviews factors reducing availability, and recommends steps to improve it.

7.013 Fettner, Lee. *The American Maritime Industry Since 1928: Productivity and Other Factors in its Decline.* Doctoral dissertation presented to New York University, 1974. 239 pp.

Analyzes the impact of managerial techniques, labor unions, and government regulation on the industry. Develops total factor productivity indexes and finds no comparative disadvantage. Concludes the industry decline is a result of government policy which leads to high costs of operation.

7.014 Figueras, Juan Antonio. *Agrarian Reform and Agricultural Development in Mexico.* Doctoral dissertation presented to The University of Florida, 1972. 544 pp.

Analyzes the causes of agrarian reform in Mexico, stressing their political aspects. Shows that agrarian policies continue to be dominated by political rather than economic considerations, although these were gaining in importance from the thirties forward.

7.015 Fulmer, John, editor. *Proceedings of Conference on Maximizing Productivity Improvement of Hourly Workers.* Atlanta, Georgia Institute of Technology, 1971. 170 pp.

Presents views of 30 participants from business, law, education, and government.

7.016 Gellerman, Saul W. "Who's Against Productivity?" *The Conference Board Record,* Vol. 10, September 1973, pp. 39-43.

Argues that productivity improvement is based on "company politics," with high-ranking management support needed for a plan to work. Describes examples of company productivity improvement plans.

7.017 Giannakouros, George. *The Economies of Greek Shipping: Growth, Problems and Alternatives.* Doctoral dissertation presented to the University of Iowa, 1974, 231 pp.

Examines the industry's position, within both the Greek economy and the international market for shipping services. Discusses industry structure and assesses government policy toward the industry.

7.018 Granick, David. *Managerial Comparisons of Four Developed Countries: France, Britain, United States, and Russia.* Cambridge, Mass., MIT Press, 1972, 394 pp.

Examines management as a factor of production in the output of large-scale manufacturing enterprises. Models of management are developed. Compares managerial selection, careers, practices, behavior and incentives in American, French, English and Soviet business enterprises.

7.019 Hartley, K. "Development Time Scales for British and American Military Aircraft." *Scottish Journal of Political Economy,* Vol. 19, No. 2, June 1972, pp. 115-134.

Seeks to determine the influence of certain factors on production time requirements in British and U.S. aircraft industries. Examines hypotheses relating to industry structure, procurement policy, and experience possessed by each.

7.020 Holcombe, Arthur Norman. *The Capacity of the United Nations System to Promote Increased Output, Income, and Employment Among*

Traditional Producers in Rural Areas. Doctoral thesis presented to New York University, 1973. 353 pp.

Examines the types of rural institutional services required by traditional producers to gain access to improved farming inputs, production credits, and agricultural knowledge. Develops a theoretical framework of a strategy for modernizing subsistence agriculture. Critically evaluates the U.N. system.

7.021 Huang, Yukon. "Tenancy Patterns, Productivity, and Rentals." *Economic Development and Cultural Change,* Vol. 23, No. 4, July 1975, pp. 703-718.

Argues that economic forces shape tenancy patterns, that productivity is not adversely affected by tenancy, and refutes the proposition that rental levels are exploitative.

7.022 Johnson, Glenn L., and Quance, C. Leroy, eds. *The Overproduction Trap in U.S. Agriculture: A Study of Resource Allocation from World War I to the Late 1960's.* Baltimore, Johns Hopkins University Press for Resources for the Future, 1972. 211 pp.

Papers by eight agricultural economists on resource allocation in American agriculture. Topics studied include capital utilized by the agricultural sector, payments to factors of production, output, and the size and mix of land.

7.023 Kamerschen, David R. "A Reaffirmation of Marginal Productivity Theory." *Revista Internazionale di Scienze Economiche e Commerciali,* Vol. 20, No. 3, March 1973, pp. 286-290.

Reviews recent empirical evidence which supports the theory that firms expand the labor force to the point where marginal productivity equals marginal factor cost. Concludes that firms in the long run attempt to adjust their workforce so as to maximize profits.

7.024 Kamien, M. I., and Schwartz, N. L. "Market Structure, Rivals' Response, and the Firm's Rate of Product Improvement." *Journal of Industrial Economics,* Vol. 20, No. 2, April 1972.

The authors examine the question of whether rivalry spurs or retards technical progress.

7.025 Kamien, M. I., and Schwartz, N. L. "Some Economic Consequences of Anticipating Technical Advance." *Western Economic Journal,* Vol. 10, No. 2, June 1972, pp. 123-138.

The authors study the investment decisions of a firm under the supposition that the firm foresees better technology becoming available. They find that the anticipation of technical advance tends to delay investment.

7.026 Katzell, Mildred E. *Productivity: The Measure and the Myth.* New York, AMACOM, 1975. 38 pp.

Differentiates between the economic definition of productivity and the management definition which is confined to efficiency and performance of the individual organization. Argues that the most important factors in improving productivity depend on management. Reviews survey results and offers approaches to increasing productivity.

7.027 Khachaturov, T. "Improving the Methods of Determining the Effectiveness of Capital Investments." *Problems of Economics,* Vol. 16, No. 5, September 1973, pp. 3-30.

Discusses the importance of productivity in the decision-making process of the Russian economy. Argues that investments decisions should be made with a view to increasing productivity. Examines methods to evaluate the effectiveness of investment decisions. Illustrates the importance of higher education and scientific research in improving productivity.

7.028 Khromov, P. "Scientific and Technical Progress and Labor Productivity." *Problems of Economics,* Vol. 15, No. 3, July 1972, pp. 46-59.

Argues that production function models place too much emphasis on the capital-output ratio in economic development. States that increased labor productivity depends not only on capital accumulation but chiefly on the effective use of capital.

7.029 Kretzmann, Alfred Martin. *Productivity Changes, Trade Balance and Socio-Economic Repercussions: An Inquiry into A Change-Oriented Society.* Doctoral thesis presented to Colorado State University, 1973. 215 pp.

Argues that undirected, general productivity advances, including those spurred by government, may contribute to deterioration in the balance of trade. Develops a selective productivity-trade balance model, designed to help improve the trade balance. Also takes account of the social costs implicit in this model.

7.030 Lee, M. I. "Interdependent Behavior and Resource Misallocation in Hospital Care Production." *Review of Social Economy,* Vol. 30, No. 1, March 1972, pp. 84-95.

Examines the decisionmaking process whereby hospitals acquire inputs. Concludes that because of insufficient attention to the demand for services, resource misallocation has taken place, resulting in hospital cost inflation.

7.031 Liberman, E. C. *Economic Methods and the Effectiveness of Production.* New York, Anchor Books, 1973. 215 pp.

Gives views on economic planning and on how to optimize planning. Discusses economic reforms in the U.S.S.R. in the mid-1960's.

7.032 McBeath, Gordon. *Productivity Through People. A Practical Guide to Improvement.* New York, John Wiley, 1974. 176 pp.

Discusses ways to improve productivity, focusing on specific areas, such as manpower, plant and machinery, organization, systems and planning, and others. Also deals extensively with worker attitudes, job enrichment, and training for productivity improvement.

7.033 McGee, J. S. "Economies of Size in Auto Body Manufacture." *Journal of Law and Economics,* Vol. 16, No. 2, October 1973, pp. 239-274.

Assesses the relation between the rate of output and total volume on costs. Finds that auto body manufacturers are not large enough to exhaust even the purely technical economies of scale.

7.034 Mantell, E. H. "Factors Affecting Labor Productivity in Post Offices." *Journal of the American Statistical Association,* Vol. 69, No. 346, June 1974, pp. 303-309.

Examines the joint production function which characterizes intra-post office activities. Finds that post office allocation of labor and capital is suboptimal in terms of productivity.

7.035 Meade, J. E. "Labour-Managed Firms in Conditions of Imperfect Competition." *Economic Journal,* Vol. 84, No. 336, December 1974, pp. 817-824.

Examines labor-managed cooperatives and finds them to be more restrictive than the entrepreneurial firm. Concludes labor-managed cooperatives are viable where economies of scale are not important, the production process is labor intensive and there are no barriers to entry for competing cooperatives.

7.036 Meisner, Joseph Charles. *Investor Capital, Taxes, and the Structure of Cattle Feeding.* Doctoral dissertation presented to the University of Missouri-Columbia, 1974. 429 pp.

Examines the accumulation of nonfarm capital in cattle feeding, and the concentration of ownership in the industry.

7.037 Moore, Thornton, and Wecksler, A. N. *Improving Productivity: A Description of Selected Company Programs.* (Series I) National Center for Productivity and Quality of Working Life, Washington, D. C., Government Printing Office, December 1975. 30 pp.

The authors decribe the productivity improvements programs of five major companies.

7.038 Morris, William T. *Work and Your Future: Living Poorer, Working Harder.* Reston, Va., Reston Publishing Co., 1975. 305 pp.

Addresses the question whether improvements in productivity will eliminate such threats to rising living standards as inflation, unemployment, and foreign competition. Discusses principal factors in productivity change, particularly technology, managerial approaches, and job design.

7.039 Moore, Brian. *A Plant-Wide Productivity Plan in Action: Three Years Experience with the Scanlon Plan.* National Commission on Productivity and Work Quality. Washington, D.C., May 1975. 54 pp.

Describes the impact of the Scanlon Plan on productivity in a specific case. Emphasizes the suggestion system introduced. Presents a review of the literature, and an evaluation.

7.040 Mueller, Jurgen. "On Sources of Measured Technical Efficiency: The Impact of Information." *American Journal of Agricultural Economics,* Vol. 56, No. 4, November 1974, pp. 730-738.

Argues that the concept of technical efficiency differences is unsatisfactory from a production theory point of view. Develops a model in which differences in information obtained by management may explain productivity differences between firms. Presents estimates from a sample of dairy farms to show the specific impact of information.

7.041 Mueller, Jurgen. *The Impact of Information on Technical Efficiency.* Doctoral dissertation presented to Stanford University, 1972. 113 pp.

Attempts to integrate the concept of technical efficiency—as opposed to allocational efficiency—into the theory of the firm. Postulates differences in the levels of information available to managers,

and measures the impact of these differences upon output.

7.042 Nassau County and others. *Multi-Municipal Productivity Project.* Final Evaluation Report. July 1975. 327 pp.

Describes a project that consisted of attitudinal surveys, personnel surveys, and a study of productivity bargaining, focused chiefly on productivity improvement within a framework of close labor-management participation.

7.043 National Commission on Productivity and Work Quality. *A National Policy for Productivity Improvement. A Statement.* Washington, D.C., October 1975. 35 pp.

Deals with the basic concerns of the Commission, including labor-management relations bearing on productivity; job security; education and training; technology and capital investment; and government regulation.

7.044 National Commission on Productivity and Work Quality. *Employee Incentives to Improve State and Local Government Productivity.* Washington, D.C., Government Printing Office. March 1975. 147 pp. plus appendix.

Surveys practices of State and local governments. Discusses examples such as attendance incentives, competition and contests, job enlargement, performance bonuses and merit increases.

7.045 National Commission on Productivity. *Productivity in the Food Industry. A Preliminary Study of Problems and Opportunities.* Washington, D.C., Government Printing Office. (No date.) 23 pp.

Presents an economic overview of the industry. Outlines five areas of opportunities for productivity improvement.

7.046 National Commission on Productivity and Work Quality. *Jurisdictional Guide to Productivity Improvement Projects.* A Handbook for City Officials prepared for the Commission by the International City Management Association. Washington, D.C., Government Printing Office, May 1975, plus quarterly updates.

A medium for transmitting information on implemented methods of productivity improvements among State and local jurisdictions, divided by major services such as general administration, inspections, libraries, and parks and recreation.

7.047 National Commission on Productivity. *Productivity in State and Local Government.* The Wingspread Conference, July 1973. Washington, D.C., 1973. 27 pp.

Reports on some of the problems encountered in attempts to improve productivity in public service. Also reports on incentives, information problems, and organizational constraints.

7.048 National Commission on Productivity and Work Quality. *Labor-Management Committees in the Public Sector. Experiences of Eight Committees.* Washington, D.C., November 1975. 71 pp.

Describes experiences in repair and maintenance shops in the District of Columbia; in the New York transit system; in the Defense Supply Agency; among Washington State nurses and administrators; in the Memphis joint health and safety committees; in the Denver schools; and others.

7.049 National Commission on Productivity and Work Quality. *Productivity Centers Around the World.* Washington, D.C., May 1975, 36 pp.

Describes the current objectives, functions and operations of national productivity centers in a number of countries.

7.050 National Commission on Productivity and Work Quality. *So, Mr. Mayor, You Want to Improve Productivity . . .* Washington, D.C., Government Printing Office, 1974. 32 pp.

Argues the need for a methodical productivity program; how to implement and manage it. Discusses related themes.

7.051 Neuhauser, Duncan, and Turcotte, Fernand. "Costs and Quality of Care in Different Types of Hospitals." *Annals of the American Academy of Political and Social Science,* Vol. 399, January 1972, pp. 50-61.

The authors examine how cost and quality of care vary by type of hospital. They conclude that while size alone apparently lowers per unit costs, increased scope of services and teaching, which occur in large hospitals, increase costs and quality of care.

7.052 Okun, Arthur M. *Equality and Efficiency: The Big Tradeoff.* Washington, D.C., The Brookings Institution, 1975. 124 pp.

Argues efficiency and equality can be increased if inequalities of opportunity are removed. Exam-

ines pertinent national policies. The role of the market place is emphasized.

7.053 Orzechowski, William P. "Labor Intensity, Productivity, and the Growth of the Federal Sector." *Public Choice,* Vol. 19, Fall 1974, pp. 123-126.

Finds that the Federal sector is capital intensive relative to private industry and the service sector. Suggests that the low productivity of the federal sector is due to behavioral differences between public agencies and private firms, not labor intensity.

7.054 Peddersen, Raymond F., and others. *Increasing Productivity in Foodservice.* Boston, Cahners Books, 1973. 206 pp.

The authors suggest techniques to improve productivity in the industry. They hold that productivity problems are a task for management.

7.055 Piekarz, Rolf, and Thomas, Eleanor. *U.S. Productivity Growth: An Assessment of Perceptions and Prescriptions.* Washington, National Science Foundation, Office of National R & D Assessment, October 1974. 20 pp. plus appendix.

The authors examine the argument that recent U.S. productivity performance has been poor, as well as the public policy recommendations addressing this problem.

7.056 "Productivity: the Federal Government's Role." *Industrial Engineering,* Vol. 5, No. 2, February 1973, pp. 24-31.

Presents interviews with Federal Government officials involved in the Nation's quest for higher productivity.

7.057 Reinhardt, U. "A Production Function for Physician Services." *Review of Economics and Statistics,* Vol. 54, No. 1, February 1972. pp. 55-66.

Seeks to identify the effects of auxiliary personnel and of the mode of practice (solo or group) on the rate of output of physicians. Finds that American physicians could increase their hourly rate of output by 25 percent by employing roughly twice the number of aides that they currently employ.

7.058 Ritter, Archibald Robert Milne. *The Economic Development of Revolutionary Cuba: Strategy and Performance.* Doctoral dissertation presented to the University of Texas at Austin, 1973. 483 pp.

Examines the effectiveness with which Cuba pursued income redistribution, reduced unemployment, spurred economic growth, and attempted to make itself less dependent on sugar and a hegemonic partner.

7.059 Rochart, J. F. "Approach to Productivity in Two Knowledge-Based Industries." *Sloan Management Review,* Vol. 15, Fall 1973, pp. 23-33.

Examines ways of increasing productivity in education and medicine, including study by computer methods; employment of paraprofessionals, and preinterview filling out of forms by physicians' clients.

7.060 Roman, Zoltan, ed. *Progress and Planning in Industry.* Proceedings of the International Conference on Industrial Economics, Budapest, April 14-17, 1970, Budapest, Akademial Kiado, 1972. 417 pp.

A collection of papers by economists from Communist bloc countries and Western nations on planning and economic reform, international development, productivity, efficient utilization of capital and decisionmaking in industry.

7.061 Rosenbloom, R. S. "The Real Productivity Crisis is in Government." *Harvard Business Review,* Vol. 51, No. 5, September-October 1973, pp. 156-164.

Asserts that the factors spurring productivity in the private sector are not operating in government. Calls for the empirical measurement of productivity in State and local governments. Suggests that use of modern managerial techniques, employment of better trained workers, more emphasis by suppliers of technology, and a revised system of reward will lead to productivity improvement.

7.062 Sayles, Leonard R. "Managing Human Resources for Higher Productivity." *Conference Board Record,* Vol. 10, No. 7, July 1973, pp. 57-58.

Argues that low productivity does not result from job boredom, but from managerial waste and poor attitude toward workers and their equipment.

7.063 Silberston, Aubrey, and Seton, Francis, editors. *Industrial Management: East and West.* Papers from the International Economic Association Conference on Labor Productivity 1971. Washington, Praeger, 1973. 260 pp.

Presents papers comparing managerial problems arising in different types of economic systems. Contributions cover problems of managing an entire economy to problems concerned with managing firms.

7.064 Sleight, Lynn G., and Gruebele, James W. "Compensating the 'Human Costs' of Increased Productivity of Fluid Milk Drivers." *American Journal of Agricultural Economics,* Vol. 56, No. No. 3, August 1974, pp. 594-599.

The authors argue that increased labor productivity is accompanied by some form of human cost. They show that collective bargaining is a framework for determining the compensation of human costs, and a restriction on labor productivity in fluid milk delivery.

7.065 Smith, Brett Alan. *Forms of Workers' Participation in Management and Their Impact on Enterprise Performance.* Doctoral dissertation presented to The University of Michigan, 1975. 285 pp.

Formulates hypotheses regarding the effect of worker participation on worker well–being and firm productivity. Examines the empirical evidence concerning the relation between participation and productivity. Among findings is that there are many alternatives to the traditional autocratic pattern of work organization.

7.066 Snoonian, Paul Edward. *A Comparison of Industrial Efficiency for Mexico, Puerto Rico, and the United States.* Doctoral dissertation presented to Michigan State University, 1971. 197 pp.

Finds that plants with equivalent levels of capital intensity are less efficient in Mexico and Puerto Rico than in the U.S., owing to differences in labor and managerial efficiency and economies of scale.

7.067 Staats, Elmer B. "Measuring and Enhancing Federal Productivity." *The Conference Board Record,* Vol. 10, No. 7, July 1973, pp. 53-56.

Discusses recent growth in government spending and the concomitant need to measure and improve productivity in the government sector. Suggests more capital investment, research and development, and education and training. Also argues that timely financing and audits of results of investments would improve productivity.

7.068 Steiner, Ivan D. *Group Process and Productivity.* New York, Academic Press, 1972. 204 pp.

Examines the integrative role of productive tasks performed by groups. Deals with the performance of groups undertaking certain types of tasks. Also deals with the effects of group size on productivity, the consequences of group composition, and group-related motivation.

7.069 Stetson, Damon. *Productivity: More Work For A Day's Pay.* Washington, D.C., Labor-Management Relations Service, National League of Cities etc., November 1972. 8 pp.

Discusses some of the difficulties of introducing productivity norms in municipal services. Examines steps used in doing so in New York City, such as linkage of productivity to pay, scheduling of sanitation pickups and handling of health insurance claims.

7.070 Sturm, Peter Hans. *A Comparison of Aggregate Production Relationships in East and West Germany.* Doctoral dissertation presented to Yale University, 1974. 313 pp.

Attempts to isolate the effects of differences between the economic systems prevailing in the two areas on the level of growth of output per capita and factor productivity.

7.071 Surrey, M. J. C. "The National Plan in Retrospect." *Bulletin of the Oxford University Institute of Economics and Statistics,* Vol. 34, No. 3, August 1972, pp. 249-268.

Analyzes the failure of the British economy to meet productivity and balance of payments objectives as outlined in the National Plan. Criticizes the plan for failing to demonstrate how projections could be used by industrial decision-makers and for failing to indicate how productivity growth was related to demand and investment.

7.072 Task Force on Railroad Productivity. *Improving Railroad Productivity. Final Report.* A report to the National Commission on Productivity and the Council of Economic Advisers. Washington, November 1973. 329 pp.

Surveys the changing markets for rail freight transport, the financial position of railroads, and rail productivity. Recommends policies to improve the railroads' performance, including containerization, rationalization of light-density lines, modernization of regulatory processes, and changes in the industry's corporate structure.

7.073 *The Productivity of Servicing Consumer Durable Products.* The Center for Policy Alternatives, Massachusetts Institute of Technology, The Charles Stark Draper Laboratory, Inc. Cambridge, Mass. (no date). 331 pp.

Focusing on TV sets and refrigerators, the study evaluates such factors as engineering and

design, product service requirements, product warranties, service agency operations, service technician training, and repair service productivity. Forecasts of service requirements are presented.

7.074 Thrasher, Bruce. *Joint Advisory Committee on Productivity: What Does It Mean to You?* Pittsburgh, Pa., United Steelworkers of America, AFL-CIO, November 1971. 46 pp.

Describes the steel industry's problems in improving productivity and in relation to steel imports. Also describes the contract provisions, objectives, and guidelines concerning the Joint Advisory Committee.

7.075 Twiss, Brian C. *Managing Technological Innovation.* London, Longman Group, Ltd., 1974. 237 pp.

Deals with the process of technological innovation, and the factors contributing to its success on the company level. Examines strategies for research and development, and technological forecasting. Also discusses financial evaluation of research and development projects.

7.076 Urie, John M. "Municipality's Productivity Program." *The Office,* Vol. 79, No. 1, January 1974, pp. 156-174.

Discusses a productivity improvement plan used in Kansas City. Shows that municipalities can improve productivity by applying methods used in private industry.

7.077 U.S. Army Management Engineering Training Agency. *Survey of Productivity Measurement Systems in Nongovernment Organizations.* Rock Island, Ill., May 1972.

Surveys systems and measures used by 12 well-managed companies in terms of case studies. Includes such studies as service quality improvements under a wage incentive program; uses of standard unit costs; employee rewards; and post-audits of capital investments.

7.078 U.S. Department of the Interior. *Productivity Improvement Through Collective Bargaining.* Washington, March 1975. 60 pp.

Discusses productivity factors and measurement, and the feasibility of productivity improvement through collective bargaining. Presents guidelines for the planning, development, and implementation of productivity bargaining.

7.079 U.S. General Accounting Office and others. *Analysis of Productivity-Enhancing Capital Investment Opportunities.* Special Report No. 4. Washington, September 1973. 66 pp.

Examines Federal agencies' problems in financing productivity-enhancing capital investments. Concludes that there is a need for agencies to improve the sophistication of their entire capital budget decision-making process.

7.080 U.S. General Accounting Office and others. *Auditing.* A Compendium Prepared for the Joint OMB/CSC/GAO Project Team on Improving Productivity by a Special Research Team of the Northern Virginia Chapter of the Federal Government Accountants Association. Washington, D.C., June, 1972. 110 pp.

Papers on management auditing, and its conceptual basis and usefulness in determining whether program goals have been met with economy and efficiency.

7.081 U.S. General Accounting Office and others. *Guidelines for Evaluating Work Measurement Systems in the Federal Government.* Washington, July 1972. 43 pp.

Discusses the principal functions of work measurement systems. Also discusses controls that must be considered to assess a system's effectiveness.

7.082 U.S. General Accounting Office and others. *Human Factors in Organizational Productivity.* Special Report No. 5. Washington, October 1973. 146 pp.

Presents documents produced by the Joint Productivity Project Team on the productive use of human resources. Includes proceedings from the Workshop on Improving Organizational Productivity in the Federal Government, and an overview of the Social Security Administration Work Environment Improvement Project.

7.083 U.S. General Services Administration. *Enhancing Productivity Through Improved Acquisition and Management of Capital Equipment,* Vol. I, June 1975. 48 pp.

Reviews and evaluates existing agency policies and programs with regard to the acquisition and management of productivity-enhancing capital equipment. Develops a model capital equipment investment program.

7.084 U.S. General Services Administration. *Enhancing Productivity Through Improved Acquisition*

and Management of Capital Equipment, Vol. II (Appendices), June 1975. 207 pp.

Contains 5 appendices to the GSA report on enhancing productivity through capital equipment investment. Includes discussions of funded and unfunded capital equipment investments; trends in Federal capital equipment investments; financing capital equipment investment opportunities; and capital equipment investment case studies.

