# Book Reviews

*Linear Programming and Economic Analysis.* By Robert Dorfman, Paul A. Samuelson, and Robert M. Solow. McGraw-Hill Book Co., Inc., New York. 525 pages. 1958. $10.

AT LAST ECONOMISTS can get in one book a comprehensive, authoritative, and not overly technical discussion of three of the most important developments in economic analysis—linear programming, input-output analysis, and the theory of games. Dorfman, Samuelson, and Solow give us by far the best general discussion of these subjects that has appeared anywhere. Each of these men is a recognized authority. And in this case, the group of three has pooled its knowledge and resources so well that the book is doubtless better than any one of the three authors could have written alone.

It is not a "popular" book that is written down to such a level that it can be absorbed without effort by a person who knows no mathematics and little economics. Frankly, the methods covered here are rather difficult. Wisely, the authors have used some mathematics but, I think, not too much. For example, the reader can understand everything in these pages without learning about matrices. The authors have here written mainly for economists, not for mathematicians.

The authors emphasize the close relationships between linear programming, input-output analysis, and the theory of games. They demonstrate, for example, that any linear-programming problem can be stated as a problem in game theory, and can be solved by the von Neumann principle. They also discuss the curious fact that any linear-programming problem involving the maximization of a linear function can be restated as a *dual* problem involving the minimization of another linear function.

Developments in these fields are coming thick and fast these days. As I was reading this book, a friend showed me a newspaper article about a large corporation that is using an electronic computer to make day-to-day adjustments in the ingredients of animal feeds in order to minimize the cost of a mixture guaranteed to meet a large number of specifications concerning such things as nutritive content. Some railroads are reportedly using the simple form of linear programming discussed in this book as "the transportation problem." I hear that some agencies of Government are using the closely related "contract-awards problem" to save the taxpayers money. These methods are not just fancy gadgets to amuse bright mathematicians and economists. They have great practical possibilities that are just beginning to be understood.

Any young economist who is getting started in quantitative research would do well to invest in this book. It may be hard going, but it should pay the reader handsome dividends.

***Frederick V. Waugh***

*Economic Models: An Exposition.* By E. F. Beach. John Wiley & Sons, Inc. 1957. 227 pages. $7.50.

MATHEMATICS, according to Professor Paul Samuelson, has been knocking at the door of economic theory for more than a century. Somewhere along the line the door was opened, and for at least a quarter of a century, mathematics, along with statistics, has become increasingly important in economic analysis.

This has created some problems. One is the provision of adequate training for students of economics. Another is the provision of means whereby older economists, who may have limited knowledge of mathematics and statistics, can gain some understanding of the contributions being made by mathematical economists and econometricians.

Professor Beach's small volume is designed to help solve both of these problems. The general scope and purpose are fairly well described by the statement on the jacket—"an elementary exposition of the mathematical and statistical implications of multiple relations in economic theory."

Mathematical models, dealt with in part I, are divided into "static" and "dynamic," the former being defined as those which do not explicitly involve time. Static models involving linear relationships among the variables are illustrated by several formulations, such as Colin Clark's 6-equation model of the United States economy. Those involving nonlinear relationships are illustrated by models of Hicks and Modigliani designed to show the relation between the Keynesian and classical systems.

The dynamic models are divided into "continuous models" where "the variables are thought of as changing continuously through time;" and "sequence models," where the variables relate to "certain *time periods*." The continuous models include Domar's debt model and Samuelson's investment model, which involve the solution of first and second order differential equations, respectively. The sequence models employ difference equations, and are illustrated by a number of income-savings-investment models from Harrod and Samuelson.

"Econometric models," which is the subject of part II, is a résumé of methods relevant to the statistical estimation of the relationships specified in the theoretical models. Topics covered include an introduction to sampling theory, simple and multiple correlation, and the fitting of simultaneous relationships along Cowles Commission lines. Beach manages to pack a lot in a small space, covering partial correlation in three pages, confluence analysis in four, and autocorrelation in about four more.

What can be said of the book in terms of the author's stated objectives? With respect to the education of students, I would think that it could be very useful indeed. The presentation is logical, clear and concise, and the illustrative materials are well selected. For the most part, the references are well chosen. But unless students had recently had mathematics equivalent to a substantial portion of Allen's *Mathematical Analysis for Economists*, plus introductory statistics, it would certainly be necessary to supplement the text with special materials or assignments.

With respect to the older economist who wants to bring himself up-to-date, the book is one of the most useful that has appeared. This is especially true if one's interest is in obtaining a sort of bird's-eye view of economic model building. There has been a bewildering flow of models in recent years, and I think that Beach's exposition, particularly in part I, performs a real service by providing a compact and logical presentation of this whole field.

But if the economist wants to go beyond this point to understand the mathematical implications of some of the more sophisticated models and to acquire some facility of his own, the book is quite a way from being self-sufficient, especially chapters 5 and 6, where differential and difference equations are involved.

Beach himself recognizes the problem by noting the desirability of the reader's having had some calculus and a beginning course in the theory of statistics. At the same time, however, he expresses the hope that much can be learned from the book on the basis of elementary algebra, and he tries to help the cause along by the occasional introduction of some mathematical instruction, such as the short appendix on derivatives following chapter 3.

Much depends, of course, on the background of the individual reader. For example, I found part II, which Beach regards as generally more difficult than part I, distinctly easier than some portions of part I. In my opinion, non-mathematical economists who wish to maximize the return from this book will have to be prepared to make a few serious excursions into some fairly difficult mathematical topics.

Apart from this problem, Professor Beach's volume has many excellent qualities, some of which have already been noted. The fact that it is brief and inclusive will enable both the beginning student and the older economist to become acquainted with the broad field of economic models without danger of failing to see the forest for the trees. It will also enable them readily to compare their stock of mathematical and statistical knowledge with that required for a reasonably good understanding of the field of economic models and to reach a decision as to whether it is worth their while to make the intellectual investment necessary to yield a high return in that field.

***J. P. Cavin***

*Marketing Research.* By Richard D. Crisp. McGraw-Hill Book Company, New York. 798 pages. 1957. $7.50.

TO MANY ECONOMISTS, marketing research suggests systematic study with the aim of increasing efficiency in the marketing system and reducing costs. The present text, however, confines its attention to the problem of increasing business success. The statement is made that marketing research is a management tool and its primary function is to aid executive judgment.

Major areas of research application in marketing are listed as (1) sales forecasting, (2) determining the size and characteristics of the market for a product, (3) estimating territorial sales potentials and measuring territorial variations in sales effectiveness, (4) product research, (5) new-product development, (6) advertising research, (7) test marketing, and (8) qualitative and "motivational" research.

Within its defined limits, the book is a thorough, knowledgeable, and judicious teaching text. Because of its length, it is not adapted to rapid reading; but with its well-arranged chapter headings, and its case, name and subject indexes, it is, as the author suggests, probably useful as a guide to (at least some) workers already in the field.

One of the values of the book to such workers lies in its searching portrayal of current practice in business circles in the conduct of marketing research. Thus it is possible for those who are engaged in the area to check their own methods and techniques (and problems) against what might be considered par for the course. The author's acquaintance with research methods used by various segments of industry is wide and experienced.

The teaching is practical rather than theoretical, although ample reference is made to theoretical sources in methodology. Extensive use of case histories is made to illustrate both method and conceptual approach in problem solving. Unlike most earlier texts, this one covers the broad area of problem solving for the business firm, including not only use of the survey technique but also use of data from other sources, both within and without the firm. Considerable attention is given to sources of "secondary" data and their application.

Nevertheless, sampling receives its due share of consideration. Here we find a sturdy recognition of the virtue of random or probability sampling. At the same time, the author, by reason of widespread industry usage, is forced to the defense of the usually less costly, more rapid quota sampling. With proper safeguards, it is pointed out, quota samples can contribute to the solution of many problems in which knowledge of confidence limits is not considered essential. Or, if we want to be uncritical about this kind of thing, we may, as some apparently do, establish rough confidence limits, but at three standard errors rather than two.

So far as technical methods are concerned, the author appears to be generally well informed and up to date. In the chapter on product research, however, no mention is made of use of the single-stimulus test involving two or more variants of a single product to be rated, or of use of the unstructed rating scale. Both of these techniques have been used successfully.

Concerning qualitative and "motivational" research, the three-level classification of awareness formulated by George Horsley Smith is followed. The first level deals with material that can be discussed with respondents, although consumers' lack of training in "introspecting" may make it difficult for them to give complete information. Here the author notes that the area of information accessible by direct approaches at this level is smaller than it was once thought to be. The second level of awareness deals with material that is rarely openly discussed, largely because of ego involvement. The third level deals with material not consciously recognized by respondents and likely to give rise to anxiety or other disturbance if brought to conscious awareness.

Certain psychoanalytical projective techniques have been adapted to marketing research to obtain qualitative responses. Among these are sentence completion, thematic apperception test, cartoon technique, and word association. Attention is called to the danger of the analyst projecting his own personality into the interpretation of the responses, and to deficiencies in sampling. The view, now coming to be widely recognized, is expressed that there is room for both qualitative and quantitative research to obtain answers as to the *why* of consumer behavior. For motivational research alone, that is, use of projective techniques unaccompanied by quantitative surveys, the author suggests a team approach of psychologist and seasoned marketing research man, to give it the "promise of becoming a tool almost as significant as the exaggerated claims of a few years ago suggested it might be."