7.085 U.S. Joint Economic Committee, Subcommittee on Priorities and Economy in Government. *American Productivity: Key to Economic Strength and National Survival.* Report. Washington, July 3, 1972. 9 pp.

Summarizes findings from hearings held on the declining rate of productivity improvement. Recommends actions to be taken by the National Commission on Productivity and other agencies of the Federal Government to cope with the "productivity crisis."

7.086 U.S. Joint Economic Committee, Subcommittee on Priorities and Economy in Government. *Improving National Productivity.* Hearings, April 25, 26, and 27, 1972. Washington, U.S. Government Printing Office, 1972. 256 pp.

Presents statements on trends in and factors affecting recent changes in productivity, including worker attitudes and measurement practices, and on the relation of productivity and inflation.

7.087 U.S. Senate, Committee on Government Operations. *National Productivity and Quality of Working Life.* Hearings, March 20 and 21, 1975. Washington, U.S. Government Printing Office. 374 pp.

Contains statements by public and private witnesses concerning the National Productivity Act of 1975 and the National Center for Productivity and Quality of Working Life Act.

7.088 U.S. Senate, Committee on Government Operations. *National Productivity.* Hearings, 93d Congress, 2nd session, on S.4130 and S.4212. Washington, U.S. Government Printing Office, 1975. 313 pp.

Concerns the National Productivity Act of 1974 and the National Center for Productivity and Economic Competition Act. Contains statements by government, labor, and industry experts on productivity and work quality.

7.089 Vernon, J. M., and Gusen, P. "Technical Change and Firm Size: The Pharmaceutical Industry." *Review of Economics and Statistics,* Vol. 56, No. 3, August 1974, pp. 294-302.

Explores the Relations between firm size, R & D, and technical change. Concludes that larger pharmaceutical firms incorporate technical change more successfully.

7.090 Vough, Clair F. *Tapping the Human Resource: A Strategy for Productivity.* New York, N.Y., AMACOM, 1975. 212 pp.

Maintains that productivity is increased by delegating responsibility to the worker. Draws upon his experience with a typewriter manufacturer and outlines plans for enhancing productivity and job satisfaction.

7.091 Weston, J. F., and Mansinghka, S. K. "Tests of the Efficiency Performance of Conglomerate Firms." *Journal of Finance,* Vol. 26, No. 4, September 1971, pp. 919-936.

Updates and extends performance studies of conglomerate firms. Concludes that an important function of conglomerate firms was to improve the utilization of economic resources.

7.092 Wilczynski, Jozef. *Socialist Economic Development and Reforms. From Extensive to Intensive Growth under Central Planning in the USSR, Eastern Europe and Yugoslavia.* New York, N.Y., Praeger, 1972. 350 pp.

Studies the impact of reforms on the planning systems of East European states. Examines management, prices, incentives, productivity, banking and finance, and other subjects.

7.093 Wild, Ray. *Work Organization: A Study of Manual Work and Mass Production.* New York, N.Y., John Wiley & Sons, 1975. 226 pp.

Discusses mass production systems, including automation and mechanization of assembly lines, in terms of operational efficiency and the behavioral implications of the system. Examines types of work groups and their relation to flow lines. Seeks to formulate principles for the design of mass production jobs satisfying both operational and behavioral considerations.

7.094 Wilson, Robert. "Informational Economies of Scale." *Bell Journal of Economics and Management Science,* Vol. 6, No. 1, Spring 1975, pp. 184-195.

Argues that opportunities to purchase technological information may induce economies of scale even though the technology of physical production has no scale economies. Concludes that the monopolistic behavior of dominant firms in an industry is the result of information acquisition that cannot be tempered by the possibility of free entry.

7.095 Wolfenbarger, James Larry. *Investment Allocations and Financing in Yugoslavia in the 1960's.* Doctoral thesis presented to the University of Tennessee, 1974. 303 pp.

Analyzes the reform measures introduced by the Yugoslav leadership to explain the structure of investment financing, and to determine the roles of economic units in that structure.

7.096 Yotopoulos, P. A., and Lau, L. J. "A Test for Relative Economic Efficiency: Some Further Results." *American Economic Review*, Vol. 63, No. 1, March 1973, pp. 214-223.

The authors extend earlier work on the causes for the greater economic efficiency of small farms. They conclude that both large and small farms are price efficient, and establish the superior technical efficiency of small farms. They hold that the usefulness of the model need not be restricted to the farm sector.

7.097 Young, Arthur. *General Report on Enclosures.* New York, Kelley (1808), 1971. 392 pp.

Reprint of a classic study of the effects of the enclosure of free land around English villages upon land uses and productivity, the laborers who formerly worked the land, and land owners.

7.098 Young, R., and Crestani, I. "Productivity Change and Farm Income." *Quarterly Review of Agricultural Economics,* Vol. 26, No. 3, July 1973, pp. 198-214.

The authors relate the growth in purchased inputs of Australian farms to gains in productivity and income. They find that purchased inputs rose at a lesser rate than productivity over the 20-year period studied.

Technological change

8.001 American Association for Textile Technology. *The New Textile Technology and Marketing.* 1972 Technical Review and Register. New York, N.Y., Modern Textiles, 1972. 100 pp.

Presents papers covering recent developments in the fabrication and distribution of textiles.

8.002 Asher, E., and Kumar, T. K. "Capital-Labor Substitution and Technical Progress in Planned and Market Oriented Economies: A Comparative Study." *Southern Economic Journal*, Vol. 40, No. 1, July 1973, pp. 103-109.

Compares production structures of the manufacturing sectors in socialist and private enterprise systems. Finds considerable differences in structure and productivity growth rates.

8.003 "A Surprising Potential for New Gains." *Business Week*, No. 2245, September 9, 1972, pp. 88-94.

Reports on new technological advances which have increased productivity in certain industries, and discusses future possibilities. Also discusses the computer in boosting productivity.

8.004 Aufhauser, R. K. "Slavery and Technological Change." *Journal of Economic History*, Vol. 34, No. 1, March 1974, pp. 36-50.

Attacks the hypothesis that slavery is necessarily associated with technological retardation and therefore slows progress.

8.005 Ault, David. "On the Importance of Lags in Technology: An Empirical Test." *Rivista Internazionale di Scienze Economiche e Commerciali*, Vol. 20, No. 10, October 1973, pp. 945-960.

Examines the relative importance of differences in the rates of diffusion of innovations, unit labor costs, and the size of the domestic industry. Constructs models of the steel industry for developing and developed countries. Finds a developing country must generate sufficient demand to allow an industry to exploit internal and external economies of scale.

8.006 Ault, David. "The Continued Deterioration of the Competitive Ability of the U.S. Steel Industry: The Development of Continuous Casting." *Western Economic Journal*, Vol. 11, No. 1, March 1973, pp. 89-97.

Argues that U.S. steel firms were slow in adopting continuous casting, and discusses the reasons, including confusion on patent rights; variation of product quality of steels made by continuous casting, etc. Calculates the impact of continuous casting on competitiveness.

8.007 Backman, Jules, ed. *Labor, Technology, and Productivity in the Seventies.* New York, New York University Press, 1974. 144 pp.

Contains five articles on issues relating to labor relations, collective bargaining processes, and technological change.

8.008 Balasubramanyam, V. N. *International Transfer of Technology to India.* New York, Praeger, 1973. 143 pp.

Examines the trends in, and problems associated with, technical collaboration agreements. Also examines the impact of the transfer of know-how on Indian industrial productivity.

8.009 Barker, R. "The Evolutionary Nature of the New Rice Technology." *Food Research Institute Studies*, Vol. 10, No. 2, 1971, pp. 117-130.

Examines the inputs associated with high yielding rice varieties. Also discusses current research efforts to tailor new rice technology to fit the inadequate resources found on most Asian farms.

8.010 Barr, D. W. "Improving Office Productivity." *The Office*, Vol. 75, No. 1, January 1972, p. 80.

Argues the lack of productivity growth for clerical employees. Discusses technology geared to take over some office work.

8.011 Barraclough, S., and Schatan, J. "Technological Policy and Agricultural Development." *Land Economics*, Vol. 49, No. 2, May 1973, pp. 175-194.

The authors, analyzing Mexican data, relate the technologies of the "Green Revolution" to the improvement of the agricultural sector. They find that large farms have greatly increased productivity, income, and output since the fifties, while small farms have not fared so well.

8.012 Basche, James R. Jr., and Duerr, Michael G. *International Transfer of Technology. A Worldwide Survey of Executives.* New York, The Conference Board, 1975. 21 pp.

The authors present the views of international executives on such topics as the price of technology; the level of technological sophistication; the ways technology should be transferred; and the government's role.

8.013 Batra, R. N. "Technological Change in the Soviet Collective Farm." *American Economic Review*, Vol. 64, No. 4, September 1974, pp. 594-603.

Examines the impact of technical change on output in post-revolutionary Soviet agriculture. Concludes that because of the organizational factors of collective farms, technical progress can lead to a decrease in output.

8.014 Beach, E. F. "Automation in Perspective." *Applied Economics*, Vol. 3, No. 2, June 1971, pp. 147-152.

Argues that automation tends to be expansionary in terms of spending and employment. Bases discussion on the literature and on general theory.

8.015 Bell, Clive. "The Acquisition of Agricultural Technology: Its Determinants and Effects." *Journal of Development Studies*, Vol. 9, No. 1, October 1972, pp. 123-159.

Examines the "Green Revolution" crop technology and its diffusion. Analyzes the means by which technical change alters the pattern of inequality among broadly defined interest groups. Concludes that the causes of changes in inequality are only partially explained by the nature of innovations.

8.016 Bell, Daniel. *The Coming of Post-Industrial Society. A Venture in Social Forecasting.* New York, Basic Books, 1973. 507 pp.

Analyzes the shift from goods to services in terms of employment and impact on industrial structure. Examines the growth of knowledge and technology, and its effect on class structure. Also investigates the corporation, planning, and power shifts.

8.017 Bernard, H. Russell, and Pelto, Pertti J., editors. *Technology and Social Change.* New York, N.Y., The Macmillan Co., 1972. 354 pp.

Presents papers, mostly in the form of case studies, dealing with the impact of changing technologies on culture.

8.018 Bhaleras, M. M., and Singh, S. B. "Economics of High-Yielding Wheat." *Artha-Vikas*, Vol. 7, No. 2, July 1971, pp. 70-79.

Compares high-yielding Mexican wheat to Indian wheat. Finds that output per hectare increased greatly, yielding higher net profits despite higher costs of production.

8.019 Bloom, Gordon. *Technology Applied to the Food Industry.* A Preliminary Report. Washington, D.C., National Commission on Productivity and Work Quality, January 1975. 32 pp.

Discusses lagging productivity growth in the food industry, and barriers to technological innovations. Describes a program designed to overcome these barriers initiated at MIT.

8.020 Bright, James R., and Schoeman, Milton, E. F., editors. *A Guide to Practical Technological Forecasting.* Englewood Cliffs, N.J., Prentice-Hall Inc., 1973. 651 pp.

A collection of essays updating techniques of technological forecasting. Topics include new theories and concepts, examples of forecasts, and approaches to improving forecasting.

8.021 Brittain, E. "The International Diffusion of Electrical Power Technology, 1870-1920." *Journal of Economic History*, Vol. 34, No. 1, March 1974, pp. 108-121.

Argues that there are regional and national factors in diffusion unrelated to market conditions or government policies. Also argues that the creative contribution of individuals in diffusion is of fundamental importance.

8.022 Brooks, H. "What's Happening to the U.S. Lead in Technology?" *Harvard Business Review*, Vol. 50, No. 3, May-June 1972, pp. 110-118.

Reviews the factors which have affected the U.S. competitive position vis-a-vis European countries and Japan. Suggests that the technology gap between the U.S. and the industrial countries has been closing since the middle 1950's. Agrees that technological advance has slowed in the U.S., but argues that this is a trend which will be experienced by the rest of the world.

8.023 Cairncross, A. "Reflections on Technological Change." *Scottish Journal of Political Economy*, Vol. 19, No. 2, June 1972, pp. 107-114.

Argues that invention responds, like natural resources, to demand pressures, and that technological diffusion responds to the same forces as efficiency, and is most rapid where efficiency is most highly regarded.

8.024 Changyoung, Jeong. *Production Functions in Korean Manufacturing: An Analysis of Trade Policy and its Effect on Technological Change.* Doctoral dissertation presented to the University of Southern California, 1971. 135 pp.

Attempts to integrate trade and development theory to provide a growth strategy for developing countries. Finds developing countries should rely on the price mechanism rather than on direct controls to allocate resources.

8.025 Chin, Sean Bun. *Exhaustible Resources and Technological Change in the United States Agriculture, 1940-69.* Doctoral dissertation presented to the University of Missouri–Columbia, 1973. 129 pp.

Investigates the effect of a number of variables on farm output, including such factors as farm labor, fertilizer use, fuel and others. Also derives the rate of technological progress, and projects non-renewable resources to the year 2000.

8.026 Choi, Kee Il. "Technological Diffusion in Agriculture Under the Bakuhan System." *Journal of Asian Studies*, Vol. 30, No. 4, August 1971, pp. 749-759.

Refutes the Ohkawa-Rosovsky explanation of the rapid increase in Japanese agricultural output after 1878.

8.027 Church, R. A. "Nineteenth Century Clock Technology in Britain, the United States and Switzerland." *Economic History Review*, Vol. 28, No. 4, November 1975, pp. 616-630.

Shows that British preeminence was destroyed by the more efficient American and Swiss manufacturers, with differences in factor endowments and systems explaining the rise of the American industry, and sensitivity to consumer needs and technical ingenuity explaining the rise of the Swiss industry.

8.028 Critchlow, Robert V., and Herman, Arthur S. *Outlook for Technology and Manpower in Printing and Publishing,* BLS Bulletin 1774. U.S. Department of Labor, Bureau of Labor Statistics, 1973. 45 pp.

Focuses on the impact of new technology on productivity, employment, and occupational requirements, and describes methods of adjustment. Includes firsthand information on the impact on production and manpower of electronic computers, phototypesetting equipment, web-offset printing, and other innovations.

8.029 Critchlow, Robert V., and others. *Computer Manpower Outlook*, BLS Bulletin 1826. U.S. Department of Labor, Bureau of Labor Statistics, 1974. 60 pp.

Presents information on the current employment, education and training characteristics of computer occupations. Explores the impact of advancing computer technology on computer manpower and education. Projects computer occu-

pational requirements and their implications for training.

8.030 Czepiel, John A. "Word-of-Mouth Processes in the Diffusion of a Major Technological Innovation." *Journal of Marketing Research*, Vol. 11, No. 2, May 1974, pp. 172-180.

Examines the diffusion of information in industrial markets as a social process, particularly that of the continuous casting process in steel. Finds that an informal communications network linked firms, and was instrumental in diffusing the technology.

8.031 Dambe, Gunars. *Planning for More Labor Intensive and More Productive Agriculture in Columbia.* Doctoral dissertation presented to Iowa State University, 1974. 174 pp.

Explores the employment and output capacity of agriculture under technological change and different income redistribution proposals. Applies input-output techniques. Finds that agriculture can be more productive and labor intensive, and can provide a more equal income distribution.

8.032 Daniel, Donnie L.; Longbrake, William A.; and Murphy, Neil B. "The Effect of Technology on Bank Economies of Scale for Demand Deposits." *Journal of Finance*, Vol. 28, No. 1, March 1973, pp. 131-146.

The authors analyze how the choice of different technological innovations affects the long-run average cost of servicing demand deposits. They consider situations where the banks use conventional bookkeeping machines, computers, punched card tabulators, off-line sorters and electronic bookkeeping machines.

8.033 Dean, Genevieve. "A Note on the Sources of Technical Innovations in the People's Republic of China." *Journal of Development Studies*, Vol. 9, No. 10, October 1972, pp. 187-199.

Traces some of the changes in the organization of China's innovative activity. Examines the economic consequences of such changes in each stage, emphasizing the capital construction industries. Also discusses the design reform movement, 1964-66.

8.034 Doctors, Samuel I. *The NASA Technology Transfer Program. An Evaluation of the Dissemination System*. Praeger Special Studies in U.S. Economic and Social Development. New York, Praeger, 1971, 226 pp.

Analyzes case studies of the NASA technology transfer programs in the light of past studies of technology transfer. Concludes that a program of market-oriented transfer of technological advances to firms which could benefit from them would be superior to the present program of literature dissemination.

8.035 Dougherty, C. R. S. "On the Secular Macroeconomic Effects of Technical Progress." *Economic Journal*, Vol. 84, No. 335, September 1974, pp. 543-565.

Investigates the impact of technical change on aggregate output, capital-value, and share of profits, within a one- and two-sector model. Applies the analysis to long-run U.S. data.

8.036 Doyle, C. J. "Productivity, Technical Change, and the Peasant Producer: A Profile of the African Cultivator." *Food Research Institute Studies*, Vol. 13, No. 1, 1974, pp. 61-76.

Argues that a weakness of economic incentives rather than social considerations is responsible for the reluctance of African farmers to adopt new techniques.

8.037 Dreiblatt, David. *The Economics of Heavy Earthmoving*. New York, Praeger, 1972. 114 pp.

Investigates the choice of developing countries between using labor or capital-intensive machinery for heavy earth-moving operations. Concludes that capital-intensive methods contribute to skilled and unskilled employment, higher productivity, and reduced costs.

8.038 Eltis, W. A. "The Determination of the Rate of Technical Progress." *Economic Journal*, Vol. 81, No. 323, September 1971, pp. 502-524.

Examines the effect of different propensities for saving and investment on technical progress. Argues that the rate of investment and the rate of technical progress are closely linked.

8.039 Evenson, R. "International Diffusion of Agrarian Technology." *Journal of Economic History*, Vol. 34, No. 1, March 1974, pp. 51-73.

Discusses alternative models of the diffusion of agricultural technology, particularly in the sugar cane industry. Develops a model for cereal grain technology for the post-World War II period.

8.040 Fernandez, Anibal. *Productivity and Technical Progress of the Venezuelan Petroleum Industry*. Doctoral dissertation presented to the University of Pittsburgh, 1971. 205 pp.

Investigates the impact of productivity growth of the industry on wages, prices, and employment and the distribution of gains among the factors of production. Develops a measure of technical progress.

8.041 Flueckiger, Gerald E. "Observation and Measurement of Technological Change." *Explorations in Economic History*, Vol. 9, No. 2, Winter 1971-72, pp. 145-177.

Presents a qualitative characterization of production; characterizes technological change as a directly observable qualitative phenomenon; and demonstrates how single technological changes can be related to production processes so that measures of technological change can be constructed.

8.042 Freivalds, John. "Bringing Space Down to Earth: Space Age Technology Transfer and the Developing Countries." *Journal of Developing Areas*, Vol. 8, No. 1, October 1973, pp. 83-92.

Argues that the transfer of space technology must incorporate cultural, political and economic considerations. Transfer mechanisms and an institutional framework must be developed. Holds that space-age technology can be applied to the problems of developing countries.

8.043 Friedland, William H., and Nelkin, Dorothy. "Technological Trends and the Organization of Migrant Farm Workers." *Social Problems*, Vol. 19, No. 4, Spring 1972, pp. 506-521.

Analyzes the characteristics of U.S. agriculture that have obstructed farm labor organizational efforts. Shows how recent technological trends have generated changes in the farm labor force, which, together with the example of the Chavez "model," promise success for such efforts.

8.044 Globerman, S. "Technological Diffusion in the Canadian Tool and Die Industry." *Review of Economics and Statistics*, Vol. 57, No. 4, November 1975, pp. 428-434.

Investigates rates of diffusion of numerical control machine tools within comparable samples of Canadian and U.S. firms. Finds that R & D was closely linked to subsequent adoption of numerical control machines.

8.045 Gold, Bela. *Technological Change: Economics, Management, and Environment*. New York, Oxford University Press, 1975. 175 pp.

Explores interactions between technological change and economic variables. Provides analytical guides for evaluation issues which innovations give rise to.

8.046 Goldberg, Joseph P. "New Technology in Longshoring." *Monthly Labor Review*, Vol. 96, No. 7, July 1973, p. 34.

Presents a summary of an article, "Longshoremen and the Modernisation of Cargo Handling in the United States," which appeared in the *International Labour Review*, March 1973.

8.047 Goldberg, Joseph P. "Results of the 1972 International Labor Conference." *Monthly Labor Review,* Vol. 95, No. 9, September 1972, pp. 38-46.

Reports on the leading themes of the conference which dealt with technology and its impact, and the social repercussions of automation, with specific reference to dock labor.

8.048 Gotsch, Carl H. "Technical Change and the Distribution of Income in Rural Areas." *American Journal of Agricultural Economics,* Vol. 54, No. 2, May 1972, pp. 326-341.

Focuses on the relation between technology, institutions, and people at the community level, as part of dealing with the political economy of technical change in agriculture and its impact on rural income distribution. Examines development patterns in Pakistan and Bangladesh.

8.049 Grandjean, Burke D. "The Division of Labor, Technology, and Education: Cross National Evidence." *Social Science Quarterly,* Vol. 55, No. 2, September 1974, pp. 297-309.

Surveys some classic perspectives—those of Smith, Marx and Durkheim—on the relation between technology and the social division of labor. Presents empirical evidence tending to bear out these perspectives.

8.050 Gregory, R. D., and James, D. W. "Do New Factories Embody Best Practice Technology?" *Economic Journal,* Vol. 83, No. 332, December 1973, pp. 1133-1155.

The authors examine labor productivity of new factories in relation to the average productivity of an industry, and to future productivity move-

ments. They find little deviation of the new factories from the industry average, and no predictive value.

8.051 Gyftopoulos, Elias P.; Lazaridis, Lazaros J.; and Widmer, Thomas F. *Potential Fuel Effectiveness in Industry.* Cambridge, Mass., Lippincott, Ballinger, 1974. 89 pp.

The authors analyze six industries for possible fuel savings. They conclude that fuel consumption can be reduced using existing technology, and urge more research in industrial processes that use less fuel per unit of output.

8.052 Hale, Carl W. "Impact of Federal Policy and Technological Change on Regional and Urban Planning Problems." *Land Economics,* Vol. 47, No. 2, February 1971, pp 24-35.

Considers the impact of two major technological changes on urban problems in the United States: the mechanization of southern agriculture, and the interstate highway system.

8.053 Hayami, Y. "Conditions for the Diffusion of Agricultural Technology: An Asian Perspective." *Journal of Economic History,* Vol. 34, No. 1, March 1974, pp. 131-148.

Identifies the conditions for the diffusion of location-specific agricultural technology. Contrasts the "Green Revolution" in South and Southeast Asia with the development of rice technology in Japan, Taiwan and Korea.

8.054 Hayden, Eric Wylie. *The Transfer of Industrial Technology to East Europe: A Study of U.S. Corporate Experience.* Doctoral dissertation presented to The Johns Hopkins University, 1975, 334 pp.

Presents eight case studies examining the reasons why U.S. firms transfer their industrial technology to East Europe, focusing on anticipated gains, including those of recipients.

8.055 Headley, J. Charles. "Agricultural Productivity, Technology, and Environmental Quality." *American Journal of Agricultural Economics,* Vol. 54, No. 5, December 1972, pp. 749-756.

Examines the pollution problems created by the techniques used to boost agricultural productivity. Mentions fertilizers and pesticides as examples. Suggests that market prices do not capture the full cost of agricultural output to society since the cost of pollution and environmental damage are not fully accounted for.

8.056 Hetzler, Stanley A. *Applied Measures for Promoting Technological Growth.* Boston, Routledge and Kegan Paul, 1973. 337 pp.

Theorizes that social change is the consequence of a forerunning technological change. Discusses solutions for the developmental problems facing technologically retarded societies.

8.057 Hiestand, Dale L. *High Level Manpower and Technological Change in the Steel Industry. Implications for Corporate Manpower Planning.* New York, Praeger, 1974. 88 pp.

Investigates the impact of human factors on the process of technological change.

8.058 Hough, Granville W. *Technology Diffusion. Federal Programs and Procedures.* Mt. Airy, Md., Lomond Books, 1975. 406 pp.

Describes and evaluates operational activities in selected Federal agencies for promoting the diffusion and utilization of technological developments resulting from Federal applied R & D.

8.059 Howenstine, E. Jay "Prefabricated Construction: Developments Abroad." *Monthly Labor Review,* Vol. 95, No. 5, May 1972, pp. 27-36.

Summarizes the highlights of the 1971 session of the Building, Civil Engineering, and Public Works Committee of the ILO, which focused on the economic and social impact of prefabrication.

8.060 Hughes, T. P. "The Early Diffusion of Steam Power; the International Diffusion of Electrical Power Technology, 1920-1970. Comment." *Journal of Economic History,* Vol. 34, No. 1, March 1974, pp. 126-130.

Basing himself on an article by J. E. Brittain, the author lists additional modes of diffusion, such as the study tour and patent literature. Also examines the adaptation of the steam engine to differing environments.

8.061 International Labour Office. *Automation in Developing Countries.* Roundtable Discussion on the Manpower Problems Associated with the Introduction of Automation in Developing Countries. Geneva, 1972. 246 pp.

Presents papers examining the use of automation as a development strategy; the reaction to advanced technology, now and historically; the skills and organizational requirements associated with the introduction of advanced technologies; and other pertinent subjects.

8.062 International Labour Office. *Labour and Social Implications of Automation and Other Technological Developments.* International Labour Conference, 57th Session, Geneva, 1972. 75 pp.

Surveys the forecasts made during the fifties, together with actual developments since then. Discusses the choice of advanced technologies in developing countries and obstacles to their adoption. Also discusses the long-term outlook and manpower adjustment programs.

8.063 Ishikawa, Shigeru. "A Note on the Choice of Technology In China." *Journal of Development Studies,* Vol. 9, No. 1, October 1972, pp. 161-187.

Discusses the problems that have faced Chinese planners as a result of the choices of technology made since the inception of the Chinese People's Republic. Examines the solutions used.

8.064 Jeremy, D. J. "British Technology Transmission to the United States." *Business History Review,* Vol. 47, No. 1, Spring 1973, pp. 24-52.

Examines the role of the skilled immigrant artisan in transmitting British textile technology in the 19th century, and the lack of appropriate knowledge on the part of American entrepreneurs.

8.065 Johnson, Richard. *Railroad Technology and Manpower in the 1970's,* BLS Bulletin 1717. U.S. Department of Labor, Bureau of Labor Statistics, 1972. 90 pp.

Discusses major changes in the railroad industry, especially during the post-World War II period. Examines technological developments, employment trends and outlook, and productivity in the industry. Focuses on the employment impact of technological change, and adjustments to such change.

8.066 Jones, Graham. *The Role of Science and Technology in Developing Countries.* New York, Oxford University Press for the International Council of Scientific Unions, 1971. 174 pp.

Explores the different ways in which modern science and technology are applied to promote economic and social growth in poor but developing countries.

8.067 Kaplan, Daniel Peter. *Growth in Demand, Technological Change, and Changing Market Shares.* Doctoral dissertation presented to the University of Michigan, 1974. 209 pp.

Attempts to explain the processes by which firms' market shares change through time. Argues that technological change is deconcentrating, and that growth in demand and technological change destabilize market shares. Develops models of how innovating firms can be expected to grow over the product life cycle.

8.068 Kato, Roy. *A Study of an Industrial Innovation: Technical Change, Economies of Scale, and Transportation Cost in the United States Ammonia Industry.* Doctoral dissertation presented to the New School for Social Research, 1972. 336 pp.

Investigates in terms of prices, location, and size of plant the effects of an innovation enabling the industry to produce two to three times as much output per plant. Notes the structural changes that preceded the innovation, and the locational changes that followed it.

8.069 Kennedy, C., and Thirlwall, A. P. "Technical Progress: A Survey." *Economic Journal,* Vol. 82, No. 325, March 1972, pp. 11-72.

The authors consider the origins of technical progress and its contribution to output growth. They discuss embodied models of capital, as well as the origins of technical progress in relation to research and development, invention and innovation.

8.070 Knight, Peter T. *Brazilian Agricultural Technology and Trade. A Study of Five Commodities.* New York, Praeger, 1971. 223 pp.

Examines technological change, public policy, and economic behavior in Brazil's agricultural sector, with emphasis on their implications for international trade.

8.071 Lacci, L. "Economic Impact of the Diffusion of New Technologies in Italy." *Review of the Economic Conditions in Italy,* Vol. 25, No. 4, July 1971, pp. 298-316.

Explores the diffusion of ten selected production processes. Finds the introduction of the oxygen process in steel manufacture, for example, was delayed by large investments in earlier technologies; that the introduction of numerically controlled machine tools was delayed by the need to import them; and that the introduction of the float system in the production of sheet glass was slowed because the process was covered by patents and could only be adopted by licensed firms.

8.072 Lall, Sanjaya. *Major Issues in Transfer of Technology to Developing Countries. A Case Study of the Pharmaceutical Industry.* United Nations Conference on Trade and Development, October 1975. 63 pp. plus annex.

Examines features of the pharmaceutical industry bearing on technology transfer to developing countries, and which affect their trade and health policies. Policy recommendations are offered.

8.073 Lansing, Richard M. "On Technical Progress and the Speed of Adjustment." *Economica,* Vol. 42, No. 168, November 1975, pp. 394-400.

Argues that the question of adjustment in the neoclassical growth model is a special case where technical improvements are more embodied than disembodied. Contends that greater embodiment of technical progress need not always lead to faster adjustment given an initial disequilibrium. Shows that embodied and disembodied models will close a given disequilibrium in the same period of time.

8.074 Levien, Roger E., and others. *The Emerging Technology. Instructional Uses of the Computer in Higher Education.* A Carnegie Commission of Higher Education and Rand Corporation Study. New York, N.Y., McGraw-Hill Book Co., 1972. 585 pp.

Examines the scope of computer-assisted instruction. Deals with such topics as the research uses of computers; administrative and library uses; campus computer services; the technology of computing; and the economics of computer use in instruction.

8.075 Levine, David Philip. *Accumulation and Technical Change in Marxian Economics.* Doctoral dissertation presented to Yale University, 1973. 318 pp.

Seeks to uncover the salient features of Marxian theory, and compares it with neo-Keynesian theories. Considers the Marxian analysis of technical progress, and relates it to competition, concentration of capital and the growth of firms.

8.076 Levine, Morton, and others. *Technological Change and Manpower Trends in Six Industries,* BLS Bulletin 1817. U.S. Department of Labor, Bureau of Labor Statistics, 1974. 66 pp.

The authors appraise some of the major technological changes emerging among selected American industries and discuss the impact of these changes on productivity and occupations over the next 5 to 10 years. They report on the following six industries: textile mill products, lumber and wood products, tires and tubes, aluminum, banking, and health services.

8.077 Lokiec, Mitchell, *Labor and Technology in the Postwar Era.* Columbia, S.C., Bobbin Publications, 1973. 140 pp.

Argues that the economic future may depend on the nature of relations between management and labor and the role of government in handling technological development and its possible negative aspects. Explores characteristics of the postwar society and modern technology, the nature and composition of the labor force, methods of wage payment, and the attitudes of organized labor toward the role of government in collective bargaining.

8.078 Loth, David, and Ernst, Morris L. *The Taming of Technology.* New York, Simon & Schuster, 1972. 256 pp.

The authors examine the laws that deal with the consequences of certain technologies. They discuss law in space; environmental law; law and the computer; and other topics.

8.079 McCain, R. A. "Induced Technical Progress and the Price of Capital Goods." *Economic Journal,* Vol. 82, No. 327, September 1972, pp. 921-933.

Expands the one-sector model of the theory of induced technical progress, focusing on the steady-growth solution to the model.

8.080 McCullough, A. "Technical Change in Northern Ireland Manufacturing 1950-1968." *The Economic and Social Review,* Vol. 5, No. 2, January 1974, pp. 181-198.

Measures the extent and nature of technological change, and compares the results with those of other countries. Develops production functions to estimate the investment required to sustain various rates of output growth.

8.081 McLean, I. W. "Growth and Technological Change in Agriculture: Victoria 1870-1910." *Economic Record,* Vol. 49, No. 128, December 1973, pp. 560-574.

Calculates output, input, and technological change in describing the unique development of Victoria in comparison with the remainder of Australia.

8.082 Mansfield, E. "International Technology Transfer: Forms, Resource Requirements, and Policies." *American Economic Review,* Vol. 65, No. 2, May 1975, pp. 372-376.

Discusses the international diffusion of new technology. Notes that the process has received little theoretical or empirical analysis. Suggests an approach to measure the cost of transferring technology, other than the value of purchased equipment and materials.

8.083 Marga Institute of Sri Lanka. *Major Issues Arising from the Transfer of Technology: A Case Study of Sri Lanka.* Geneva, UNCTAD, 1975. 102 pp.

Studies the terms and conditions under which Sri Lanka has acquired technology over the last 30 years. Concludes that technologies transferred were inappropriate and that costs exceeded benefits. Draws implications for developing countries as a whole.

8.084 Mason, Hal R. "The Selection of Technology: A Continuing Dilemma." *Columbia Journal of World Business,* Vol. IX, No. 2, Summer 1974, pp. 29-34.

Discusses the relative inability of multinational corporations to adapt production technologies to conditions in developing countries. Ascribes this inability to the fixity of production processes, distorted price relations in factor markets, imperfect competition, and ignorance of market conditions.

8.085 *Mechanization and Employment in Agriculture.* Geneva, International Labour Office, 1973. 192 pp.

A collection of case studies on developing countries in their efforts to mechanize agriculture. The studies show that there has been an undesirable substitution of capital for labor, creating a surplus labor force in agriculture that cannot be absorbed by the industrial sector. Elements of a proper mix for intersectoral growth are developed.

8.086 Melman, Seymour, "The Impact of Economics on Technology." *Journal of Economic Issues,* Vol. 9, No. 1, March 1975, pp. 59-72.

Challenges the assertions that technology has an autonomous momentum and direction. Argues that technology is determined by economic and social factors.

8.087 Mick, Stephen S. "Social and Personal Costs of Plant Shutdown." *Industrial Relations*, Vol. 14, No. 2, May 1975, pp. 203-208.

Reports on aspects of shutdowns and closures. Finds that few workers are protected by either employers or the bargaining contract. Notes that aggregate economic statistics mask the social costs of such shutdowns.

8.088 Morison, Elting E. *From Know-How to Nowhere: The Development of American Technology.* New York, Basic Books, 1974. 199 pp.

Narrates the historical milestones in technological developments and discoveries. Offers proposals to humanize the purposes of technology.

8.089 Mueller, A. G. "Impact of Changing Technology on Livestock Systems." *Illinois Agricultural Economics,* Vol. VII, No. 2, July 1971, pp. 1-5.

Examines technical and economic changes in the livestock industry, and their output-increasing and resource-substituting relations. Also explores relations between livestock and crop-raising enterprises.

8.090 Mulleady, Jose Tomas. *Technological Change: The Case of Corn Production in the Argentine Pampas.* Doctoral thesis presented to Iowa State University, 1973. 164 pp.

Examines the reasons why corn yields in an area representative of the Pampean region have remained virtually unchanged over the past 40 years. Finds high prices for chemical technology and lack of research in developing fertilizer-responsive hybrids among the factors limiting corn yield increases.

8.091 Mundy, Steven Darrell. *Technology and the Farm Labor Market.* Doctoral dissertation presented to The University of Tennessee, 1972. 164 pp.

Argues that technological change has been and remains a determinant of low returns to farm labor, unemployment and underemployment. Tests the argument (or hypothesis) by estimating the effect of technology on the farm labor market.

8.092 Myers, John G., and others. *Energy Consumption in Manufacturing.* The Conference Board in cooperation with the National Science Foundation. Cambridge, Mass., Ballinger Publishing Co., 1974. 610 pp.

The authors examine past developments in energy use in terms of production processes and technology. They identify future developments in these processes and technologies, and determine probable energy demands. They also discuss in-

dustries facing particularly serious energy problems. Extensive data on energy per output unit and related magnitudes are presented.

8.093 Nabseth, L., and Ray, G. F., eds. *The Diffusion of New Industrial Process: An International Study.* New York, Cambridge University Press, 1974. 324 pp.

Ten studies which examine and compare the diffusion processes of technological advances in various countries.

8.094 National Academy of Engineering. *Application of Technology to Improve Productivity in the Service Sector of the National Economy.* Washington, D.C., 1973. 362 pp.

Based on a symposium and workshop, the report presents papers on such subjects as productivity improvement in education; technology and productivity in the health field; and New York City operations and service requirements.

8.095 National Science Foundation. *Energy, Environment, Productivity.* Proceedings of the First Symposium on Research Applied to National Needs, Washington, November 18-20, 1973. U.S. Government Printing Office, May 1974. 251 pp.

Presents papers on such topics as energy systems, conservation programs, coal gasifying techniques, transmission systems, geothermal energy, solar energy, and various types of threats to the environment. Also features papers on public sector productivity, technology transfers, and automation.

8.096 Nelson, Richard R. "Less Developed Countries—Technology Transfer and Adaptation: The Role of the Indigenous Science Community." *Economic Development and Cultural Change,* Vol. 23, No. 1, October 1974, pp. 61-77.

Examines views of development economists and natural scientists on the role of the scientific community in furthering development. Asserts both disciplines have misperceived the role of science in economic development and offers alternative approaches.

8.097 Nowill, Paul Henry. *Productivity and Technological Change in Electric Power Generating Plants.* Doctoral dissertation presented to the University of Massachusetts, 1971. 224 pp.

Studies the subject by means of production functions.

8.098 Organization for Economic Cooperation and Development. *The Conditions for Success in Technological Innovation.* Paris, OECD, 1971. 169 pp.

Analyzes the impact of science and technology in OECD member countries. Investigates differences between industries, government roles, and the status of university science and industrial technology.

8.099 Ozawa, Terutomo. *Japan's Technological Challenge to the West, 1950-1974: Motivation and Accomplishment.* Cambridge, The MIT Press, 1974. 162 pp.

Describes the postwar experience in assimilating Western technology and developing an R&D base. Notes that the agricultural sector played a passive role in Japan's economic growth, and that agricultural productivity gains were a byproduct of industrialization. Draws implications for U.S. trade policy in the area of high technology.

8.100 Packard, Phillip C. "On the Apparent Benefits of Higher Productivity: An Arithmetical Illustration: A Comment." *Journal of Development Studies,* Vol. 9, No. 3, April 1973, pp. 451-452.

Argues against the hypothesis that some mechanization can lead to results which make a country worse off. Uses the banana handling industry as an example, and compares the use of labor-intensive means of production with capital-intensive means.

8.101 Parry, T. G. "Technology and the Size of the Multinational-Corporation Subsidiary: Evidence from the Australian Manufacturing Sector." *Journal of Industrial Economics,* Vol. 23, No. 2, December 1974, pp. 125-134.

Deals with the effects of technological superiority of the operations of multinational corporation subsidiaries on other firms in the host country. Concludes that for Australian manufacturing, research intensity which leads to greater foreign operations also leads to greater relative size of multinational corporation subsidiaries in an industry, and greater concentration of foreign ownership.

8.102 Parvin, Manoucher. "Technological Adaptation, Optimum Level of Backwardness and the Rate of Per Capita Income Growth: An Econometric Approach." *American Economist,* Vol. 19, No. 1, Spring 1975, pp. 23-31.

Explores the assimilation of new production functions by less developed countries. Demon-

strates that the adaptation of a technique is less costly than discovery and development. Draws implications for developing countries on the issue of whether to foster domestic innovation or acquire technology from abroad.

8.103 Polak, George. *Economic Effects of Technological Innovations in the Shallow-Draft Water Transport Industry.* Doctoral dissertation presented to Case Western Reserve University, 1974. 365 pp.

Finds that innovations led to a revival of the industry between 1947 and 1969. Examines the gains in labor productivity as resulting from increased capital per worker, intensive utilization of capital, and more modern equipment. Notes that productivity increases and improved technologies offset rising prices, and permitted carriers to hold unit costs steady.

8.104 Polenske, Karen R., ed. *State Estimates of Technology, 1963.* Lexington, Massachusetts, Lexington Books, 1974. 519 pp.

Presents and examines estimates of regional technology. Also presents data on statewide output, employment, and payrolls in 1947, 1958, and 1963.

8.105 Quast, Theodore Emmanuel. *The Transfer of Technology.* Doctoral dissertation presented to the University of Illinois at Urbana-Champaign, 1972. 179 pp.

Considers factors influencing the transfer of technology between countries at different stages of development.

8.106 Raj, K. N. "Mechanization of Agriculture in India and Sri Lanka." *International Labour Review,* Vol. 106, No. 4, October 1972, pp. 315-334.

Reviews differing patterns of mechanization and reasons for it in the face of ample supplies of labor. Finds that in some cases, mechanization has not increased production but was adopted by large landowners to reduce dependence on tenants or casual labor.

8.107 Rao, C. H. Hanumantha. *Technological Change and Distribution of Gains in Indian Agriculture.* Delhi, Macmillan, 1975. 249 pp.

Assesses the magnitude of technological change, 1949-71, and factors accounting for it. Estimates costs and returns associated with the use of modern inputs. Examines the distribution of gains between and within regions. Also discusses relevant policies.

8.108 Rausser, Gordon C. "Technological Change, Production, and Investment in Natural Resources." *American Economic Review*, Vol. 64, No. 6, December 1974, pp. 1049-1059.

Discusses technical progress resulting from the experience of producing, i.e., "learning by doing." Develops an equilibrium model which treats technical progress as an endogenous variable.

8.109 Rausser, Gordon C. "Technical Progress and Environmental Tradeoffs in Natural Resource Industries." *Journal of Economics and Business,* Vol. 28, No. 1, Fall 1975, pp. 1-14.

Presents a theoretical formulation of natural resource production taking endogenous technical progress and environmental costs into account—in contrast to conventional studies which treat these variables as being exogenous.

8.110 Revankar, Nagesh S. "Capital-Labor Substitution, Technological Change and Economic Growth: The U.S. Experience, 1929-1953." *Metroeconomica*, Vol. 23, No. 2, May-August 1971, pp. 154-176.

Examines the contribution of the neutral and non-neutral components of technical change to economic growth. Uses a VES production function and focuses on the elasticity of substitution.

8.111 Richards, Alan Rutherford. *Accumulation, Distribution and Technical Change in Egyptian Agriculture, 1800-1940.* Doctoral dissertation presented to The University of Wisconsin-Madison, 1975. 316 pp.

Investigates the consequences of Egypt's integration into the world market for the distribution of land ownership and the formation of social classes; the impact of technical change on farm output and peasant welfare; and the process of diffusion of agricultural techniques.

8.112 Robinson, Eric H. "The Early Diffusion of Steam Power." *Journal of Economic History*, Vol. 34, No. 1, March 1974, pp. 91-107.

Discusses how knowledge of the steam engine was transmitted by such means as books, models, conversation, industrial espionage and bribery. Argues that the slow diffusion of the steam engine outside England was due to inefficiencies in the steam engine as well as unfavorable resource endowments and entrepreneurial failure.

8.113 Romeo, Anthony Asta. *Interindustry Differences in the Diffusion of an Innovation.* Doctoral

dissertation presented to the University of Pennsylvania, 1973. 218 pp.

Studies the spread of numerical machine tools throughout ten industries, based largely on statistical analyses of a survey.

8.114 Rosenberg, Nathan. "Factors Affecting the Diffusion of Technology." *Explorations in Economic History*, Vol. 10, No. 1, Fall 1972, pp. 3-33.

Offers new approaches for research in assessing the role of technological change in generating productivity increases. Asserts that the economic impact of inventions is a process of slow diffusion rather than Schumpeterian in nature.

8.115 Russell, Louise B., and Burke, Carol S. *Technological Diffusion in the Hospital Sector.* Washington, D.C., National Planning Association, 1975. 242 pp.

The authors trace the diffusion of major medical technologies, including postoperative recovery rooms, intensive care units, open heart surgery units, and therapeutic radiology facilities. They also discuss cost aspects.

8.116 Sargen, Nicholas Peter. *"Tractorization" in the United States and its Relevance for the Developing Countries.* Doctoral dissertation presented to Stanford University, 1975. 296 pp.

Investigates the determinants of the choice of farm power and the factors accounting for the time-series pattern of tractor technology diffusion. Generalizes from the U.S. experience, and finds that the prospects of spreading capital-intensive techniques to less developed countries are diminished.

8.117 Saxonhouse, G. "A Tale of Japanese Technological Diffusion in the Meiji Period." *Journal of Economic History*, Vol. 34, No. 1, March 1974, pp. 145-165.

Traces the assimilation of modern Western manufacturing into the Japanese cotton textile industry from the late 1860's to the early 1930's. Finds the cost of acquiring technological information for any single firm to be low by international standards. Links the high turnover in the labor force to the technological uniformity of the industry which resulted in few firm-specific skills, and a concomitant low level of investment in skill training by the firms.

8.118 Schumacher, E. F. "The Work of the Intermediate Technology Development Group in Africa." *International Labour Review*, Vol. 106, No. 1, July 1972, pp. 75-92.

Reports on activities to make self-help technology available to underdeveloped countries. Urges that labor-saving, capital-intensive technologies of rich countries are not appropriate to the conditions of poor people in poor countries.

8.119 Sen, Amartya. *Employment, Technology and Development.* A Study Prepared for the International Labour Office within the Framework of the World Employment Programme. New York, Oxford University Press, 1975. 193 pp.

Surveys the issues associated with the choices of technology, discussing concepts of employment and efficiency, and pertinent measurement problems.

8.120 Setzer, Florence Orletta. *Technological Change over the Life of a Product: Changes in Skill Inputs and Production Processes.* Doctoral dissertation presented to Yale University, 1974. 241 pp.

Measures and explains changes in inputs of capital and labor related to changes in production processes due to innovations.

8.121 Shen, T. Y. "Technology Diffusion, Substitution, and X-Efficiency." *Econometrica*, Vol. 41, No. 2, March 1973, pp. 263-284.

Asserts that the changes in output, and capital and labor inputs in a sample of manufacturing plants were due to technology and improvements in X-efficiency. Concludes that a new approach to specification of production functions is needed.

8.122 Shisko, Robert. *An Empirical Study of Technical Change Through Product Improvement.* Doctoral dissertation presented to Yale University, 1972. 99 pp.

Examines the implications of product improvement for weapons acquisition. Applies the concept of "level of technology" to jet engines, and investigates the effect of product improvement on technology and performance. Also studies cost impacts. impacts.

8.123 Smith, Arthur B. "Boycotts of Prefabricated Building Products and the Regulation of Technological Change on Construction Job Sites." *Industrial Labor Relations Review*, Vol. 25, No. 2, January 1972, pp. 186-199.

Reports on the opposition of union tradesmen to labor-saving prefabricated homes. Discusses the implications of this type of action.

8.124 Smith, Bruce Ainslie. *Technological Innovation in Electric Power Operation, 1950-1970.* Doctoral thesis presented to Indiana University, 1974. 260 pp.

Identifies the sources of technological advances, together with major innovations. Finds that large utilities do not perform better than small ones with regard to relative innovative output.

8.125 Smith, V. Kerry. "The Implications of Regulation for Induced Technical Change." *Bell Journal of Economics and Management Science*, Vol. 5, No. 2, Autumn 1974, pp. 623-632.

Investigates the selection of factor-augmenting innovations in the regulated firm. Finds that regulation distorts resource allocation, and that the regulated firm will overcapitalize.

8.126 Solo, Robert A., and Rogers, Everett M. eds. *Inducing Technological Change for Economic Growth and Development.* East Lansing, Michigan State University Press, 1972. 238 pp.

A collection of papers on the processes and agencies of technological change in relation to economic development.

8.127 Sonny, Jacob. *Technological Change in the U.S. Machine Tool Industry, 1947-1966.* Doctoral dissertation presented to the New School for Social Research, 1971. 238 pp.

Examines the technological drag in the industry. Estimates productivity change over the period, and discusses the institutional and economic forces that retard the introduction of new technologies.

8.128 Southworth, Gayle Frederick. *Technological Advance and Production Skills.* Doctoral dissertation presented to The University of Wisconsin-Madison, 1975. 219 pp.

Examines technological change in the printing industry, applying the Marxian model of technological change, which he views as providing an analytical framework for explaining the relation between production workers and changing techniques, which complement rather than replace them.

8.129 Srivastava, Uma K., and Heady, Earl O. "Technological Change and Relative Factor Shares in Indian Agriculture: An Empirical Analysis." *American Journal of Agricultural Economics,* Vol. 55, No. 3, August 1973, pp. 509-514.

Using cross-section data, the authors attempt to measure changes in the relative factor shares in Indian agriculture following the "Green Revolution."

8.130 Staub, William J., and Blase, Melvin G. "Induced Technological Change in Developing Agricultures: Implications for Income Distribution and Agricultural Development." *Journal of Developing Areas*, Vol. 8, No. 4, July 1974, pp. 581-596.

The authors examine changes in income distribution which coincide with the diffusion of new farm practices. Most examples relate to India, but the analysis is pertinent to similar problems encountered by other developing countries.

8.131 Stoneman, P. "The Effect of Computers on the Demand for Labour in the United Kingdom." *The Economic Journal.* Vol. 85, No. 339, September 1975, pp. 590-606.

Presents a model comparing a fully computerized with a noncomputerized economy. Argues that process control computers have no effect on labor, and that the main effects are confined to management information systems. Finds that computers' impact on labor demand has remained small, and will likely continue to be small.

8.132 Streeten, P. P. "Technology Gaps between Rich and Poor Countries." *Scottish Journal of Political Economy*, Vol. 19, No. 3, November 1972, pp. 213-230.

Examines two obstacles to diffusion of applied knowledge-communication, and absence of suitable technologies. Recommends policies for closing these gaps.

8.133 Subrahmanian, K. K. *Import of Capital and Technology. A Study of Foreign Collaborations in Indian Industry.* New Delhi, People's Publishing House, 1972. 248 pp.

Assesses the technical collaboration of foreign firms in Indian economic growth.

8.134 Suslov, I. "Technical Progress and Effectiveness of Agriculture." *Problems of Economics*, Vol. 15, No. 9, January 1973, pp. 47-60.

Describes plans to increase farm production by using more mechanized equipment and more electrical power, and making better use of chemicals and fertilizers. Focuses on mechanization and the importance of producing more equipment and parts.

8.135 Susskind, Charles. *Understanding Technology*. Baltimore, The Johns Hopkins University Press, 1973, 163 pp.

Presents an overview of the development of modern technology and of its political and social consequences.

8.136 Tamura, Shuji. *Economies of Scale and Technological Progress of the Japanese Petrochemical Industry and Their Implications for Development Planning*. Doctoral dissertation presented to Stanford University, 1972. 130 pp.

Considers the limited substitutability of factors when modern technologies are adopted, and the substantial economies of scale they offer. Develops a theory to deal with problems of attempts to transplant modern techniques into labor surplus environments.

8.137 Thiesenhusen, William C. "Green Revolution in Latin America: Income, Effects, Policy Decisions." *Monthly Labor Review*, Vol. 95, No. 3, March 1972, pp. 20-27.

Indicates that unless there is a massive agrarian reform program, the income benefits of increased agricultural production will continue to enrich the few who hold the bulk of the area's resources, while the poor will fall further behind.

8.138 Thomas, D. Babatunde. *Capital Accumulation and Technology Transfer: A Comparative Analysis of Nigerian Manufacturing Industries*. New York, Praeger Publishers, 1975. 152 pp.

Argues that transfer of technology is a more effective alternative for promoting productivity gains than the indigenous development of a technological base. States that the means to maximize the benefits of technology transfer is to utilize equipment through "learning by doing." Presents data on the Nigerian experience.

8.139 Thomas, D. Babatunde. *Technology Transfer and Capital Accumulation. A Study of the Nigerian Manufacturing Industries*. Doctoral thesis presented to Indiana University, 1973. 222 pp.

Argues that the transfer of technology promotes productivity gains more effectively than the indigenous development of technology. Examines learning by doing in light of various theories.

8.140 Tilton, John E. *International Diffusion of Technology: The Case of Semiconductors*. Washington, The Brookings Institution, 1971. 183 pp.

Presents three case studies of diffusion–in the U.S., Europe and Japan. Argues that diffusion is determined by the availability of technology; economies of scale and capital requirements; and the role of government. Finds great differences in the way these variables affect the diffusion process.

8.141 United Nations. *The Application of Computer Technology. Economic Effects of the Outflow of Trained Personnel from Developing Countries*. New York, United Nations, 1975. 13 pp.

Presents data on computer uses and personnel in selected developing countries, as well as descriptive details. Also discusses the potential of the computer use in planning, education, and national policy generally.

8.142 UNCTAD Secretariat. *The Reverse Transfer of Technology. Economic Effects of the Outflow of Trained Personnel from Developing Countries*. New York, United Nations, 1975. 13 pp.

Evaluates the conomic effects of the "brain drain" in terms of the benefits lost by the developing countries and the benefits gained by the developed countries. Outlines the methods used in calculating gains and losses.

8.143 U. S. Committee on Intergovernmental Science Relations. *Public Technology: A Tool for Solving National Problems*. A Report to the Federal Council for Science and Technology. Washington, D. C., U. S. Government Printing Office, 1972. 60 pp.

Examines the scope of research and development on the State and local level, and the impact of Federal policies on the scientific activities of States and localities. Formulates relevant recommendations.

8.144 U. S. Library of Congress, Congressional Research Service. *Office of Technology Assessment. Background and Status*. Report to the Committee on Science and Astronautics, U. S. House of Representatives, August 1973. Washington, D. C., U. S. Government Printing Office, 1973. 47 pp.

Surveys the functions and structure of the Office of Technology Assessment. Presents a summary of the provisions of the law setting it up, and a legislative history.

8.145 U. S. Senate, Committee on Rules and Administration, Subcommittee on Computer Services. *Office of Technology Assessment for The Congress*. Hearings, March 2, 1972. Washington,

D. C., U. S. Government Printing Office, 1972. 120 pp.

Presents statements of experts and others relating to the need for the assessment of the effects of technology on society and the environment. Includes the text of the pertinent bill.

8.146 U. S. Senate, Committee on Rules and Administration, Subcommittee on Computer Services. *Technology Assessment for The Congress.* Staff Study, November 1, 1972. Washington, D. C., U. S. Government Printing Office, 1972. 105 pp.

Presents definitions of technology assessment; legislative history of relevant proposals; an overview of the technology assessment movement; and operational concepts for implementing technology assessment.

8.147 Vickery, Mary L. "New Technology in Laundry and Cleaning Services." *Monthly Labor Review,* Vol. 95, No. 2, February 1972, pp. 54-59.

Discusses innovations introduced in the cleaning services industries. Concludes that new cleaning methods for man-made fibers, rising labor costs, tight labor markets in the 1960's, and competitive pressure gave impetus to technological development and innovation.

8.148 Walsh, William D. "Establishment Efficiency and Profitability, and the Introduction of New Technology in the Mid-Nineteenth Century Pennsylvania Pig Iron Industry." *Yale Economic Essays,* Vol. 11, Nos. 1 and 2, Spring-Fall 1971, pp. 3-52

Examines the diffusion of technological change in the Pennsylvania pig iron industry between 1850 and 1870, as well as the relationship between establishment technology characteristics and establishment efficiency and profitability.

8.149 Warner, Kenneth Edgar. *The Diffusion of Leukemia Chemotherapy: A Study in the Nonmarket Economics of Medical Care.* Doctoral dissertation presented to Yale University, 1974. 391 pp.

Examines how physicians and patients decide whether to adopt a medical innovation. Compares the medical diffusion process to more conventional diffusion processes reported in the literature.

8.150 Waters, Joseph Paul. *Technological Acceleration and the Great Depression.* Doctoral dissertation presented to Cornell University, 1971. 261 pp.

Presents evidence of acceleration of technological change in the twenties, and examines its impact during the thirties. Reviews the pertinent literature.

8.151 Wedderburn, Dorothy, and Crompton, Rosemary. *Workers' Attitudes and Technology.* Cambridge, The University Press, 1972. 176 pp.

The authors examine technology as an explanatory variable in the study of attitudes and behavior within organizations. They study workers' tasks and backgrounds, and the control system and social relationships between supervisors and the supervised.

8.152 Welch, Jonathan Bruce. *Telecommunications: Competition and Technological Change.* Doctoral dissertation presented to The University of Connecticut, 1975. 191 pp.

Reviews the effects of certain FCC decisions on competition in telecommunications. Finds that there has been greater productivity of the A.T. & T.'s R & D effort, e.g., reduction of development time.

8.153 Wilkins, M. "The Role of Private Business in the International Diffusion of Technology." *Journal of Economic History,* Vol. 34, No. 1, March 1974, pp. 166-188.

Discusses ways in which private business diffuses technology. Technology is supplied by means of exports, patents, technical assistance, and direct investment. Case studies illustrate the author's propositions.

8.154 Williamson, Jeffrey G. "Optimal Replacement of Capital Goods: The Early New England and British Textile Firm." *Journal of Political Economy,* Vol. 79, No. 6, November/December 1971. pp. 1320-1334.

Develops two models of replacement behavior--one with neutral and one with labor-saving technical change. Concludes that tariff policy had a significant impact on replacement decisions.

8.155 Wilson, Robert Woodrow. *The Sale of Technology through Licensing.* Doctoral dissertation presented to Yale University, 1975. 220 pp.

Theorizes that licensing is a strategic decision in oligopolistic rivalry with respect to the physical attributes of products, involving the creation of technical knowledge. Identifies the characteristics of firms' environment influencing the granting of licenses.

8.156 Wisman, Jon Donald. *The Role of Technology in Economic Thought: Adam Smith to John Maynard Keynes.* Doctoral dissertation presented to the American University, 1974. 290 pp.

Sets forth the role assigned to technological change in the theory of major economists and schools of thought. Highlights the relationship between technology and sociopolitical issues. Examines the aspects of technological change with which contemporary economists must deal if their models are to have relevance.

8.157 Yamaguchi, Mitoshi. *Technical Change and Population Growth in the Economic Development of Japan.* Doctoral dissertation presented to the University of Minnesota, 1973. 246 pp.

Finds that high rates of technical change accompany relatively low population growth. Also finds that nonfarm technical change has contributed more to growth than agricultural technical change.

8.158 Young, Ben E. *Transfer of Technology: A Case Study of Japan and Mexico.* Doctoral thesis presented to the University of Oklahoma, 1973. 306 pp.

Examines the channels of technological transfers, as well as the processes by which they occur. Views multinational corporations and the product cycle as explanations for the kind and direction of technological transfers.

8.159 Zeisel, Rose N. "Modernization and Manpower in Textile Mills." *Monthly Labor Review,* Vol. 96, No. 6, June 1973, pp. 18-25.

Examines the effects of technological change on manpower utilization, job content, and employment levels. Finds that although capital expenditures are increasing, the industry is characterized by outmoded equipment and high labor intensity.

Research and development

9.001 Angilley, A. S. "Returns to Scale in Research in the Ethical Pharmaceutical Industry: Some Further Empirical Evidence." *Journal of Industrial Economics,* Vol. 22, No. 2, December 1973, pp. 81-93.

Presents a measure of pharmaceutical innovation involving the number of original pharmaceutical compounds produced, weighted by the degree of market success, and degree of therapeutic advance. Relates research input to output.

9.002 Batelle Memorial Institute. *Interactions of Science and Technology in the Innovative Process: Some Case Studies.* Final Report. Prepared for the National Science Foundation. Columbus, Ohio, March 19, 1973. (Paginated by chapter.)

Part of an effort to document historically the significant events in the process of several technological innovations of high social impact, this report presents case studies of the development of the heart pacemaker, hybrid grains, electrophotography, input-output analysis, and others. Generalizing analyses and conclusions are drawn from the case studies.

9.003 Batelle Memorial Institute. *Science, Technology, and Innovation.* Prepared for the National Science Foundation. Columbus, Ohio, February 1973. 33 pp.

An abridged version of the Institute's *Interactions of Science and Technology in the Innovative Process: Some Case Studies.* See the pertinent entry.

9.004 Ben-Porath, Yoram. "Some Implications of Ecomomic Size and Level for Investment in R & D." *Economic Development and Cultural Change,* Vol. 21, No. 1, October 1972, pp. 96-100.

Indicates how the relative size of R & D expenditures depends on the economic size and the level of economic development of a country.

9.005 Blau, Judith R. *The Structure of Science.* Doctoral dissertation presented to Northwestern University, June 1972. 247 pp.

Attempts to ascertain the principles which explain the behavior of scientists. Focuses on informal groupings. Examines the distribution of rewards in terms of recognition.

9.006 Branch, Ben. "Research and Development and its Relation to Sales Growth." *Journal of Economics and Business,* Vol. 25, No. 2, Winter 1973, pp. 107-111.

Tests the hypothesis that R & D results in higher sales. Uses time-series data from the Fortune 500. Concludes that sales growth from R & D is not especially rapid, but that the long-run impact is substantial.

9.007 Bredahl, Maury E. *The Productivity and Allocation of Research at U. S. Agricultural Experi-*

ment Stations. Doctoral dissertation presented to the University of Minnesota, 1975. 138 pp.

Investigates the effects of public agricultural research on agricultural output. Develops production function estimates for four types of farms, and calculates marginal products and rates of return on research.

9.008 Brown, Lawrence A., and Lentnek, Barry. "Innovation Diffusion in a Developing Economy: A Mesoscale View." *Economic Development and Cultural Change,* Vol. 21, No. 2, January 1973, pp. 274-292.

The authors focus upon the spatial diffusion of innovation within the rural hinterland of an urban center. They present a model and apply it in the analysis of commerical dairying in Aguascalientes, Mexico, from 1958 to 1968.

9.009 Cooper, Charles. "Science, Technology and Production in the Underdeveloped Countries: An Introduction." *Journal of Development Studies,* Vol. 9, No. 1, October 1972, pp. 1-18.

Argues that scientific activities in less developed countries are a form of consumption because of their dependence on foreign technology. Western technology may be inappropriate also because it makes intensive use of resources which are scarce in less developed countries.

9.010 Evenson, R. E., and Kislev, Y. "Research and Productivity in Wheat and Maize." *Journal of Political Economy,* Vol. 81, No. 6, November-December 1973, pp. 1309-1329.

The authors develop various measures of agricultural research output to explain increases in yield-per-unit land in 75 countries.

9.011 Fellner, William. "Empirical Support for the Theory of Induced Innovations." *The Quarterly Journal of Economics,* Vol. 85, No. 4, November 1971, pp. 581-604.

Examines the impact on the income distribution of the factor-saving effects of inventions, on the one hand, and of rising capital-labor ratios on the other. Hypothesizes that the latter tend to raise labor's relative share, while the former tend to reduce it.

9.012 Firestone, O. J. "Innovations and Economic Development - The Canadian Case." *Review of Income and Wealth,* Vol. 18, No. 4, December 1972, pp. 399-419.

Examines the reasons for the less-than-expected results from Canada's attempt to lessen her dependence on foreign know-how through an expanded R & D program. Finds the link between R & D expenditures and innovations in Canada is tenuous compared to the U.S., due to Canada's lower rate of utilization of patents.

9.013 Fisher, F. M., and Temin, P. "Returns to Scale in Research and Development: What Does the Schumpeterian Hypothesis Imply?" *Journal of Political Economy,* Vol. 81, No. 1, January-February 1973, pp. 56-70.

Criticizes various attempts to expand on Schumpeter's hypothesis that there are increasing returns in R & D both as to size of R & D establishment and as to firm size.

9.014 Fussler, Herman H. *Research Libraries and Technology.* A Report to the Sloan Foundation. Chicago, The University of Chicago Press, 1973. 91 pp.

Focuses on resource access and bibliographical control problems of large, research-oriented libraries. Deals with such aspects of library technology as computers, photocopying, and facsimile transmission.

9.015 Gilpin, Robert. *Technology, Economic Growth, and International Competitiveness.* A Report prepared for the Subcommittee on Economic Growth of the Joint Economic Committee, Congress of the United States. Washington, D. C., July 9, 1975. 87 pp.

Argues that America's once unchallenged scientific and technological superiority has deteriorated. Surveys current state of R & D, and examines the nature of industrial innovation. Also examines foreign experience. Concludes with recommendations for appropriate government policies.

9.016 Gliazer, L. "The Influence of Science on Economic Development (A Critical Survey of the Methodology of Calculation)." *Problems of Economics,* Vol. 14, No. 11, March 1972. pp. 3-30.

Examines basic methodology for the measurement of growth, and the impact of science and technology on growth. Uses empirical evidence from Russia and other European countries showing that progress in science and technology makes higher growth and productivity.

9.017 Globerman, S. "Market Structure and R & D in Canadian Manufacturing Industries." *Quarterly*

Review of Economics and Business, Vol. 13, No. 2, Summer 1973, pp. 59-67.

Seeks to determine the empirical relationship between different market structure characteristics and the overall research intensity of an industry by regression analysis. Finds that research intensity increases with increased foreign ownership and decreased concentration for technologically progressive industries; and that a reverse relationship obtains for technologically less progressive industries.

9.018 Goldberg, Lawrence. *The Demand for Industrial R & D.* Doctoral dissertation presented to Brown University, 1972. 191 pp.

Analyzes the effects of market structure upon technical change, and the reasons why R & D per unit of sales increases, then decreases with sales.

9.019 Hall, John T., and Dixon, Roger A. *Productivity Measurement in R & D. Productivity Measurement Experiment in Selected Research and Development Programs at the National Bureau of Standards.* Washington, D.C., U.S. Department of Commerce, December 1975. 49 pp.

Discusses problems encountered in measuring productivity of R&D. Highlights the differences between perceived outputs in manufacturing and in R&D. Concludes that counts of output media, such as publications or citations, do not reliably measure productivity.

9.020 Hayami, Yujiro. "Elements of Induced Innovation: A Historical Perspective for the Green Revolution." *Explorations in Economic History,* Vol. 8, No. 4, Summer 1971, pp. 445-472.

Examines agricultural development in Japan, Taiwan, and Korea prior to World War II. Discusses such factors as lifting of feudal restraints on farmers; the land tax revision granting titles to farmers; and scientific research and education by the government.

9.021 Henry, Nicholas L. "Copyright, Public Policy, and Information Technology." *Science,* Vol. 183, No. 4123, February 1, 1974, pp. 384-391.

Discusses computer-based information storage and retrieval systems and photocopying technologies in terms of their costs and benefits to knowledge-producing and -using circles in American society, and the legal and policy issues they have been raising.

9.022 Hu, Sheng Cheng. "On the Incentive to Invent: A Clarificatory Note." *Journal of Law and Economics,* Vol. 16, No. 1, April 1973, pp. 169-177.

Discusses previous research on the incentive to invent. States that what determines the degree of research effort is the expected marginal, not the total return.

9.023 Johannisson, Bengt, and Lindstrom, Christian. "Firm Size and Inventive Economic Activity." *Swedish Journal of Economics*, Vol. 73, No. 4, December 1971, pp. 427-442.

The authors examine the relation between firm size and some variables related to the number of patent applications by firms. They find the theory that large firms are responsible for a larger proportion of inventions than their market share cannot be generally supported.

9.024 Johnson, P. S. *Co-operative Research in Industry: An Economic Study*. New York, John Wiley, 1973. 232 pp.

Reviews the structure of R & D organizations in England. Attempts to determine the factors influencing an industry's support of research associations.

9.025 Kamien, Morton I., and Schwartz, Nancy L. "Market Structure and Innovation: A Survey." *Journal of Economic Literature*, Vol. XIII, No. 1, March 1975, pp. 1-37.

The authors review the literature on the relationship of resource allocation to R & D and technical advance. They cover such topics as research inputs, monopoly power, firm size, market structure, and inventive output.

9.026 Khromov, P. "Scientific and Technical Progress and Labor Productivity." *Problems of Economics*, Vol. 15, No. 3, July 1972, pp. 46-59.

Investigates the factors responsible for increases in productivity and the relative importance of each. Stresses technological progress. Compares the views of Western and Soviet authors on such matters as quantity of capital per worker and role of education.

9.027 Kuznets, Simon. "Innovations and Adjustments in Economic Growth." *Swedish Journal of Economics*, Vol. 74, No. 4, December 1972, pp. 431-451.

Classifies innovations on the basis of modern economic growth. Outlines the adjustments which technological innovations call for.

9.028 Laserson, Gregory L., and Sperling, JoAnn. *The Survival of R and D in American Industry*. An AMA Research Report. New York, American Management Association, 1972. 32 pp.

The authors examine the viability of industrial R & D as a result of a significant decline in R & D staff, and fund reductions, since 1968.

9.029 Layton, Christopher; Harlow, Christopher; and De Houghton, Charles. *Ten Innovations. An International Study on Technological Development and the Use of Qualified Scientists and Engineers in Ten Industries*. New York, Crane, Russak and Co., 1972. 199 pp.

A comparison of the innovative process in ten British industries with similar industries in the U.S. and continental Europe. The authors' concern is with the proper utilization of British engineers and scientists. Industries studied include aircraft manufacturing, vehicle engines, semi-conductors, color television, nuclear power, and others.

9.030 Long, W. H., and Feller, I. "State Support of Research and Development: An Uncertain Path to Economic Growth." *Land Economics*, Vol. 48, No. 3, August 1972, pp. 220-227.

The authors develop a theory of the role of research and development in influencing regional growth. They discuss the various R & D strategies normally pursued by States and the conceptions they imply concerning the relationship between R & D and regional growth.

9.031 Mansfield, Edwin. "R & D's Contribution to the Economic Growth of the Nation." *Research Management*, Vol. 15, May 1972, pp. 31-46.

Examines the problems of measuring the relation of R & D to economic growth. Finds that the attempts at quantifying the relationship have remained inconclusive.

9.032 Nordhaus, W. D. "Some Skeptical Thoughts on the Theory of Induced Innovation." *Quarterly Journal of Economics*, Vol. 87, No. 2, May 1973, pp. 208-219.

Questions whether the theory of induced innovation can be used to introduce technological change into the neoclassical growth models. Argues that it is based on a restrictive microeconomic assumption that technological knowledge is costless. Concludes that the theory operates only in a special case where the natural drift of technology is Harrod-neutral (purely labor-augmenting).

9.033 Prosi, Gerhard. "Patents and Externalities." *Zeitschrift Fur Nationalokonomie*, Vol. 31, Nos. 1-2, June 1971, pp. 63-80.

Analyzes the patent system as an instrument for internalizing external economies and diseconomies of technological change. Shows that profit-motivated research and development conducted by private enterprise is necessarily biased toward reducing internal costs and neglects the external costs of technological change.

9.034 Rasmussen, J. A. "Applications of a Model of Endogenous Technical Change to U.S. Industry Data." *Review of Economic Studies*, Vol. 40, No. 122, April 1973, pp. 225-238.

Develops a model to explain the effects of R & D on the future discounted costs of capital, labor, and research services. Finds that R & D is capital-saving.

9.035 Robinson, Eric. "James Watt and the Law of Patents." *Technology and Culture*, Vol. 13, No. 2, April 1972, pp. 115-139.

Describes Watt's view of patent laws and how they should be reformed, in addition to his struggles over patent rights.

9.036 Schmookler, Jacob. *Patents, Invention, and Economic Change. Data and Selected Essays*. Edited by Zvi Griliches and Leonid Hurwicz. Cambridge, Mass., Harvard University Press, 1972. 292 pp.

A collection of essays dealing with total factor productivity, technological change, and the relation of inventive activity to market structure and industrial organization, as well as the relation between technological change and the economic system. Extensive time series on patent statistics are also presented.

9.037 Shaw, J. A., and Leet, D. R. "Research and Development and Productivity Change in the U.S., 1948-1968." *Journal of Industrial Economics*, Vol. 22, No. 2, December 1973, pp. 153-155.

The authors present the results of an investigation of research and development in 21 U.S. manufacturing industries from 1948 to 1968. Their study reveals a significant relationship between R & D and output per employee-hour

from 1953 to 1963. They find no statistically significant relationship for the period 1963 to 1968.

9.038 Taylor, C. T., and Silberston, Z. A. *The Economic Impact of the Patent System*. Cambridge, England, The University Press, 1973. 408 pp.

The authors assess the British experience in terms of whether patent monopolies result in net benefit or loss to the economy. Case studies indicate that the existing system modestly outweighs compulsory licensing. They find that more data are needed before firm conclusions can be reached.

9.039 Tilton, John E. "Research and Development in Industrial Growth: Comment." *Journal of Political Economy*, Vol. 81, No. 5, September-October 1973, pp. 1245-1248.

Comments on William N. Leonard's 1971 study of R & D and industrial growth. Contradicts Leonard's conclusion that industry growth is not a determinant of the intensity of industry R & D expenditures. Finds the causality to be two-way.

9.040 U.S. Department of Commerce, Patent Office. *Technology Assessment and Forecast. A Review of Patent Ownership*. Fourth Report, January 1975. Washington, D.C., 1975. 143 pp.

Lists patents issued, 1969-1973, by industry and company or government agency. Also lists patents for the more active classes, as well as in nuclear energy, coal gasification and oil shale.

9.041 U.S. Department of Commerce, Patent and Trademark Office. *Technology Assessment and Forecast*. Fifth Report, August 1975. Washington, 1975. 174 pp.

Presents information on particularly active patent classes where patenting by foreign inventors has been high. Also presents patent activity by standard industrial classification.

9.042 U.S. National Science Board, National Science Foundation, *Science Indicators, 1974. Report of the National Science Board, 1975*. Washington, D.C., 1975. 242 pp.

A compendium of text and graphs covering resources for R & D; basic research and the resources devoted to it; industrial R & D and innovation, together with the outputs and returns generated by it; science and engineering personnel, and their characteristics and employment status; and international comparisons.

9.043 Veger, D. "Calculating Economic Effectiveness Under Conditions of Indeterminacy." *Problems of Economics*, Vol. 15, No. 4, August 1972, pp. 41-62.

Deals with the problem of forecasting expenditures needed to accomplish set goals in scientific research. Investigates the problems faced by the Soviet Union in allocating resources which will maximize the effectiveness of scientific research and development efforts.

9.044 Wilder, Ronald P., and Stansell, Stanley, R. "Determinants of Research and Development Activity by Electric Utilities." *Bell Journal of Economics and Management Science*, Vol. 5, No. 2, Autumn 1974, pp. 646-669.

The authors present an empirical model of R & D determinants. Their findings indicate that R & D outlays increase with firm size but are inelastic with respect to profitability. They draw implications for rate regulation as an effective tool to stimulate R & D expenditures.

9.045 Williams, B. R., editor. *Science and Technology in Economic Growth*. Proceedings of a Conference held by the International Economic Association at St. Anton, Austria. New York, John Wiley, 1973. 446 pp.

A collection of papers on such subjects as the contribution of science and technology to economic development; research expenditures and growth accounting; technological forecasting; financing of new science and technology; determinants of the speed of diffusion; and others.

Productivity, prices, and costs

10.001 Abel, I. W. *Employment Security and Plant Productivity Committee–Ten Coordinating Steel Companies*. Washington, D.C., National Commission on Productivity and Work Quality, December 12, 1974. 10 pp.

Describes prupose and structure of the Committee. Discusses long-range goals, and the future of the basic steel industry.

10.002 Bandurski, B. L. "Ecology and Economics–Partners for Productivity." *Annals of the American Academy of Political and Social Science*, Vol. 405, January 1973, pp. 75-94.

Examines ecological considerations in economic decision making. Argues that the price system fails to capture all the costs to society of producing

output. Holds that total productivity will rise when society identifies, and eliminates as far as possible, the hidden costs of human technological activity.

10.003 Barro, R. J., and Grossman, H. I. "Suppressed Inflation and the Supply Multiplier." *Review of Economic Studies*, Vol. 41, No. 125, January 1974, pp. 87-104.

The authors demonstrate how the behavior of households and firms under conditions of suppressed inflation produces a multiple contraction in output and employment. They show that excess demand leads the household to increase savings and decrease its effective labor supply. They develop a supply multiplier similar to the conventional demand multiplier.

10.004 Braun, R. "The Role of Incomes Policy in Industrial Countries Since World War II." *International Monetary Fund Staff Papers*, Vol. 22, No. 1, March 1975, pp. 1-36.

Surveys the issues and indicates sources of information on incomes policy. Explains the changes in emphasis during periods of widespread application from World War II up to recent years. Suggests a rationale for incomes policy at the present time.

10.005 Capdeville, Patricia, and Neef, Arthur. "Productivity and Unit Labor Costs in 12 Industrial Countries." *Monthly Labor Review*, Vol. 96, No. 11, November 1973, pp. 14-21.

The authors discuss comparative trends in productivity, hourly compensation, and unit labor costs in the years 1960-1972.

10.006 Cluff, A. T. "The Cyclical Behavior of Labor Productivity: Implications for an Incomes Policy." *The Quarterly Review of Economics and Business*, Vol. 12, No. 3, Autumn 1972, pp. 35-43.

Examines the shortcomings of the wage-price guidelines imposed under the New Economic Policy. Argues for an incomes policy which allows more rapid expansion of hourly wages when increases in labor productivity offset them and less rapid expansion when such increases are not forthcoming.

10.007 Douty, H. M. *Labor Management Productivity Committees in American Industry*. Prepared for the National Commission on Productivity and Work Quality. Washington, D.C., May 1975. 59 pp.

Surveys experiences with joint committees, and examines their characteristics. Presents case studies. Discusses recent initiatives.

10.008 Eckstein, Otto, and Shields, Nikki. *The Role of Productivity in Controlling Inflation*. Washington, D.C., National Commission on Productivity and Work Quality, December 1974. 26 pp.

After reviewing the causes of current inflation, the authors define productivity and describe an econometric model that explains the relation between the long-term productivity trend and trends in the price level.

10.009 Eisenberg, William M., and Fulco, Lawrence J. "Productivity and Costs in the Private Economy, 1972." *Monthly Labor Review*, Vol. 96, No. 5, May 1973, pp. 3-7.

The authors review and analyze cyclical patterns in productivity and related measures (output, man-hours, unit labor costs, compensation per man-hour, and prices) in the private sector of the economy.

10.010 Ferguson, C. E. "Wages, Productivity, and the Guidelines." *The Economic Record*, Vol. 47, No. 118, June 1971, pp. 217-229.

Considers the assumptions underlying standard guideline theory. Presents a two-sector model which shows that wage-price guidelines tend to destabilize rather than stabilize.

10.011 Goldstein, Ken. "International Productivity and Labor Costs." *The Conference Board Record*, Vol. 13, No. 2, February 1976, p. 8.

Presents indexes of productivity and unit labor costs for 12 industrial countries for the period 1960-74. Notes that the United Kingdom had the worst experience, Japan, the best.

10.012 Grayson, C. Jackson. "Prices, Productivity—and Decontrol." *The Conference Board Records*, Vol. 9, No. 4, April 1972, pp. 13-16.

Argues that increased productivity is needed to slow inflation. Suggests a new dialogue between workers and managers; innovative thinking about training based on motives; new group incentives; and job enrichment.

10.013 Herman, Arthur S. "What Have Labor Statistics Contributed to the Economic Stabilization Program?" in *Selected Papers from North American Conference on Labor Statistics, June 26-29, 1972*. U S. Department of Labor,

Bureau of Labor Statistics. Washington, U.S. Government Printing Office, 1972. pp. 25-27.

Outlines the role of BLS productivity data in the stabilization program by providing some of the basic measures used by the Price Commission for determining price changes. Discusses the output per employee-hour and unit labor cost measures prepared by the BLS.

10.014 Herman, Shelby W. "Productivity and Cost Movements in 1971." *Monthly Labor Review*, Vol. 95, No. 5, May 1972, pp. 12-16.

Reviews productivity, employment, and cost trends in 1971, comparing them with other recovery years. Finds that increased productivity was largely due to a decrease in man-hours rather than a growth in output.

10.015 Highton, Frank E. "The Pay Board and Productivity Bargaining." *Personnel*, Vol. 50, No. 1, January-February 1973, pp. 8-20.

Discusses principal uses of, and fallacies about, the factor of productivity in collective bargaining. Underscores the need for the Pay Board to base wage guidelines on long-term productivity trend rates, rather than quarterly or yearly rates.

10.016 Kosters, Marvin, and others. *Inflation Control, Productivity, and Collective Bargaining*. New Brunswick, N.J., Rutgers University, October 18, 1972. 44 pp.

Papers presenting an appraisal and critique of wage controls in the Economic Stabilization Program of the Nixon administration; and on the possibilities of improving productivity through collective bargaining.

10.017 Levinson, Harold M., and others. *Collective Bargaining and Technological Change in American Transportation*. Evanston, Illinois, Northwestern University, 1971. 723 pp.

The authors examine how management, unions, and the government handle problems resulting from technological innovations in the transportation sector. They formulate public policy recommendations.

10.018 Lieb, Robert C. *Labor in the Transportation Industries*. Praeger Special Studies in U.S. Economic, Social, and Political Issues. New York and London, Praeger, 1974. 125 pp.

Analyzes the role of labor and labor-management relations in the U.S. transportation industry. Includes information on compensation trends, union structure, bargaining patterns, work rules, and labor productivity.

10.019 "Low Productivity: The Real Sin of High Wages." *Engineering News Record*, Vol. 188, February 24, 1972, pp. 18-23.

Reports on union practices known as "featherbedding" which lower productivity and in most cases raise unit-labor costs. Cites examples of many different unions in the construction industry using practices which raise costs and lower productivity.

10.020 McKersie, R. B., and Hunter, L. C. *Pay Productivity and Collective Bargaining*. New York, St. Martin's, 1973. 389 pp.

The authors discuss the development of, and reasons for, productivity bargaining in Britain.

10.021 McKersie, Robert and others. *Productivity Bargaining: The British and American Experience.* Prepared for the National Commission on Productivity. Washington, January 1972. 19 pp.

The authors discuss productivity bargaining as a means of improving efficiency and lowering unit labor costs, while also giving workers significant economic gains. Reasons for its adoption are reviewed. Suggestions for its more widespread use in the U.S. are offered.

10.022 McLaughlin, Curtis P. "Technology and Medical Care Costs: Some Basic Evaluative Problems." *Economic and Business Bulletin*, Vol. 24, No. 1, Fall 1971, pp. 36-43.

Discusses various bases for cost calculation, including intensity of care, and economies of scale, as well as the effects of inflation on costs. Presents case studies.

10.023 Mark, Jerome A. "Productivity and Costs in the Private Economy." *Monthly Labor Review*, Vol. 98. No. 6, June 1975, pp. 3-8.

Discusses productivity, hourly compensation, unit labor costs, and prices in the total private, nonfarm, and manufacturing sectors for 1974. Presents annual rates of change in productivity and related measures 1969-74 for the total private economy, the nonfarm and manufacturing sectors, and nonfinancial corporations.

10.024 Melman, Seymour. "Twelve Propositions on Productivity and the War Economy." *Challenge*, Vol. 18, No. 1, March/April 1975, pp. 7-11.

Argues that productivity is diminished because the military preempts capital and technical resources, eroding the economy's cost-reducing potential.

10.025 Moore, Geoffrey H. "Productivity, Costs, and Prices: New light from an Old Hypothesis." *Explorations in Economic Research*, Vol. 2, No. 1, Winter 1975, pp. 1-17.

Examines the effect of the business cycle on productivity, costs, profits, and prices with particular attention to the 1961-73 period.

10.026 Neef, Arthur. "Unit Labor Costs in the United States and 10 other Nations, 1960-71." *Monthly Labor Review*, Vol. 95, No. 7, July 1972, pp. 3-8.

Compares unit labor costs in U.S. manufacturing with eight European countries, Canada, and Japan. Finds that U.S. manufacturing experienced the lowest average annual percent change in unit labor costs, output per man-hour, and hourly compensation over the 1960-1971 period.

10.027 Norsworthy, J. R., and Fulco, L. J. "Productivity and Costs in the Private Economy, 1973." *Monthly Labor Review*, Vol. 97, No. 6, June 1974, pp. 3-9.

The authors discuss recent productivity trends. They find that a slowdown has occurred since 1966, which they attribute to shifts in employment to higher from lower productivity sectors.

10.028 Okubo, Sumiye. *The Effect of Inflation on Economic Growth*. Doctoral dissertation presented to Tulane University, 1972. 243 pp.

Tests the hypotheses that high inflation rates inhibit growth, and that the effect of inflation on growth depends on the level of economic development and price anticipations.

10.029 Pitchford, J. D. "The Usefulness of the Average Productivity Wage Adjustment Rule." *The Economic Record*, Vol. 47, No. 118, June 1971, pp. 225-261.

Examines the simple average productivity wage adjustment rule as it functions as a part of anti-inflationary wage policy. Finds it to be misleading even as a rule of thumb.

10.030 Roberts, M. "Sharing the Benefits of Productivity." *American Federationist*, Vol. 79, October 1972, pp. 19-23.

Discusses factors of productivity change, such as education, research, and capital formation. Also discusses the impact of productivity changes on labor costs. Gives his view of the role of trade unions in improving productivity.

10.031 Rosow, Jerome M. "Now is the Time for Productivity Bargaining." *Harvard Business Review*, Vol. 50, No. 1, January-February 1972, pp. 78-89.

Argues that the U.S. needs productivity bargaining because of poor productivity in the sixties accompanied by high unit labor costs, leading to inflation. Discusses English experiences with productivity bargaining.

10.032 Slezak, Lester. "Effects of Changes in Payment System on Productivity in Sweden." *Monthly Labor Review*, Vol. 96, No. 3, March 1973, pp. 51-52.

Examines the effects of a pay system change on productivity, quality of performance, absenteeism, personnel turnover, and general employment climate. Finds that shifts to the premium payment system increased productivity from 5 to 35 percent.

10.033 Stark, Harry F. *Productivity and Bargaining*. New Brunswick, N.J., Rutgers University, March 1974. 14 pp.

Outlines the links between productivity, unit costs and prices, as well as the concept and measurement of productivity. Discusses effects of rising productivity. Relates instances of productivity bargaining.

10.034 Stern, Gary. "A Note on Productivity, the Real Wage, and the Accelerationist Hypothesis." *Southern Economic Journal*, Vol. 41, No. 4, April 1975, pp. 683-687.

Argues that the accelerationist hypothesis has neglected the role of productivity in wage determination. Incorporates productivity in a short-run model of the real wage rate and employment. Finds a direct relationship between unemployment and unit labor costs.

10.035 Suri, G. K. and Pillay, P. S. R. "Productivity Bargaining: A Study of Problems and Possibilities." *Indian Journal of Industrial Relations*, Vol. 9, No. 3, January 1974, pp. 347-362.

The authors examine the concept and operability of productivity bargaining in the context of a public sector enterprise. They argue that productivity

bargaining can help eliminate wasteful practices, and link wage increases to cost reductions.

10.036 Suri, G. K. and Chellappa, H. V. V. "Wage-Cost-Productivity Nexus and Incomes Policy." *Indian Journal of Industrial Relations*, Vol. 9, No. 1, July 1973, pp. 69-82.

The authors examine the relations between movements in money wages, real wages, unit cost and productivity, and raise issues relevant to the formulation of incomes policy.

10.037 Sylos-Labini, Paolo. *Trade Unions, Inflation, and Productivity*. Lexington, D. C. Heath & Co., Lexington Books, 1974. 170 pp.

Presents an econometric model of the Italian economy. Argues against the use of incomes policy. Finds a cost-push effect on wages, and asserts a shift in income distribution toward wage and salary earners.

10.038 Taymans, A. L. "The Use of Productivity Gains in the Price Control Program of the United States." *Economisch en Sociaal Tydschrijt*, Vol. 27, No. 2, April 1973, pp. 181-190.

Presents a factual and critical overview of Phase II of the price control program of the Nixon Administration.

10.039 U.S. Department of Labor, Bureau of Labor Statistics, *Productivity and Costs in Nonfinancial Corporations.* Quarterly press release. Washington.

Presents productivity and cost data, supplementing the data for the total private sector and some of its components.

10.040 U.S. Tariff Commission, *Competitiveness of U.S. Industries*. Report to the President. TC Publication 473. Washington, D.C., April 1972. 224 pp.

Examines reasons for the deterioration in the U.S. trade balance since the mid-sixties. Particularly investigates inflation, declining productivity, and certain changes in the characteristics of U.S. products for exports, and in imported products.

10.041 Van Houten, J. "Assembly Industries in the Caribbean." *Finance and Development*, Vol. 10, No. 2, June 1973, pp. 19-22, 37.

Reports on the assembly industry of many Caribbean countries, noting the use of low cost labor as compared to the U.S., and high productivity, as the main factors which attract assembly plants to the area. Discusses the economic impact on the different countries and the benefits of locating plants outside the U.S.

10.042 Webb, Michael. *Transporting Goods by Road* L.S.E. No. 10, London Weidenfeld and Nicolson, and the London School of Economics and Political Science, 1972. 428 pp.

Urges a reduction in the rapidly increasing expenditures on road goods transported in the U.K. Suggests that improved pricing and operational coordination will increase transport efficiency.

10.043 Weinberg, Edgar. *Recent Initiatives in Labor-Management Cooperation*. Washington, D.C., National Center for Productivity and Quality of Working Life. February 1976. 62 pp. and appendix.

Presents highlights of conferences on labor-management cooperation to improve productivity and work life quality, together with a discussion of the factors that have led to the need for more such cooperation.

10.044 Whang, Byung-Joon. *Inflation and Economic Growth: A Dynamic Analysis of Deficit Finance*. Doctoral dissertation presented to the State University of New York at Binghamton, 1974. 195 pp.

Examines the impact of financing capital formation by an inflationary budgetary deficit in a developing economy. Investigates the trade-off relation between inflation and output increases.

10.045 Wilford, W. T., and Poe, M. H. "An Examination of Wage Change Determinants in Seven Industrial Sectors, 1965-1970." *Weltwirtschaftliches Archiv*, Vol. 111, No. 1, March 1975, pp. 52-78.

The authors explore the relationship between wage rates and prices and estimate the influence of price, unemployment, and productivity upon wage changes. Disaggregation techniques are used to analyze major sectors, thereby pinpointing influences that are masked by aggregation.

10.046 Willmot, D. G. "Productivity and Canada's Competitive Posture." *The Conference Board Record*, Vol. 13, No. 2, February 1976, pp. 32-34.

Compares Canadian productivity and unit labor costs with the experience of the United States over the period 1970-74. Finds the Canadian position has been deteriorating as a result of large wage gains and the slowdown in the world's economy. Draws implications for future income levels in Canada.

Productivity and employment

11.001 Abed, George T. "Labor Absorption in Industry: An Analysis with Reference to Egypt." *Oxford Economic Papers,* N. S., Vol. 27, No. 3, November 1975, pp. 400-425.

Investigates the link between output growth and labor absorption. Focuses on prices and wages as possible sources of slow labor absorption.

11.002 Azevedo, Ross Eames. *The Labor Market for Scientific Personnel: The Problem of Allocation and Efficiency.* Doctoral dissertation presented to Cornell University, 1972. 287 pp.

Analyzes the structure and functioning of the labor market for scientists and engineers, developing a pertinent theoretical model. Finds great inefficiencies in the operation of this market despite sophisticated methods of job search. Offers remedial recommendations.

11.003 Barker, Randolph; Meyers, William H.; Crisostomo, Cristina M.; and Duff, Bart. "Employment and Technological Change in Philippine Agriculture." *International Labour Review*, Vol. 106, No. 2-3, August-September, 1972, pp. 111-139.

The authors note that the closing of the land frontier, coupled with an increasing agricultural labor force and limited nonfarm employment opportunities, requires an increase in the productivity of the land base. They detail the factors affecting productivity such as increasing crop yields, mechanical technology, the rate of diffusion of mechanical equipment and government programs, all of which have led to sharp increases in labor productivity over the period 1966-70.

11.004 Bhalla, A. S., editor. *Technology and Employment in Industry.* Geneva, Switzerland, International Labour Office, 1975. 324 pp.

Presents case studies of technological choices open to developing countries. Discusses conceptual and measurement issues bearing on alternative technological possibilities. Focuses on the analysis of detailed technological information, usually overlooked in general equilibrium planning models.

11.005 Brimmer, Andrew F. *A New American Dilemma – The Task of Reconciling Growth in Productivity and Employment.* Remarks by Andrew F. Brimmer. Sponsored by the Joint Boards of Directors of the Federal Reserve Bank of St. Louis, Memphis, Tennessee, April 1972. 24 pp.

Explores relations between productivity and employment. Argues that strong productivity gains will lead to higher unemployment, and that an expanded public employment program to absorb the unemployed is advisable.

11.006 Cepede, Michel. "The Green Revolution and Employment." *International Labour Review*, Vol. 105, No. 1, January 1972, pp. 1-8.

Argues that the "Green Revolution" can be organized so as to spread agricultural employment more evenly over the year; that it creates new nonfarm jobs; and that land reform is necessary to its success.

11.007 Clayton, Eric S. "Mechanization and Employment in East African Agriculture." *International Labour Review,* Vol. 105, No. 4, April 1972, pp. 309-334.

Discusses the effectiveness of tractors and other mechanized tools. Shows that tractors are ineffective for the small farmer because of high costs of operation and the small revenues brought in by additional crops.

11.008 Conant, Eaton H. *Teacher and Paraprofessional Work Productivity. A Public School Cost Effectiveness Study.* Lexington, Mass., D. C. Heath, 1973. 149 pp.

Investigates the effects of teacher-paraprofessional employment on the kind and amount of instruction performed. Finds that though the routine work load of the teacher was not reduced, much additional work was done with disadvantaged children.

11.009 Corden, W. M., and Findlay, R. "Urban Unemployment, Intersectoral Capital Mobility and Development Policy." *Economica,* Vol. 42, No. 165, February 1975, pp. 59-78.

The authors expand the Harris-Todaro two-sector model of urban unemployment. They introduce capital mobility between sectors in response to differential rates of return. They analyze output levels, the effects of economic expansion, and arguments for wage and output subsidies.

11.010 Cotterill, P. "The Elasticity of Demand for Low-Wage Labor." *Southern Economic Journal,* Vol. 41, No. 3, January 1975, pp. 520-525.

Develops a model based on comparative cross-section analysis, the results of which comport with dynamic time-series models. Finds that the chief determinants of the demand for labor in a retail industry are relative input prices, the level of output, and the quality of labor.

11.011 Crandall, R. W.; MacRae, C. D.; and Yap, L.Y.L. "An Econometric Model of the Low-Skill Labor Market." *Journal of Human Resources,* Vol. 10, No. 1, Winter 1975, pp. 3-24.

The authors describe the supply and demand of low-skilled labor by State. Their estimates indicate that demand is slightly inelastic, while the supply function is backward bending for heads of households and other family workers.

11.012 Emmerij, Louis. "A New Look at Some Strategies for Increasing Productive Employment in Africa." *International Labour Review,* Vol. 110, No. 3, September 1974, pp. 199-218.

Reports on discussions at an ILO seminar concerning such topics as the choice of technology, the promotion of employment in small scale industries, incomes policy as an element in employment strategy, and education and training policies.

11.013 "Employment–We Lost 130,000." *The Economist,* Vol. 245, No. 6745, December 2, 1972, pp. 89 and 93.

Examines productivity increases in the upswing period of five business cycles, comparing increases in output to increases in output per worker. Concludes that the secular rate of increase of productivity in Britain may well be increasing.

11.014 Evan, Harry Zvi. "Socio-Economic and Labour Aspects of Pollution Control in the Chemical Industries." *International Labour Review,* Vol. 110, No. 3, September 1974, pp. 219-233.

Examines the economic and social aspects of pollution control in their broader aspects. Uses an interdisciplinary approach to the environmental problems arising from industrial activity.

11.015 Fabricant, S. "Productivity in the Tertiary Sector." *Acta Oeconomica,* Vol. 8, No. 2-3, 1972, pp. 207-219.

Reviews studies of productivity, and employment and output growth in the service sector. Stresses the importance of continued study, inasmuch as the sector accounts for an expanding share of employment.

11.016 Freeman, Richard B. *Engineers and Scientists in the Industrial Economy.* Prepared for the Manpower Administration, U.S. Department of Labor. No date of publication. 254 pp.

Examines the contribution of scientific manpower to the rate and nature of economic change; the impact of change on labor markets; and the determination of the number of persons employed in generating scientific and technical change.

11.017 Haig, B. D. "An Analysis of Changes in the Distribution of Employment between the Manufacturing and Service Industries, 1960-1970." *Review of Economics and Statistics,* Vol. 57, No. 1, February 1975, pp. 35-42.

Attempts to quantify the determinants of the shift in employment to services, using Australian data. Finds that the faster growth in service employment is due to differences in elasticities of demand for the outputs of the two sectors, and changes in input-output-coefficients.

11.018 Haulk, Charles Jakie. *Growth and Employment in a Labor-Surplus Economy.* Doctoral dissertation presented to Duke University, 1972. 183 pp.

Develops criteria for selecting development programs achieving an optimal growth path with respect to the economic growth rate and per-capita income and employment.

11.019 Haworth, J. G. and others. Gwartney, J.; and Haworth, C. "Earnings, Productivity, and Changes in Employment Discrimination During the 1960's." *American Economic Review,* Vol. 65, No. 1, March 1975, pp. 158-168.

The authors develop a model of earnings determination. They present evidence that structural changes in employment opportunities took place in the sixties. They find that one-half of the gain in the nonwhite-to-white ratio is due to the exit of older nonwhites from the workforce, combined with the entry of younger, better prepared nonwhites.

11.020 Herer, Wiktor. "Choice of the Rate of Decrease of Agricultural Employment and of Increase of Industrial Employment." *Eastern European Economist,* Vol. 11, No. 1, Fall 1972, pp. 58-89.

After presenting data on the decline of farm employment in selected countries, the author addresses the problem of low agricultural productivity growth in Poland, which is associated with

a low rate of employment decline in agriculture. Examines the absorptive capacity of the industrial sector. Suggests planning measures to optimize migration out of agriculture.

11.021 Inoue, Keichi. "From Labour Surplus to Labour Shortage Economy: The Case of Japan." *International Labour Review*, Vol. 113, No. 2, March-April 1976, pp. 217-225.

Draws implications from the Japanese experience which apply to developing countries. Discusses such factors as investment, changes in employment structure and conditions of work. Concludes that a developing economy should have diversified input-output relationships among its industries so that a stimulus given to one spreads to all.

11.022 Landes, David Lamont. *Import Substitution, Industrialization and the Demand for Labor in Urban Chile, 1930-1970: The Development of Urban Underemployment.* Doctoral thesis presented to Washington University, 1973. 255 pp.

Argues that underemployment and unemployment have tended to rise as a result of the limited expansion of labor demand generated by relatively small internal markets, especially for capital-intensive products manufactured as import substitutes.

11.023 McFarland, Earl Lester. *Employment Growth in Services: Mexico, 1950-1969.* Doctoral thesis presented to Columbia University, 1974. 357 pp.

Measures service employment growth, and evaluates alternative explanations. Finds that while service industry output has remained unchanged relative to total output, service employment has expanded rapidly. Also finds that the quality of labor employed in services has improved more slowly than in general.

11.024 Maikov, A. "Manpower and Labour Productivity." *Problems of Economics*, Vol. 15, No. 3, July 1972, pp. 60-72.

Argues the need for Russia to attain a higher level of productivity to meet the future needs of the economy. Points out that employment growth will slow and, at the present rate of productivity, future output is unlikely to meet demand.

11.025 Morawetz, D. "Employment Implications of Industrialization in Developing Countries: A Survey." *The Economic Journal*, Vol. 84, No. 335, September 1974, pp. 491-542.

Presents an analytical survey of the pertinent literature. Discusses the impact of output composition and of choice of techniques on employment, examining such subjects as intraindustry product mix, small-scale industry, capital utilization, and others. Concludes that the growth of manufacturing cannot in itself be expected to solve unemployment and underemployment problems.

11.026 Mureithi, Leopold P. *Employment, Technology, and Industrialization in Kenya: A Study in Development Strategy.* Doctoral dissertation presented to Claremont Graduate School, 1974. 198 pp.

Examines the impact of factor combinations or choice of techniques on employment. Finds that technological progress in Kenya has been labor-saving, and encouraged by capital subsidies. Urges adoption of measures conducive to the adoption of more labor-intensive technologies.

11.027 Neal, L., and Uselding, P. "Immigration, a Neglected Source of American Economic Growth: 1790-1912." *Oxford Economic Papers*, N.S., Vol. 24, No. 1, March 1972, pp. 68-88.

Attempts to measure the resource pool created by immigration and its effect on economic growth. Uses a counterfactual model to evaluate the demographic and economic effects that would have resulted in the absence of immigration.

11.028 Oikawa, Kazuo, and Andrieux, Pierre. *Trade Unions and the New Technology of Posts and Telecommunications, Computers and Data Transmission.* Postal, Telegraph and Telephone International, 22nd World Congress, Oslo, June 30 to July 4, 1975. (Oslo, Universitetet, Blindern, 1975.) 54 pp.

The authors analyze the scope of computerized communications, and their effects on employment. They discuss prospective structural changes in the telecommunications industry, and the computer's impact on privacy. They also examine the role of trade unions in planning the extension of computerized networks.

11.029 Olivier, R., and Sabolo, Y. "Simultaneous Planning of Employment, Production and Education." *International Labour Review*, Vol. 107, No. 4, April 1973, pp. 359-372.

The authors criticize the approach to employment and educational planning which subordinates manpower and education to the production plan. They propose a simultaneous approach.

11.030 Pack, H. "Employment and Productivity in Kenyan Manufacturing." *Eastern Africa Economic Review,* Vol. 4, No. 2, December 1972, pp. 29-52.

Questions that capital deepening necessarily lowers employment absorption. Finds that capital substitution in primary production processes has minimal impact on employment. Also finds that the elimination of excess capacity of labor and capital spurs productivity growth.

11.031 Pack, H. "The Employment-Output Trade-off in LDC's: A Microeconomic Approach." *Oxford Economic Papers,* N.S., Vol. 26, No. 3, November 1974, pp. 388-404.

Explores the possibilities for substituting labor for capital in the production process. Bases data on observations at the firm level. Results indicate higher substitution possibilities than have usually been found. Considers policy implications.

11.032 Pazos, Felipe. "Development and the Underutilization of Labour: Lessons of the Dominican Republic Employment Mission." *International Labour Review,* Vol. 111, No. 3, March 1975, pp. 235-249.

Reports on efforts to measure the relation between growth and employment. Discusses factors contributing to the underutilization of labor such as the unevenness of technology and productivity differentials.

11.033 Pham, Tu Duc. *A Simulation Study of Growth and Employment in Hawaii.* Doctral dissertation presented to the University of Hawaii, 1974. 221 pp.

Tests the hypothesis that long-run excess supply of labor exists in Hawaii. Shows that most of the employment expansion in the State in the past 20 years has been in the service sector. Examines the conditions under which the supply of labor will outrun employment opportunities.

11.034 Pickett, J.; Forsyth, J. C.; and McBain, N. S. "The Choice of Technology, Economic Efficiency and Employment in Developing Countries." *World Development,* Vol. 2, No. 3, March 1974, pp. 47-54.

The authors argue that engineering influence is as important as distorted factor prices in explaining why production tends to be more capital-intensive in developing countries. They present evidence from a study of Ethiopia and Ghana and conclude that labor-intensive processes provide more employment.

11.035 Porta, Pier Luigi. "Patterns of Output and Employment in the Industrially Advanced Countries." *Rivista Internazionale di Scienze Economiche e Commerciali,* Vol. 20, No. 5, May 1973, pp. 449-469.

Develops a cross-section model on the association between output and employment by sector in 12 countries. Finds high correlation between productivity and output growth. Devotes considerable attention to the Italian experience.

11.036 Pudichery, Joseph P. *Planning, Employment and Economic Growth in India.* Doctoral dissertation presented to the University of Pittsburgh, 1975. 260 pp.

Points out the possible trade-off between employment, consumption and economic growth. Argues that Indian planning performance failed in the area of income distribution but not growth. Offers a model to achieve a socially optimal level of employment.

11.037 Rosine, J., and Helmburger, P. "A Neoclassical Analysis of the U.S. Farm Sector, 1948-1970." *American Journal of Agricultural Economics,* Vol. 56, No. 4, November 1974, pp. 717-729.

The authors estimate the supply for farm labor inputs, and the demand for farm output. They find that changes in technology and prices are the major exogenous influences, and that 90 percent of farm program benefits accrue to landowners.

11.038 Rosner, Monroe Herman. *The Problem of Employment Creation and the Role of the Agricultural Sector in Latin America.* Doctoral dissertation presented to the University of Wisconsin, 1972. 303 pp.

Argues for a reorientation of the economic development process so as to absorb the unemployed and lessen income inequality. Holds that the belief of policymakers that a lack of capital hindered development led to the adoption of labor-saving methods, worsening the problem of unemployment. Offers remedial recommendations, centering on labor-intensive investments and agricultural reforms favoring small farmsteads.

11.039 Rowthorn, R. E. "What Remains of Kaldor's Law?" *Economic Journal,* Vol. 85, No. 337, March 1975, pp. 10-19.

Examines the argument that labor supply is a constraint on the potential growth of productivity in manufacturing. Presents a statistical analysis of the theory. Concludes there is no significant

relationship between productivity growth and labor input growth over the period 1950-65.

11.040 Sabolo, Yves, and others. *The Service Industries.* Geneva, International Labour Office, 1975. 238 pp.

Discusses the overgrowth of service industries in developing countries. Compares Colin Clark's thesis with his own findings. Also discusses the demand for services, and the choice of techniques in producing them.

11.041 Sanders, John Houston. *Mechanization and Employment in Brazilian Agriculture, 1950-1971.* Doctoral thesis presented to the University of Minnesota, 1973. 280 pp.

Finds that mechanization was heavily subsidized by the state, at negative real interest rates. Also presents other findings bearing on the financial advantages of substituting capital for labor, making the absorption of labor in agriculture more difficult.

11.042 Seifer, Daniel M. "The Service Industry: Automation, Minimum Wages, Unemployment." *Bulletin of Business Research,* Vol. 46, No. 8, August 1971, pp. 4, 6-8.

Evaluates the employment-expanding prospects in the service industries in light of the dilemma of increasing employment and production without adding to inflation. Concludes that the service industries have only a limited potential for absorbing unskilled labor.

11.043 Sethuraman, S. V. "Employment and Labor Productivity in India Since 1950." *Economic Development and Cultural Change,* Vol. 22, No. 4, July 1974, pp. 673-690.

Links employment and labor productivity trends in India with the development strategy followed since 1959. Finds that labor absorption in services is poor, and that while labor productivity in large-scale manufacturing, utilities, and railways has increased, it declined in agriculture. Holds that the strategy to shift resources to agriculture can raise the rate of economic growth without worsening the distribution of income.

11.044 Shaw, Paul R. "Land Tenure and the Rural Exodus in Latin America." *Economic Development and Cultural Change,* Vol. 23, No. 1, October 1974, pp. 123-132.

Presents a model identifying causes of high rates of rural emigration. Argues that the institutional system of tenure subjects rural-agricultural labor to limited employment opportunities. Outlines situations of economic stress.

11.045 Sims, C. A. "Output and Labor Input in Manufacturing." *Brookings Papers on Economic Activity,* No. 3, 1974, pp. 695-728.

Investigates the relationship between changes in output and labor input. Finds that production worker hours fully adjust proportionately to changes in output within six months. Production worker employment, however, adjusts to output changes with a somewhat longer lag.

11.046 Sloan, Frank A. "Physician Supply Behavior in the Short Run." *Industrial & Labor Relations Review,* Vol. 28, No. 4, July 1975, pp. 549-569.

Analyzes two dimensions of physician supply: hours worked per week and weeks worked per year. Finds that evidence to support a backward-bending supply curve is weak, and that physician input is not responsive to wages. Draws policy implications on price control and physician preference for shorter workweeks.

11.047 Sorrentino, Constance. "Comparing Employment Shifts in 10 Countries." *Monthly Labor Review,* Vol. 94, No. 10, October 1971, pp. 3-11.

Presents data on civilian employment by sector in 10 countries at 5-year intervals from 1950 to 1970. Finds that employment disparities among the 10 countries narrowed significantly.

11.048 Sorrentino, Constance, and Moy, Joanna. "Unemployment in the United States and Eight Foreign Countries." *Monthly Labor Review,* Vol. 97, No. 1, January 1974, pp. 47-52.

The authors present comparative statistics on labor force, employment, and unemployment for the United States and eight foreign countries—including Canada, Great Britain, France, Japan, and Germany, 1968-72.

11.049 Steel, William F. "Complementarities and Conflicts between Employment and Output Growth in Low-Income Countries." *Economic Bulletin of Ghana,* Vol. 3, No. 1, Second Series, 1973, pp. 50-66.

Discusses the employment problem of less developed countries as one of providing sufficient demand to employ available labor, rather than one of identifying and mobilizing surplus labor supply. Examines the relation between the goals of raising

output and of achieving full employment, and offers policy suggestions.

11.050 Stewart, Charles T., Jr. *Low-Wage Workers in an Affluent Society.* Chicago, Nelson-Hall, 1974. 247 pp.

Examines the impact of low-productivity, low-skill, low-wage workers on national output. Evaluates demand and supply factors, and presents a remedial program.

11.051 Stewart, F. "Technology and Employment in LDCs." *World Development,* Vol. 2, No. 3, March 1974, pp. 17-46.

Analyzes employment problems as deriving from a dualistic form of development with modern capital-intensive and high-productivity technology in one sector accompanied by traditional low-productivity technology in the other. Defines and examines the characteristics of appropriate technology for developing countries. Offers policy suggestions.

11.052 Stewart, Frances, and Streeten, Paul. "Conflicts between Output and Employment Objectives in Developing Countries." *Bangladesh Economic Review,* Vol. 1, No. 1, January 1973, pp. 1-24.

The authors investigate whether maximizing output levels is consistent with maximum employment objectives. They conclude that policies which spur output growth are compatible with the growth in employment. They note that rapid output increases have been realized with no increase in employment in some less developed countries due to the productivity of capital; the failure to channel higher savings into investment; rising real wages; and repatriation of foreign owned profits.

11.053 Stitzlein, John Noel. *The Economics of Agricultural Mechanization in Southern Brazil.* Doctoral thesis presented to Ohio State University, 1974. 187 pp.

Examines the effects of agricultural mechanization on employment, land and labor productivity, and production efficiency, in three typical farm resource situations.

11.054 Sullivan, Michael Fuller. *Automation, Employment, and Collective Bargaining in the Telephone Industry.* Doctoral dissertation presented to the University of Colorado, 1972. 219 pp.

Discusses the disemployment effects of telephone communications automation, and offsetting developments. Holds that essentially the mechanization of telephone switching has tended to stabilize employment. Examines the impact of telephone automation on collective bargaining in the industry.

11.055 Sufrin, Sidney C., and Wagner, Abraham. "U.S. Employment and Growth in the Immediate Future: A Guess." *Revista Internazionale di Scienze Economiche e Commerciali,* Vol. 20, No. 1, January 1973, pp. 63-71.

The authors draw implications for future U.S. economic activity resulting from a reduced birth rate. They assert that new models must be developed to explore the effects of low population growth and constrained economic growth.

11.056 Thompson, G. R., and Black, H. "The Relationship between Labor Force Participation and Service Sector Employment." *Journal of Regional Science,* Vol. 15, No. 1, April 1975, pp. 61-65.

The authors contend that there is a significant and inverse relationship between the labor force participation rate and the percentage of the labor force employed in the service sector. They develop a model to test observations from each State. They conclude this relationship will aid the study of sectoral distribution of employment.

11.057 Truscott, Michael Hugh. *The Brain Drain of Scientists, Engineers, and Physicians from the Developing Countries to the United States.* Doctoral dissertations presented to The Louisiana State University and A & M College, 1971. 177 pp.

Examines the "push" and "pull" factors commonly cited as contributing to the brain drain in the context of the controversies surrounding the issue. Finds that U.S. immigration laws are the main contributing factor.

11.058 Weeks, John. "Policies for Expanding Employment in the Informal Urban Sector of Developing Economies." *International Labour Review,* Vol. III, No. 1, January 1975, pp. 1-14.

Argues that official labor force statistics obscure part of the rise in wage-earning employment because they ignore small urban establishments. Analyzes the determinants of growth of these establishments. Recommends steps to stimulate this growth.

11.059 Weiss, Thomas, "Urbanization and the Growth of the Service Workforce." *Explorations in Economic History,* Vol. 8, No. 3, Spring 1971, pp. 241-258.

Examines the concurrent growth of the urban population and the service workforce. Concludes that population redistribution has had a strong influence on the growth of the service sector between 1840 and 1900.

11.060 Williamson, Jeffrey G. "Capital Accumulation, Labor Saving, and Labor Absorption Once More." *Quarterly Journal of Economics,* Vol. 85, No. 1, February 1971, pp. 40-65.

Examines the difficulties facing developing nations with urban unemployment and underemployment. Tests several models of labor absorption with Philippine manufacturing data.

11.061 Winston, Gordon C. "Capital Utilization and Optimal Shift Work." *Bangladesh Economic Review,* Vol. 2, No. 2, April 1974, pp. 515-558.

Shows that the optimal level of capital utilization is an economic variable that depends on relative factor prices that have rhythmic patterns, and on elasticities of substitution. Describes the impact of capital utilization on employment. Draws implications for the underdeveloped countries with low levels of capital utilization and employment growth.

11.062 Zeckhauser, R. and Eliastam, M. "The Productivity Potential of the Physician Assistant." *Journal of Human Resources,* Vol. 9, No. 1, Winter 1974, pp. 95-116.

The authors use production function analysis to estimate the potential contribution of physician assistants in medical care delivery. They find that in the most productive cases, the assistant can replace half of the full-time output of a physician.

Productivity and economic growth

12.001 Abramovitz, M., and David, P. A. "Economic Growth in America: Historical Parables and Realities." *De Economist,* Vol. 121, No. 3, May-June 1973, pp. 251-272.

The authors are concerned with the impact of knowledge on productivity change. They find that knowledge (i.e., the productivity residual) had little effect in the 19th century. The rise in the productivity residual in the 20th century has tended to reverse the upward movement of the capital-output ratio typical for the 19th, and has exerted a capital-augmenting effect.

12.002 Alexandrakis, Nicos E. *Tourism as a Leading Sector in Economic Development: A Case Study of Greece.* Doctoral thesis presented to the University of Kentucky, 1973. 221 pp.

Examines the conditions under which a successful leading sector for development is established. Establishes the conditions under which tourism becomes a leading sector, by examining the characteristics of international demand for tourism. Presents a detailed survey of the Greek tourist industry and its impact on the Greek economy.

12.003 Akino, M., and Hayami, Y. "Sources of Agricultural Growth in Japan, 1880-1965." *Quarterly Journal of Economics,* Vol. 88, No. 3, August 1974, pp. 454-479.

The authors attempt to identify sources of growth, other than labor and capital, which accounted for 50 percent of productivity growth in Japanese agriculture. They introduce education and research into the agricultural production function, reducing the residual to a negligible magnitude.

12.004 Aliber, R. Z. "Japanese Growth and the Equilibrium Foreign Exchange Value of the Yen." *Southern Economic Journal,* Vol. 39, No. 3, January 1973, pp. 406-418.

Examines the role of the external payments balance in the growth of the Japanese economy. Tests the hypothesis which atributes Japanese growth to government-backed cartels. Finds that growth can best be explained in terms of the foreign exchange market, the labor market, and the capital market.

12.005 Anders, Gerhard. *On the Economic Development of Canada's North West Territories.* Doctoral dissertation presented to Texas A&M University, 1972. 215 pp.

Examines the problem of widespread unemployment, and its causes, and the influence of world views which constrain development policies. Presents extensive statistical appendices.

12.006 Arai, Joji. "Sources and Costs of Productivity in Japan." *Arizona Review,* Vol. 22, No. 5, May 1973, pp. 6-9.

Analyzes reasons for the high productivity growth rate in Japan and its economic and social impact. Concludes that the economic aspects of high productivity growth are generally favorable, but that society and the environment have undergone extreme changes, not always beneficial.

12.007 Athreya, Venkatesh. *Project Evaluation and Economic Development.* Doctoral dissertation presented to The University of Wisconsin-Madison, 1975. 216 pp.

Offers a critique of current approaches to project evaluation. Argues that such evaluation must take account of internal and external political and economic structures. Advances a strategy of development emphasizing the production of wage goods.

12.008 Baer, Werner, and Villela, Annibal V. "Industrial Growth and Industrialization: Revisions in the Stages of Brazil's Economic Development." *Journal of Developing Areas,* Vol. 7, No. 2, January 1973, pp. 217-234.

The authors identify a series of stages in the industrial development of Brazil revealing the forces behind it. They attempt to clarify the impact of development on the structure and functioning of the Brazilian economy.

12.009 Ban, Sung Hwan. *The Long-Run Productivity Growth in Korean Agricultural Development, 1910-1968.* Doctoral dissertation presented to the University of Minnesota, 1971. 243 pp.

Develops partial and total factor productivity measures and presents subperiod analyses of growth trends.

12.010 Banks, Arthur S. "Industrialization and Development: A Longitudinal Analysis." *Economic Development and Cultural Change,* Vol. 22, No. 2, January 1974, pp. 320-337.

Presents patterns of change as measured by certain "developmental" indicators across 38 countries classified as either "industrialized" or "nonindustrialized." Covers two time periods: 1865-1966 and 1946-1966.

12.011 Batra, Raveendra N. "Technical Progress and Relative Stability of a Two-Sector Model of Economic Growth." *Southern Economic Journal,* Vol. 38, No. 3, January 1972, pp. 294-301.

Explores the neoclassical growth model and derives conditions for the stability of the balanced growth path in the presence of Hicks-technical progress which may be neutral or non-neutral.

12.012 Bhattasali, B. N., and Bhattasali, G. *Productivity and Economic Development.* Tokyo, Asian Productivity Organization, 1972. 121 pp.

The authors survey basic social and political factors impinging on their subject, such as population growth, natural resources, the role of nationalism and of government, and labor and capital.

12.013 Blumenthal, T. "Exports and Economic Growth in Postwar Japan." *Quarterly Review of Economics,* Vol. 86, No. 4, November 1972, pp. 617-631.

Investigates the long- and short-run relations between exports and economic growth in postwar Japan. Concludes that the export sector contributes to growth because of its high rate of technological change, and its ability to provide foreign exchange to finance imports.

12.014 Brems, Hans. *Labor, Capital, and Growth.* Lexington, Mass., D. C. Heath, 1973. 188 pp.

Examines "steady-state" growth using Marxian, classical, linear, and neoclassical models. Stresses the continued scope of technological progress and discusses resource allocation within a growth context.

12.015 Britto, Ronald. "Some Recent Developments in the Theory of Economic Growth: An Interpretation." *Journal of Economic Literature,* Vol. 11, No. 4, December 1973, pp. 1343-1366.

Examines several growth models incorporating various assunptions about savings. Models with heterogeneous capital goods and models of optimal growth are also examined. Also discusses the role of technical progress in economic growth.

12.016 Brooks, L. G. "More on the Output Elasticity of Energy Consumption." *Journal of Industrial Economics,* Vol. 21, No. 1, November 1972, pp. 83-92.

Relates energy inputs to economic growth. Finds that the energy coefficient falls from infinity to unity with increased use of fuel as a country passes from primitive forms of output to the ultimate stage of energy-intensive production.

12.017 Brown, Gilbert T. *Korean Pricing Policies and Economic Development in the 1960s.* Baltimore, The Johns Hopkins University Press, 1973. 317 pp.

Holds that the major source of growth in South Korea was government policy permitting prices (including the exchange rate and interest rate) to reflect actual opportunity costs. Uses a Harrod-Domar framework in discussing sources of growth.

12.018 Browne, Basil Alexander. *An Evaluation of the Economic Development Ideas in the Reports of the World Bank's General Survey Missions.* Dissertation presented to Washington State University, 1971. 305 pp.

Finds that the missions stressed the improvement of agriculture and transportation facilities and that they discouraged government operation of industrial plants, recommending credit facilities, sites, tax incentives, and training programs instead. Also reports that the missions held orthodox views regarding international trade as a transmitter of growth.

12.019 Burgess, Giles Harold, Jr. *A Study of Modern Economic Growth Using Estimates of Aggregate Production Functions for Six Nations, 1870-1914.* Doctoral dissertation presented to the University of Oregon, 1973. 105 pp.

Presents a quantitative model of economic growth by which to explain the rates achieved by several industrial nations. Attempts to identify the sources of growth during the period reviewed.

12.020 Buss, James Arthur. *Fixed Investment and Rates of Economic Growth.* Doctoral dissertation presented to The University of Connecticut, 1972. 429 pp.

Investigates empirically the relation between aggregate rates of fixed investment and rates of economic growth in 77 countries. Also investigates the sectoral allocation of fixed investment expenditure.

12.021 Carter, Anne P. "Energy, Environment, and Economic Growth." *Bell Journal of Economics and Management Science,* Vol. 5, No. 2, Autumn 1974, pp. 578-592.

Develops a model to appraise the effects of pollution abatement on the rate of economic growth. Considers structural changes tending to reduce the long-term growth potential. Suggests adaptive responses to temper the impact of environmental constraints.

12.022 Chenery, Hollis, and others. *Redistribution with Growth: Policies to Improve Income Distribution in Developing Countries in the Context of Economic Growth.* New York, Oxford University Press, 1974. 304 pp.

The authors argue that distributional objectives should be treated as an integral part of development strategy; and that these objectives should be formulated in terms of income and consumption gains of different social strata, special weight being given to low-income groups.

12.023 Chung, Joseph Sang-Hoon. *The North Korean Economy: Structure and Development.* Stanford, Hoover Institution Press, 1974. 212 pp.

Presents the first comprehensive analysis in English of North Korean economic development. Evaluates and reconciles data from various sources.

12.024 Chung, William Kuei-yong. *A Study of Economic Growth in Postwar Japan for the Period of 1952-1967: An Application of Total Productivity Analysis.* Doctoral dissertation presented to the New School for Social Research, 1971. 290 pp.

Develops a total factor productivity index, adjusting labor input for quality change. Identifies the sources of growth, and decomposes the contributions attributable to expansion of input stocks and productivity.

12.025 Ciller, Tansu Ucuran. *The Strategy of Economic Development: The Turkish Case.* Doctoral dissertation presented to The University of Connecticut, 1972. 303 pp.

Analyzes economic development strategies in historical perspective. Focuses on the post-1963 period, when planning by the state began to be emphasized. Examines the impact of the most recently adopted strategies on long-term growth.

12.026 Clark, Gardner. *Development of China's Steel Industry and Soviet Technical Aid.* Ithaca, Cornell University, N.Y. State School of Industrial and Labor Relations, 1973. 160 pp.

Describes Russia's aid to China's steel industry, 1950-57, and the contrast in technological pattern followed by the Chinese thereafter. Compares Japanese experience in the use of Chinese raw materials early in the century. Also introduces other international comparisons.

12.027 Cline, William R. *Potential Effects of Income Redistribution on Economic Growth: Latin American Cases.* New York and London, Praeger, 1972. 242 pp.

Examines the possible effects of income redistribution on savings, imports, and "economies of scale", and the consequences on demand for labor and capital.

12.028 Conger, Darius John. *Structural Disequilibrium, Factor Productivity, and Soviet Economic Growth.* Doctoral thesis presented to the University of Oklahoma, 1974. 172 pp.

Assesses the relative contribution of capital and labor to economic growth in the Soviet Union, and the role of factor productivity in the decline of this growth during the sixties. Uses the calculated shortfall from the optimal efficiency frontier as approach.

12.029 Converse, A. O. "Environmental Controls and Economic Growth." *Journal of Economic Theory,* Vol. 7, No. 4, April 1974, pp. 411-417.

Analyzes the impact of waste discharge controls on growth of production capital. Concludes that there is an upper limit on the degree of waste treatment that can be imposed.

12.030 Cornwall, John. *Growth and Stability in a Mature Economy.* New York, John Wiley, 1972. 287 pp.

Discusses the conditions under which mature economies have grown. Develops a theory of growth and stability. Analyzes trends in economic aggregates in the United States and the United Kingdom.

12.031 Cripps, T. F., and Tarling, R. J. *Growth in Advanced Capitalist Economies 1950-1970.* University of Cambridge Department of Applied Economics Occasional Paper 40, New York and London, Cambridge University Press, 1973. 58 pp.

The authors examine the relation of economic growth to output, employment, and the rate of investment in 12 economies. They test the hypotheses that growth results from increased resource inputs or better allocation of resources.

12.032 Cubukcu, Tugrui Naci. *The Sources of Growth in Turkish Manufacturing: 1950-1968.* Doctoral thesis presented to New York University, 1973. 147 pp.

Measures the contribution of labor, capital and total factor productivity to the growth of two-digit manufacturing industries. Presents estimates of elasticities of substitution. Finds that the contribution of input factors to output has exceeded that of total factor productivity.

12.033 Daly, Herman E., editor. *Toward a Steady-State Economy.* San Francisco, W. H. Freeman and Company, 1973. 332 pp.

A collection of essays exploring the conflict between theories of unlimited economic growth (with emphasis on production), and a stationary, no-growth economy (with the central concept being distribution). Articles discuss economic and social constraints, and ethical considerations.

12.034 Darnell, J. D. "Does Banking Structure Spur Economic Growth?" *Federal Reserve Bank of Philadelphia Business Review,* November 1972, pp. 14-22.

Finds no conclusive relationship between a State's style of banking and its economic growth. Indicates that any advantage a particular type of banking structure might have in attracting capital and increasing saving would be outweighed by Federal Reserve national policy.

12.035 Dasgupta, Ajit K. *Agriculture and Economic Development in India.* New Delhi, Associated Publishing House, 1973. 117 pp.

Investigates the patterns of output, input, and productivity in the Indian agricultural and non-farm sectors, 1955-71.

12.036 Davis, Lance E., and North, Douglass C. *Institutional Change and American Economic Growth.* London and New York, Cambridge University Press, 1971. 282 pp.

The authors seek to explain economic growth, particularly in the United States, in terms of arrangemental change—the innovation, mutation, and demise of institutions. They argue that for institutions to be innovated, the innovator must be able to internalize profits without the costs of the innovation exceeding the benefits. They interpret the evolution of various facets of American economic growth in terms of their theory.

12.037 Davis, Lance E.; Easterlin, Richard A.; Parker, William N.; and others. *American Economic Growth: An Economist's History of the United States.* London and New York, Harper and Row, 1972. 683 pp.

Nine papers dealing with such subjects as output growth, changing consumption patterns, labor, technology, and manufacturing. The authors apply the methods of cliometrics in arriving at their conclusions.

12.038 de Vries, Margaret G. "Women, Jobs and Development." *Finance and Development,* Vol. 8, No. 4, December 1971, pp. 2-9.

Examines the position of women in developing countries under changing conditions of agricultural technique. Holds that women perform much agricultural work when such techniques are primitive, while men perform the work as techniques advance.

12.039 Diaz-Lopez, Felix. *The Role of Government in Industrial Development: The Case of The Commonwealth of Puerto Rico.* Doctoral dissertation presented to the University of Southern California, 1973. 113 pp.

Argues that the process of development cannot be adequately couched in purely functional relations, such as savings and income or population changes, and that the social and institutional climate must be taken into account. Examines the economic transformation of Puerto Rico in light of the government's development policies and inputs.

12.040 Dorner, Peter. *Land Reform and Economic Development.* Baltimore, Penguin, 1972. 167 pp.

Discusses land reform in relation to agricultural employment, investment, and productivity. Theories on relationships between land reform and economic development are discussed.

12.041 Ecevit, Leyla Ugur. *Structural Changes, Production Functions and Economic Development in Turkish Manufacturing.* Doctoral thesis presented to the University of Pittsburgh, 1972. 242 pp.

Analyzes Turkish industrialization in terms of international comparisons over time, and of production functions of manufacturing industries.

12.042 Eckstein, A., and others. "The Economic Development of Manchuria, The Rise of a Frontier Economy." *Journal of Economic History,* Vol. 34, No. 1, March 1974, pp. 239-264.

The authors analyze the stages of economic growth of Manchuria, particularly the effect on growth of the relation between population, farm production, and exports prior to 1950; and industrialization, supplemented by Soviet credits, after 1950.

12.043 Economic Council of Canada. *Options for Growth.* Twelfth Annual Review. Ottawa, Information Canada, 1975. 180 pp.

Examines Canada's growth potential to 1985. Considers the development of Canada in terms of current policies. Also deals with the performance of the Canadian economy in 1974, and with some of the factors accounting for the slowdown in Canadian economic growth.

12.044 Edmonds, James Albert. *Three Essays in the Theory of Growth and Development.* Doctoral dissertation presented to Duke University, 1974. 100 pp.

Discusses labor force participation, population growth, and international trade.

12.045 Eltis, W. A. "François Quesnay: A Reinterpretation. 1. The Tableau Economique." *Oxford Economic Papers,* N.S., Vol. 27 (2), July 1975, pp. 167-200. "2. The Theory of Economic Growth." *Oxford Economic Papers,* N.S., Vol. 27 (3), November 1975, pp. 327-351.

Presents a reconstruction of the work of Quesnay. Discusses first the basic assumptions leading to the Tableau Economique and its successive versions. Then, investigates the effects of departures from the Tableau's equilibrium proportions, and the conditions giving rise to growth or decline in economies.

12.046 Eltis, Walter A. *Growth and Distribution.* New York, John Wiley, 1973. 364 pp.

Discusses neoclassical and neo-Keynesian growth theories. Presents a model of equilibrium growth, incorporating technical progress. Also discusses disequilibrium growth, and the relation between actual and equilibrium growth.

12.047 England, Richard William. *Capital, Economic Growth, and Environmental Pollution.* Doctoral dissertation presented to The University of Michigan, 1974. 223 pp.

Documents the environmental feedbacks on labor supply, capital depreciation, and total factor productivity which untreated waste emissions can have.

12.048 Epstein, T. Scarlett, and Penny, David H., eds. *Opportunity and Response: Case Studies in Economic Development.* Atlantic Highlands, N.J., Humanities Press, 1973. 268 pp.

A collection of papers examining the impact of cultural, economic, and political factors on development.

12.049 Evans, Robert Jr. "Japan's Labor Economy—Prospect for the Future." *Monthly Labor Review,* Vol. 95, No. 10, October 1972, pp. 3-8.

Discusses the labor market in Japan, touching on many subjects including productivity. Also discusses the future of Japan's economy. Predicts that productivity will decline somewhat as a result of a slowdown of growth and technology.

12.050 Fallenbuchi, Zbigniew M., editor. *Economic Development in the Soviet Union and Eastern Europe.* Vol. I, *Reforms, Technological Income Distribution.* New York, Praeger, 1975. 354 pp.

A collection of papers dealing with such subjects as the political and social consequences of economic reforms; the interrelations of science and technology in the Soviet Union; and income distribution and its measurement.

12.051 Feinstein, C. H., editor. *Socialism, Capitalism, and Economic Growth.* Essays presented to Maurice Dobb. New York, Cambridge University Press, 1975. 367 pp.

A collection of essays dealing with problems in the theory of economic growth; planning and the market; and with growth in historical perspective.

12.052 Felderer, Bernhard. "Efficiency of Markets and Economic Growth—An Empirical Study." *German Economic Review,* Vol. 12, No. 4, 1974, pp. 302-318.

Investigates the extent to which economic growth is influenced by improved factor allocation. Presents evidence from a production function model which suggests that increased efficiency in the factor markets is of slight importance to economic growth.

12.053 Ghosh, Arabinda. "Size-Structure, Productivity and Growth: A Case Study of West Bengal Agriculture." *Bangladesh Economic Review,* Vol. 1, No. 1, January 1973, pp. 59-69.

Analyzes the relationship between farm size and productivity for two Indian districts. Finds that the medium size farms are the most efficient in the use of capital and labor. Notes that the factor intensity of the small farm is greater than that of the large, wage-based farms. Concludes that growth will not be enhanced simply by increasing farm size.

12.054 Gifford, Adam. *Environmental Issues and Economic Growth.* Doctoral dissertation presented to the University of California, San Diego, 1972. 104 pp.

Argues that it is possible to maintain economic growth together with a viable environment in terms of certain models—the substitution of capital and labor for pollution emissions; a "technical change frontier" between pollution abatement and output increase; fixed resource proportions in output.

12.055 Gifford, Adam Jr. "Pollution, Technology and Economic Growth." *Southern Economic Journal,* Vol. 40, No. 2, October 1973, pp. 210-215.

Studies the effects of a zero-growth level of pollution control on output growth and per capita output by means of an econometric model. Suggests a tax on pollution as a means of controlling it. Finds such a tax will slow output growth.

12.056 Gould, J. D. *Economic Growth in History.* London, Methuen, New York, Barnes and Noble, 1972. 460 pp.

Examines the role of agriculture, capital, foreign trade, and technology in economic growth. Reviews some theories of growth and development and describes historical experiences of growth and structural change.

12.057 Hale, Carl W. "Growth Centers, Regional Spread Effects, and National Economic Growth." *Journal of Economics and Business,* Vol. 26, No. 1, Fall 1973, pp. 10-18.

Examines the short run regional employment spread effects of national economic development in the U.S. since the Korean War. Concludes that the growth center spread effects were related to the rate of growth of economic activity but largely independent of city size or the degree of industrial diversity of the city.

12.058 Harju, Melvin William. *Scarcity or Plenty: The Role of Metal Resources in the Growth of the United States Economy, 1860-1960.* Doctoral thesis presented to the University of Florida, 1972. 224 pp.

Argues the "unique" character of U.S. economic growth, much of it representing extraction of rich natural resources as a form of production. Believes that U.S. economic growth cannot serve as a model for developing countries.

12.059 Hartwell, R. M. *The Industrial Revolution and Economic Growth.* New York, Barnes and Noble, 1971. 423 pp.

A selection of 17 articles, essays, and lectures on the industrial revolution. Discusses how the nature of economic growth has changed. Analyzes productivity and growth, and the resultant changes in the standard of living.

12.060 Hayami, Yujiro, and Ruttan, Vernon W. *Agricultural Development: An International Perspective.* Baltimore, The Johns Hopkins Press, 1971. 367 pp.

The authors hypothesize that an efficient economic development strategy depends critically on the achievement of rapid technical change leading to productivity growth in agriculture. They present a comparative analysis of agricultural development in the U.S. and Japan.

12.061 Hechter, Michael. "Industrialization and National Develoment in the British Isles." *The Journal of Development Studies,* Vol. 8, No. 3, April 1972, pp. 155-182.

Examines the relation between industrialization and regional inequality in England, Wales, Scotland and Ireland from 1851 to 1961. Finds no contribution by industrialization to the national development through gradual elimination of regional inequality.

12.062 Hicks, J. "The Mainspring of Economic Growth." *Swedish Journal of Economics,* Vol. 75, No. 4, December 1973, pp. 336-348.

The author summarizes his views on capital, wages, and invention. Clarifies his concept of the "impulse" of an invention.

12.063 Hilton, S. E. "Vargas and Brazilian Economic Development, 1930-45: A Reappraisal of His Attitude toward Industrialization and Planning." *Journal of Economic History,* Vol. 35, No. 4, December 1975, pp. 754-778.

Argues that the Vargas regime was committed to structural changes in the economy via industrialization, for political and economic reasons—contrary to prevailing interpretations.

12.064 Hori, Hajime. *Essays on Economic Growth under Constrained Resource Allocation.* Doctoral dissertation presented to Brown University, 1974. 186 pp.

Analyzes a neoclassical growth model in which capital equipment once installed cannot be shifted. Considers the growth of the world economy with and without capital movements, and examines the effects of migration on steady-state per-capita consumption.

12.065 Horowitz, David. *The Enigma of Economic Growth: A Case Study of Israel.* New York, Praeger, 1972. 157 pp.

Analyzes the economic growth of Israel in light of Israel's unique population transplantation and capital importation.

12.066 Hutchinson, Sir Joseph. *Farming and Food Supply.* New York and London, Cambridge University Press, 1972. 146 pp.

Analyzes the role of agriculture in economic development drawing from British, Indian and African experience. Argues that agriculture is not a declining industry, and that productivity in agricultural methods releases workers to other sectors of the economy, allowing development and thereby increases in the standard of living.

12.067 Hutchinson, William Kenneth. *Foreign Exports and Regional Economic Growth: The United States, 1870-1910.* Doctoral dissertation presented to the University of Iowa, 1974. 281 pp.

Determines the importance of exports in U.S. economic development, together with interregional differences. Develops a predictive model of the interregional transfer of goods prior to exportation, and presents a description of the regional developmental process in terms of regional commodity exports.

12.068 Johl, S. C. "Process of Growth in a Dualistic Economy: The Interaction of Population Growth and Technological Development in Agriculture." *Indian Economic Journal,* Vol. 20, No. 2, October-December 1972, pp. 190-199.

Examines the intersectoral transfer of labor and capital between agriculture and industry in a labor-surplus, developing economy. Argues that labor-intensive technology must not be forced into agriculture. Concludes that the agricultural sector is a reservoir of labor, and generates capital resources for the industrial sector of developing countries.

12.069 James, Dilmus D. *Used Machinery and Economic Development.* East Lansing, Michigan State University, 1974. 206 pp.

Investigates the technology, economics, and institutions surrounding the market for used machinery and the relation of the market to the

welfare of less developed countries. Concludes that used machinery currently makes a marginal contribution, and that its role should be substantially increased.

12.070 Kadhim, Mihssen. *The Strategy of Development Planning and the Absorptive Capacity of the Economy: A Case Study of Iraq.* Doctoral dissertation presented to the University of Colorado, 1974. 401 pp.

Finds that development strategy is based on the concept of "balanced growth." Examines its defects and performance record. Examines the relation between the economy's absorptive capacity and planning strategy.

12.071 Kanamori, Hisao. "What Accounts for Japan's High Rate of Growth?" *The Review of Income and Wealth,* Vol. 18, No. 2, June 1972, pp. 151-171.

Uses a method borrowed from Denison to analyze Japan's economic growth. Finds that the contributions of labor, capital, and "residual" factors to economic growth are higher for Japan than for the U.S. or Europe.

12.072 Karkar, Yaqub N. *Railway Development in the Ottoman Empire 1856-1914.* New York, Vantage Press, 1972. 181 pp.

Compares Turkey's railroad development with Great Britain, the U.S. and Russia. Finds that the economic consequences were unique to Turkey, and were largely confined to the agricultural sector of the economy.

12.073 Kearns, Kevin C. "Industrialization and Regional Development in Ireland, 1958." *American Journal of Economics and Sociology,* Vol. 33, No. 3, July 1974, pp. 299-316.

Discusses the economic renaissance of Ireland since 1958. Examines government policies aimed at spurring economic growth with special emphasis on regional development schemes.

12.074 Kelley, Allen C. "Scale Economies, Inventive Activity, and the Economics of American Population Growth." *Explorations in Economic History,* Vol. 10, No. 1, Fall 1972, pp. 35-52.

Focuses on the contribution of population to economic development. Presents evidence to support the Kuznets thesis that population size is associated with increasing returns to scale in inventive activity. Concludes that the benefits of population have diminished over time and are insignificant today.

12.075 Kendrick, John. *Economic Growth and Total Capital Formation.* A study prepared for the use of the Subcommittee on Economic Growth of the Joint Economic Committee, Congress of the United States. Washington, February 18, 1976. 14 pp.

Presents measures of net and gross investment in terms of all outlays augmenting income- and output-producing capacity, i.e., of both tangible and intangible capital investment. Discusses relation to GNP, composition of investment by type, gross capital stocks and returns on total capital. Recommends steps to improve capital productivity.

12.076 Kennedy, Kieran A. *Productivity and Industrial Growth: The Irish Experience.* London, Oxford University Press, 1971. 281 pp.

Uses regression analysis to explain the causes of labor productivity improvements in Irish industry from 1926 to 1966. Concludes that output expansion and technical change, rather than improvements in the quality of the labor force, are primarily responsible for productivity improvements.

12.077 Kim, Y. C., and Winston G. C. "The Optimal Utilization of Capital Stock and the Level of Economic Development." *Economica,* Vol. 41, No. 164, November 1974, pp. 377-386.

The authors develop a model of optimal capital utilization to show that the rise in capital productivity implies underutilization of capital stocks in poor countries. They show that capital productivity will decline with development, as the increased stock of capital accompanies a decline in the optimal utilization of capital.

12.078 Kuznets, Simon. "Modern Economic Growth: Findings and Reflections." *American Economic Review,* Vol. 63, No. 3, June 1973, pp. 247-258.

Summarizes his findings on six characteristics of economic growth: high rates of growth of per capita product and population; rate of rise in productivity; rate of structural transformation; change in structures of society and ideology; spread of modern economic growth; and limited economic performance of less developed countries. Discusses some social implications of modern economic growth.

12.079 Kuznets, Simon. *Population, Capital, and Growth. Selected Essays*. New York, W. W. Norton & Co., 1973. 342 pp.

Presents essays on the broader features of modern economic growth, capital formation in historical perspective, the gap between the rich and the poor countries, and related themes.

12.080 Levine, Daniel Seth. *Economic Development in Appalachia.* Doctoral dissertation presented to Northwestern University, 1971. 170 pp.

Investigates the interrelations between economic, social, and political behavior in the development of Appalachian counties, applying factor analysis.

12.081 McCloskey, Donald N., ed. *Essays on a Mature Economy: Britain after 1840.* Princeton, Princeton University Press, 1971. 439 pp.

A collection of papers discussing such topics as long-term capital markets; the impact of technology on economic efficiency; comparisons between the British and the American economy; and productivity in the capital goods and services sector.

12.082 Macrae, John. "The Relationship between Agricultural and Industrial Growth, with Special Reference to the Development of the Punjab Economy from 1950 to 1965." *The Journal of Development Studies,* Vol. 7, No. 4, July 1971, pp. 397-422.

Reviews the attempts to explain sectoral growth, and analyzes the growth experience of Punjab in the light of these theories.

12.083 Maddison, A. "Explaining Economic Growth." *Banca Nazionale del Lavoro-Quarterly Review,* Vol. 25, No. 102, September 1972, pp. 211-262.

Presents a quantitative model of growth in the U.S. and eight European countries. Stresses investment and trade liberalization. Includes materials on growth of capital stock.

12.084 Manuel, David P. *An Investigation into the Causes of Economic Growth among Industrial Economies.* Doctoral dissertation presented to the University of Mississippi, 1975. 255 pp.

Examines gross fixed capital formation, the role of government spending, foreign sector influences, and resource exhaustion as contributors to economic growth. Finds that increased urbanization and domestic unrest accompany higher rates of growth.

12.085 Matthews, R. C. C. "Foreign Trade and British Economic Growth." *Scottish Journal of Political Economy,* Vol. 20, No. 3, November 1973, pp. 195-209.

Reviews the relation between Britain's growth problem and foreign trade and payments problem over the past 100 years. Explores the two-way interaction between growth and international trade and comments on how foreign trade affects productivity, investment, and demand.

12.086 Mazzaoui, M. F. "The Cotton Industry of Northern Italy in the Late Middle Ages: 1150-1450." *Journal of Economic History,* Vol. 32, No. 1, March 1972, pp. 262-286.

Traces origins and development of the cotton industry in Northern Italy. Notes its rapid growth, technological innovation, and creation of new patterns of taste and consumption in Europe.

12.087 Mellor, John W. "Accelerated Growth in Agricultural Production and the Intersectoral Transfer of Resources." *Economic Development and Cultural Change,* Vol. 22, No. 1, October 1973, pp. 1-16.

Examines the changing role of economic and institutional devices in the transfer of resources among sectors. Discusses the relationship between such resource flows and technological change in the agricultural sector.

12.088 Mitchell, Glen H., and Barron, Theodore, E. *A Development View of the Paraguayan Beef Industry.* Las Cruces, New Mexico State University, 1974. 49 pp.

The authors examine the structure of the industry in a socioeconomic context. They conclude that the decline in cattle is due to government policies adverse to innovation and long-term investment.

12.089 Mokyr, Joel. *Industrial Growth and Stagnation in the Low Countries, 1800-1850.* Doctoral dissertation presented to Yale University, 1974. 502 pp.

Develops a model of early modern industrialization, derived from theories of labor surplus economies. Shows that large labor pools are conducive to rapid capital accumulation in the modern sector of an economy. Explains the development of the Low Countries over the period reviewed on the basis of the model.

12.090 Newbery, D. M. G., and Atkinson, A. B. "Investment, Savings and Employment in the Long Run." *International Economic Review,* Vol. 13, No. 3, October 1972, pp. 460-475.

The authors examine differences in the time paths by which various economic agents interact, and how these differences affect long-term growth. They present a range of models with the economy not always in equilibrium, and how they differ from conventional models which assume equilibrium of economic interactions.

12.091 Nelson, Lowry. *Cuba: The Measure of a Revolution.* Minneapolis, University of Minnesota Press, 1972. 242 pp.

Evaluates economic and social changes under Castro. Devotes some attention to the agricultural sector, issues of labor incentives, and productivity.

12.092 Nelson, Richard R., and Winter, Sidney G. "Growth Theory from an Evolutionary Perspective: The Differential Productivity Puzzle." *American Economic Review,* Vol. 65, No. 2, May 1975, pp. 338-344.

The authors report on efforts to integrate processes of technical change at the level of the firm with what is known about technological advance as reflected in industry or economy-wide time series data on output and inputs. They develop a model to explain cross-industry and intersectoral differences in growth.

12.093 Noho, Yoshio. "Population Growth, Agricultural Capital, and the Development of a Dual Economy." *American Economic Review,* Vol. 64, No. 6, December 1974, pp. 1077-1085.

Examines the effects of agriculture upon economic development. Concludes technology assists developing countries in escaping stagnation. Suggests policy alternatives which flow from a development model incorporating agricultural capital.

12.094 Nyilas, A. "The Efficiency of Real and Human Resources in Hungarian Industry." *Review of Income and Wealth*, Vol. 20, No. 4, December 1974, pp. 469-482.

Attributes economic growth to structural change, increased labor input, and productivity gains. Attempts to break down the development of the country's industry into its capital and human resource components.

12.095 Ohkawa, Kazushi, and Rosovsky, Henry. *Japanese Economic Growth: Trend Acceleration in the Twentieth Century*. Studies of Economic Growth in Industrialized Countries, Stanford, Stanford University Press, 1973. 327 pp.

The authors analyze the impact of labor, technology, demand, and the foreign sector on growth. They also present a growth model designed to explain long swings and trend acceleration in this century.

12.096 Olson, Mancur, and Landsberg, Hans H., editors. *The No-Growth Society*. New York, Norton, 1973, 259 pp.

Reprint of 12 essays on zero population growth and the steady-state economy. Ways of channeling development for the improvement rather than the destruction of the environment are discussed. The editors compare opposing views to evaluate the growth versus no-growth controversy.

12.097 Onoh, J. K. *Strategic Approaches to Crucial Policies in Economic Development. A Macro Link Study in Capital Formation, Technology and Money*. Portland, Oreg., International Scholarly Book Services, 1972. 236 pp.

Surveys economic development theories focusing on the problems related to capital allocation, acquisition of technological capability, and money supply. Evaluates recent trends in several African nations.

12.098 O'Relley, Zoltan Edward. *Major Currents in the Postwar Economic Development of Hungary: Goals, Achievements, and Reforms.* Doctoral dissertation presented to the University of Tennessee, 1972. 313 pp.

Critically reviews the impact of traditional planning on the economic growth rate, prior to the planning reform of 1968. Examines the impediments it presented to continued high growth. Also examines the reformed planning mechanism, and compares it with the Soviet Union.

12.099 Organization for Economic Cooperation and Development. *The Industrial Policy of Japan*. Washington, D. C., OECD, 1972. 195 pp.

Examines Japan's industrial policies in light of its growth experience. Includes statistical data for the 1960's, and projections for the 1970's.

12.100 Perkins, Dwight, editor. *China's Modern Economy in Historical Perspective*. Stanford, Stanford University Press, 1975. 344 pp.

A collection of essays dealing with such subjects as the evolution of the textile industry; reasons for lack of technological innovation among Chinese artisans; reasons why, generally, China's industrial development was relatively slow.

12.101 Pratten, C. F. "The Reasons for the Slow Economic Progress of the British Economy." *Oxford Economic Papers, N.S.*, Vol. 24, No. 2, July 1972, pp. 180-196.

Examines such factors as embodied technical progress, economies of scale, and movement of labor from low productivity to high productivity industries. Concludes that British management has not remained sufficiently abreast of methods for increasing efficiency, and British labor has been too prone to strikes and restrictive work practices.

12.102 Poulson, B. W., and Dowling, J. M. "The Climacteric in U.S. Economic Growth." *Oxford Economic Papers, N.S.*, Vol. 25, No. 3, November 1973, pp. 420-434.

Analyzes growth trends in the U.S. Concludes that the U. S. experienced retardation in growth in the first third of the twentieth century.

12.103 Powelson, John P. *Institutions of Economic Growth. A Theory of Conflict Management in Developing Countries.* Princeton, Princeton University Press, 1972. 281 pp.

Develops a general theory of institution-building for economic growth, giving some developing Latin American countries as examples.

12.104 Power, A. P., and Harris, S. A. *Agricultural Expansion in the United Kingdom with Declining Manual Labour Resources.* London, Her Majesty's Stationery Office, 1973. 48 pp.

The authors develop a model to explain the decline in unit labor requirements in British agriculture. Variables considered are changes in technology, the quality and cost of inputs, and the volume and composition of outputs.

12.105 Rajaraman, Indira. "Poverty, Inequality, and Economic Growth: Rural Punjab, 1960/61-1970/71." *Journal of Development Studies,* Vol. 11, No. 4, July 1975, pp. 275-290.

Reports on a study showing that relative inequality as well as absolute levels of living of the poorest deciles of the population worsened, even while per capita consumption of the population improved.

12.106 Ramati, Yohanan, editor. *Economic Growth in Developing Countries–Material and Human Resources: Proceedings of the Seventh Rehovot Conference.* New York, Praeger, 1975. 501 pp.

A collection of papers discussing such topics as human resources as factors in development; problems of planning and the quality of life; technology; income distribution; and constraints on development.

12.107 Randall, Alan. "Growth, Resources and Environment: Some Conceptual Issues." *American Journal of Agricultural Economics,* Vol. 57, No. 5, December 1975, pp. 803-809.

Examines economic growth models in light of certain physical laws, e. g., the exhaustibility of resources, in terms of both the long and short run. Argues that the price system is not adequate for reconciling short-run and long-run demands upon resources. Urges adoption of policies incorporating energy budgets and materials flow analysis. Offers critique of existing policies bearing on the subject.

12.108 Ransom, Roger L. "A Closer Look at Canals and Western Manufacturing." *Explorations in Economic History,* Vol. 8, No. 4, Summer 1971. pp. 501-508.

Examines the impact of canals on the economic development of the West between 1820 and 1840. Argues that their immediate impact was to stimulate the production of agricultural staples.

12.109 Reynolds, Lloyd G., editor. *Agriculture in Development Theory.* New Haven, Yale University Press, 1975. 510 pp.

A collection of essays on such themes as the postulate of the small farmer's economic behavior; the agricultural labor surplus; the generation and diffusion of agricultural technology; agriculture as a resource reservoir for development; and others.

12.110 Rice, E. B. *Extension in the Andes: An Evaluation of Official U.S. Assistance to Agricultural Extension Services in Central and South America.* Cambridge, Mass., MIT Press, 1974. 552 pp.

Examines a 30-year experience in 12 Latin American countries. Deals with problems of institutional adaptation and agricultural productivity. Concludes that U.S. assistance programs rate low in effectiveness and significance.

12.111 Roberts, John, "Engineering Consultancy, Industrialization and Development." *Journal of Development,* Vol. 9, No. 1, October 1972, pp. 39-61.

Examines the value of the engineering consultant industry to developing countries which have an industrial base. Concludes there are some conditions under which the high cost of establishing such an industry is justified.

12.112 Robinson, Sherman. "Sources of Growth in Less Developed Countries: A Cross-Section Study." *The Quarterly Journal of Economics,* Vol. 85, No. 3, August 1971, pp. 391-408.

Develops a sources of growth analysis based on a cross-section regression study of thirty-nine less developed countries. Compares his results with Edward Denison's and the few time series studies available.

12.113 Robock, Stefan H. *Brazil: A Study in Development Progress.* Lesington, Mass., D. C. Heath, 1975. 204 pp.

Examines the sources of Brazilian economic growth. Argues that success in spurring growth was linked to defining areas of development priority, use of market decisions and implementation, and foreign investment.

12.114 Rostow, W. W. "Kondratieff, Schumpeter, and Kuznets: Trend Periods Revisited." *Journal of Economic History,* Vol. 35, No. 4, December 1975, pp. 719-753.

Deals with the interrelations of decelerating growth sectors, phases of scarce and abundant foodstuffs and raw materials, and international migration waves.

12.115 Sample, C. James. *Patterns of Regional Economic Change: A Quantitative Analysis of U.S. Regional Growth and Development.* Cambridge, Mass., Ballinger, 1974. 296 pp.

Relates 50 variables to economic growth in four geographical regions of the U.S. by means of regression analysis and factor analysis.

12.116 Sato, R. "Optimal Strategies in a Developing Economy." *Weltwirtschaftliches Archiv,* Vol. 108, No. 4, 1972, pp. 565-596.

Seeks to demonstrate that there are many operational policies to achieve full employment, industrialization, and self-sustaining growth. Presents two models which apply these policies, one holding population constant, the other accounting for population and employment.

12.117 Shaw, John A. "Railroads, Irrigation and Economic Growth: The San Joaquin Valley of California." *Explorations in Economic History,* Vol. 10, No. 2, Winter 1973, pp. 211-227.

Discusses the use of waterways and railroads in the Californian San Joaquin Valley. Estimates costs and revenues. Analyzes the growth for each means of transport.

12.118 Shellhammer, Kenneth Lee. *Growth Center Strategy as Applied to Depressed Areas in Advanced Countries: The Case of Appalachia.* Doctoral dissertation presented to the University of Colorado, 1972. 161 pp.

Argues by using input-output data that Federal aid to the depressed areas of Appalachia has been based on faulty theory, i.e., growth center strategy, and that the stagnation and decline of the region has been linked to concomitant developments in the industries on which its economy has been based.

12.119 Shepherd, James F., and Walton, Gary M. *Shipping, Maritime Trade, and the Economic Development of Colonial North America.* New York and London, Cambridge University Press, 1972. 255 pp.

The authors discuss the role of overseas trade and transportation improvements and their effects on the development of colonial North America. They study colonial economic development and trade, and the sources and consequences of productivity changes in distribution facilities and shipping.

12.120 Shepherd, J. F., and Walton, G. M. "Trade Distribution, and Economic Growth in Colonial America." *Journal of Economic History,* Vol. 32, No. 1, March 1972, pp. 128-145.

The authors argue that improvements in shipping and other distribution activities were an important source of productivity advances in colonial America.

12.121 Shourie, Arun. "Growth, Poverty, and Inequalities." *Foreign Affairs,* Vol. 51, No. 2, January 1973, pp. 340-352.

Analyzes reasons why economic growth has primarily benefited the well-to-do. Argues that fundamental political transformation is required, involving drastic redistribution of income, if growth is to benefit the poor.

12.122 Sutton, Anthony C. *Western Technology and Soviet Economic Development, 1945-1965.* Third volume of a 3-volume series. Stanford, Hoover Institution Press, 1973. 482 pp.

Argues that by far the most significant factor in Soviet economic development has been the absorption of Western technology and skills. Covers a broad area of industrial technology, and finds that no fundamental industrial innovation of Soviet origin can be identified between 1917 and 1965, nor in the latter part of the sixties. Deals with the question why this is so.

12.123 Tannen, Michael Barry. *Economic Growth and the Distribution of Earnings.* Doctoral dissertation presented to Brown University, 1974. 133 pp.

Analyzes the human capital approach to the size distribution of earnings when investments are restricted to formal schooling. Focuses the model on the investor in human capital as a profit-maximizer. Concludes that the relative rates of increase of physical capital, natural labor, and technology determine whether incomes become more equally distributed over time.

12.124 Thoburn, J. T. "Exports and Economic Growth in West Malaysia." *Oxford Economic Papers, N.S.*, Vol. 25, No. 1, March 1973, pp. 88-111.

Examines the relation of exports of tin and rubber to economic growth. Finds that a high proportion of export income is retained locally, and that the quality of labor has improved.

12.125 Thomas, Brinley. *Migration and Economic Growth: A Study of Great Britain and the Atlantic Economy.* New York, Cambridge University Press, 1973. 498 pp.

Analyzes demographic and monetary factors in causing long cycles in investment, productivity, and real income since 1840. Examines black migration to America from 1870, and the trans-Atlantic brain drain since 1950.

12.126 Trapido, Stanley. "South Africa in a Comparative Study of Industrialization." *The Journal of Development Studies,* Vol. 7, No. 3, April 1971, pp. 309-320.

Compares political and economic developments in South Africa with similar developments in Tsarist Russia, Imperial Germany, and the American South. Considers the effect the South Africa mining compound had on the process of urbanization.

12.127 Ueno, H. "A Long-Term Model of Economic Growth of Japan, 1906-1968." *International Economic Review,* Vol. 13, No. 3, October 1972, pp. 619-643.

Presents a two-sector growth model to explain Japan's process of development, and to provide perspectives on future growth potential.

12.128 U.S. Department of Commerce, Bureau of Economic Analysis. *Long Term Economic Growth, 1860-1970.* Washington, D.C., 1973. 311 pp.

A statistical compendium of approximately 1,200 annual economic time series used in the study of long-term economic trends in the U.S. Revises and updates the first edition published in 1966.

12.129 van Dam, Andre. "The Future of Industry's Growthmanship." *Revista Internazionale di Scienze Economiche e Commerciali,* Vol. 22, No. 1, January 1975, pp. 79-90.

Argues that exponential growth carries the germ of its deceleration; that the future of industrial growth may partly depend on societal pressures for enhanced quality of life and on the manner in which scarce resources are allocated.

12.130 Whitcombe, Elizabeth. *Agrarian Conditions in Northern India. Vol. 1. The United Provinces Under British Rule, 1860-1900.* Berkeley, University of California Press, 1972. 330 pp.

Traces the technical and institutional changes in India which resulted from the British government's efforts to raise agricultural productivity. Cites benefits and failings of this effort.

12.131 Wilkinson, Richard G. *Poverty and Progress: An Ecological Perspective on Economic Development.* New York, Praeger, 1973. 225 pp.

Draws from economics, sociology, history and anthropology to put forth a theory of development. Asserts that ecological disequilibrium is the spur to economic development.

12.132 Williamson, J. G. "Embodiment, Disembodiment, Learning by Doing, and Returns to Scale in Nineteenth-Century Cotton Textiles." *Journal of Economic History,* Vol. 32, No. 3, September 1972, pp. 691-705.

Attempts to explain equipment replacement decisions during periods of rapid growth, technological improvement and variable tariff policies, and to identify the sources of improved produc-

tivity. Determines the relative importance of each source of labor productivity.

12.133 Willmore, L. N., and Acheson, K. "Capital Utilization in Economic Development: Comment." *Economic Journal,* Vol. 84, No. 333, March 1974, pp. 159-167.

The authors comment on an article by Gordon C. Winston on capital utilization, criticizing his use of the capital-output ratio of real value of assets to value added unadjusted for capacity use, as an inappropriate explanatory variable. They argue that both the size of the firm and the capital intensity of production have a positive effect on the level of capacity utilization.

12.134 Yu, C. L. "The Local Industry and its Impact on the Agricultural Development of China: A Report on 23 Countries and One Autonomous Region." *Asia Quarterly,* No. 4, 1971, pp. 321-341.

Discusses the role small industries played in capital accumulation on the local level in China. Analyzes how the building of water conservation works and power stations by labor-intensive techniques contributed to agricultural productivity and stimulated local industrialization by providing a cheap power source. Shows how small industry at the local level promotes farm mechanization.

12.135 Zarembka, Paul. *Toward A Theory of Economic Development.* San Francisco, Holden-Day, 1972. 249 pp.

Discusses labor surplus theory and the general structure of closed and open economies. Examines the agricultural sector in detail. Presents empirical data on agricultural output in India.

Bibliographies, annual reports, etc.

13.001 Armstrong, Douglas, and Dworaczek, Marian. *The Compressed Workweek.* A Bibliography. Ontario Ministry of Labour, Research Library. October 1973. (Place of publication not indicated.) 28 pp.

13.002 Dworaczek, Marian, and Matthews, Catherine. *Recent Innovations in Work Scheduling.* A Bibliography. Ontario Ministry of Labour, Research Library. (Place of publication not indicated.) September 1974. 66 pp.

13.003 Goodwin, Jack. "Current Bibliography in the History of Technology (1970)." *Technology and Culture,* Vol. 13, No. 2, April 1972, pp. 226-294.

13.004 Goodwin, Jack. "Current Bibliography in the History of Technology (1972)." *Technology and Culture,* Vol. 15, No. 2, April 1974, pp. 246-324.

13.005 Goodwin, Jack. "Current Bibliography in the History of Technology (1974)." *Technology and Culture,* Vol. 17, No. 2, April 1976, pp. 286-364.

13.006 Harvard University Program on Technology and Society. *Technology and Social History.* Research Review No. 8, Cambridge, Mass., Harvard University Press, 1971. 93 pp.

Selected literature on the historical relationship between technology and social change is summarized and discussed. Covers such areas as technology and economic growth, the forces of diffusion and resistance, and the effect of single technologies on social change.

13.007 Kennedy, Charles, and Thirlwall, A. P. "Surveys in Applied Economics: Technical Progress." *The Economic Journal,* March 1972.

Presents as an appendix of this survey article an authoritative bibliography of works bearing on the title theme.

13.008 Mitcham, Carl, and Mackey, Robert. "Bibliography of the Philosophy of Technology." *Technology and Culture,* Vol. 14, No. 2, Part II, April 1973. Whole issue.

13.009 Morawetz, D. "Employment Implications of Industrialization in Developing Countries: A Survey." *The Economic Journal,* Vol. 84, No. 335, September 1974, pp. 531-542.

A bibliography on the subject is appended to the article on the pages indicated.

13.010 National Commission on Productivity and Work Quality. *Fourth Annual Report, March 1975.* Washington, D. C. 56 pp.

The Commission's Annual Reports present discussions of recent and long-term trends in productivity, and data bearing on them, as well as of the work performed by the Commission during the year covered by the Report.

13.011 Taylor, James, and others. *The Quality of Working Life.* An Annotated Bibliography. Los Angeles, University of California, 1973.

13.012 U.S. Department of Commerce, National Technical Information Service. *Productivity: A Bibliography with Abstracts.* 1974. 137 pp.

Annotations of 126 research reports on sources of productivity change, effects of job improvement, personnel management, and the relationship of productivity to the economy as a whole.

13.013 U.S. Department of Labor, Bureau of Labor Statistics. *BLS Publications on Productivity and Technology.* Report 461. Washington, 1976.

13.014 U.S. Department of Labor, Bureau of Labor Statistics. *Chartbook on Prices, Wages, and Productivity.* Washington, U.S. Government Printing Office. Monthly.

Monthly publication presenting graphs on changes in prices, wages, costs, profits, and productivity in the U.S. economy, in their historical setting.

13.015 U.S. Department of Labor, Bureau of Labor Statistics. *Employment and Earnings.* Washington, U.S. Government Printing Office. Monthly.

Monthly publication featuring household data on the labor force, total employment and unemployment; jobseeking methods used by the unemployed; establishment data on employment, hours, earnings, and turnover rates; output per hour, hourly compensation, and unit labor costs; insured unemployment; special articles presenting data on various phases of labor force.

13.016 U.S. Department of Labor, Bureau of Labor Statistics. *Handbook of Labor Statistics, 1975–Reference Edition.* BLS Bulletin 1865. Washington, U.S. Government Printing Office, 1975. 471 pp.

Contains time series on BLS statistics, including productivity and unit labor costs. Also presents explanatory notes covering the statistics.

13.017 U.S. Department of Labor, Bureau of Labor Statistics. *Major Programs 1976, Bureau of Labor Statistics.* Report 495. Washington, 1976.

Outlines BLS programs, including those covering productivity and technology.

13.018 U.S. Department of Labor, Bureau of Labor Statistics. *Monthly Labor Review.* Washington, U.S. Government Printing Office.

Regularly publishes original articles on concepts, trends, and the sources of productivity, as well as on other subjects relating to productivity and technological change. Also lists new publications on productivity each month.

13.019 U.S. Department of Labor, Bureau of Labor Statistics. *Productivity: A Selected, Annotated Bibliography, 1965-71.* BLS Bulletin 1776. Washington, U.S. Government Printing Office, 1973. 107 pp.

Provides annotated references for nearly 800 publications published between 1965 and 1971, dealing with concepts and methods, measurement of levels and trends, the sources of productivity change, and the relation of productivity to the economy as a whole, and to economic variables such as wages and prices.

13.020 U.S. Department of Labor, Bureau of Labor Statistics. *Productivity and Costs in the Private Economy.* Quarterly press release. Washington.

Presents data on productivity, hourly compensation, and unit labor costs in the total private sector as well as separately for the nonfarm and manufacturing sector.

13.021 U.S. Department of Labor Library. *Flexible Working Hours: Selected References.* Washington, U.S. Government Printing Office, January 1976. 21 pp.

13.022 U.S. Department of Labor Library. *The Shorter Workweek and Flexible Hours.* Washington, March 1974. 56 pp.

13.023 U.S. General Services Administration. *Productivity Clearinghouse: An Annotated Bibliography.* Washington, November 1974. 38 pp.

Presents an annotated compilation of Government publications, reports, and manuals, concerning the design and the use of work/productivity measurement systems, and of capital investment opportunities.

Author Index

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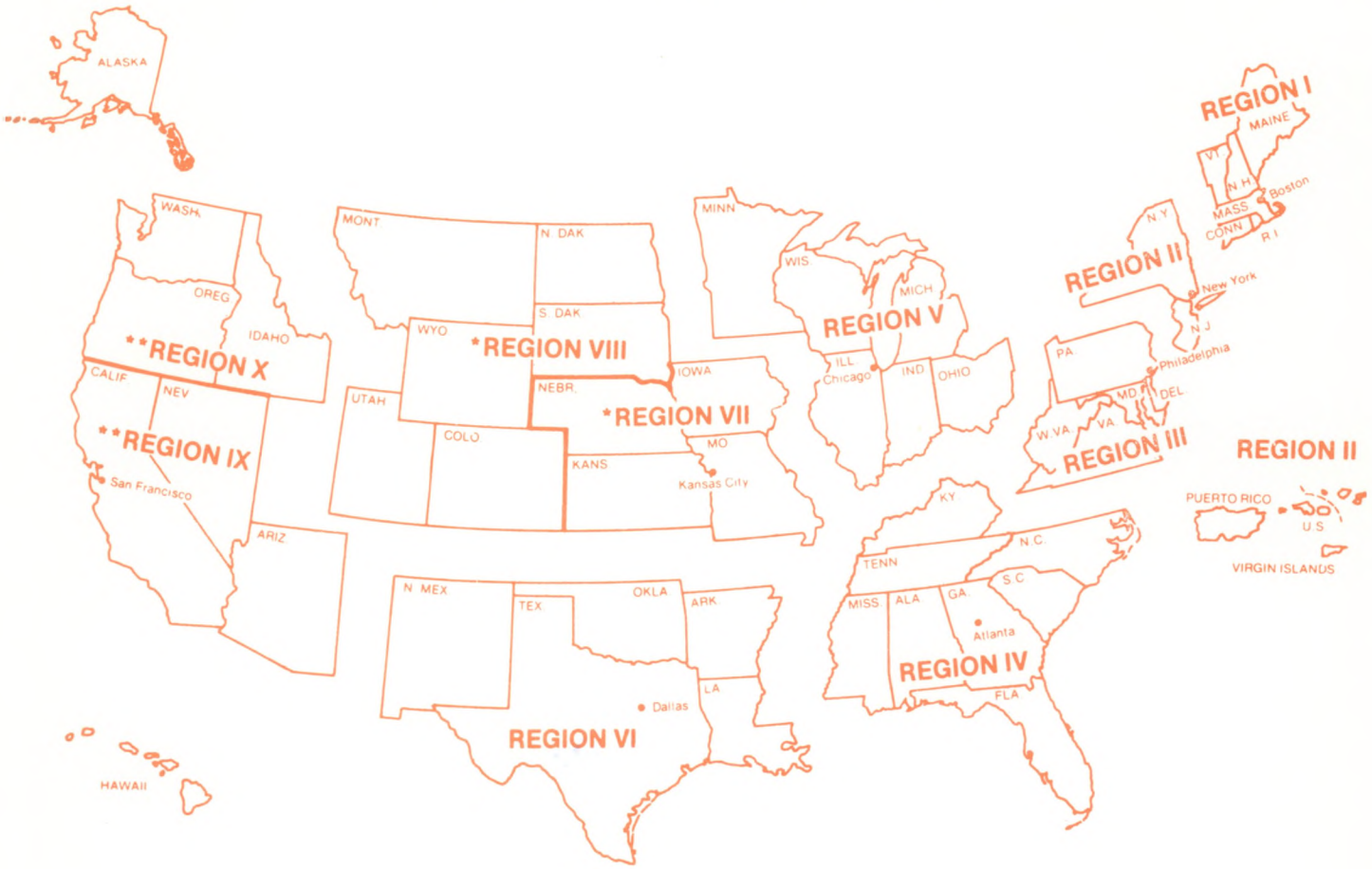

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