*Robert M. Walsh*

*Problems in Marketing* (Second Edition). By Malcolm P. McNair, Milton P. Brown, Davis S. R. Leighton, and Wilbur B. England. McGraw-Hill Book Company. 740 pages. 1957. $7.00.

INSTRUCTORS of marketing courses should find this latest in the series of marketing case books by the faculty of the Harvard Business School a valuable addition to the literature in the field. It will provide useful supplementary information even for those instructors who do not completely agree with the authors that ". . . the case method makes the difference between real education and merely passively acquired words and ideas." Researchers concerned with decision-making of individuals or firms may find a study of many of the cases informative, but those concerned with aggregates or broad policy may find the material less helpful.

In justification of the use of the case method, the authors dismiss the industry or commodity approach as being needlessly time-consuming and ineffective, and the institutional approach because of its failure to emphasize dynamic aspects of marketing. They contend that an approach which emphasizes physical functions would fail to give consideration to functions that are of primary concern to businessmen and that an approach from the standpoint of economic functions is not appropriate for the would-be practitioners of marketing for whom the text is designed. They conclude, therefore, that case studies which focus attention upon business management functions and upon the interdependence and complexity of marketing functions provide the best approach.

The 79 cases, most of which are presented for the first time, are organized into 9 sections relating to such marketing problems or questions as the influence of the consumer, channels of distribution, merchandising, advertising policy, and pricing. Sections added for the first time in the series relate to the use of marketing research and integrated marketing programs.

The cases that relate to channels of distribution may be of interest to researchers concerned with market structure and organization since they suggest something of the importance and possible usefulness of the case method in developing studies in this area. The section on merchandising is particularly pertinent to workers in agriculture, because of its treatment of the problem of product planning and its relation to the competitive position of products.

*William A. Faught*

*Federal Lending and Loan Insurance.* A Study by the National Bureau of Economic Research. By R. J. Saulnier, Harold G. Halcrow, and Neil H. Jacoby. Princeton University Press, Princeton, N. J. 566 pages. 1958. $12.00.

FEDERAL CREDIT programs have grown rapidly. They are now an important part of our financial structure, and for some time there has been need for a treatise that would bring together in one publication information on the various Federal credit agencies. This need has now been met by three leading economists—R. J. Saulnier, Harold G. Halcrow, and Neil H. Jacoby—in this book. Economists and others interested in finance will find it a useful study.

The authors state that the purposes of their study are to show how the Federal credit programs developed, describe their services, and record the experience and analyze the impact of these programs on private finance and the economy generally. The first part of the volume deals mainly with the nature and scope of the Federal credit agencies, their services, lending experience, economic significance, and effect on credit markets and lending practices. Following is a discussion of the three main areas served by Federal credit agencies: (1) Agricultural credit programs; (2) Federal lending and loan insurance programs for business and financial institutions; and (3) Federal lending and loan insurance programs for housing. The first of three appendixes consists of summary tables for the various agencies showing by years the loans made, insured, or guaranteed. The second appendix analyzes business loans of the Reconstruction Finance Corporation from 1934 to 1951. A discussion of the business loan guaranty and insurance program of the Veterans Administration from 1945 to 1955 is found in the third appendix from 1945 to 1955.

Agricultural credit programs, which began with the establishment of the Federal land bank system in 1916, are reviewed and analyzed. The land banks were organized with the use of Government capital, but all Government capital has been retired and the banks are now wholly owned by farmer borrowers through the National Farm Loan Associations, which hold all the stock of the land banks.

The strong net worth position of the system at present would indicate that its earning position has been stronger than is indicated by the authors when they state, "it seems probable that the earnings somewhat exceeded full costs of operation over the long run and that the regular land bank program has been self-sustaining."

Similarly, the Federal Farm Mortgage Corporation, which operated on its income from mortgages and investments in land bank bonds, and which has paid back its capital and more than $139 million in dividends to the Treasury, appears to have a better record than that indicated by the statement that "it appears . . . the Commissioner loan program has been more than self-supporting." The reimbursement which the Corporation and the land banks received from the Treasury for reducing to 3½ percent the interest charged borrowers on loans during certain depression years was at the direction of Congress and should be considered a subsidy to the borrowers and not a cost chargeable against these agencies.

The development of the Production Credit System is reviewed and the services and loan experience analyzed. Production credit associations are local associations that make short-term and intermediate-term loans to farmers and obtain funds by discounting farmers' notes with the Federal Intermediate Credit Banks. Their importance as a source of credit varies by regions. The authors conclude that the loan experience has been similar to that of commercial banks.

Other Federal agencies that finance agriculture are considered and analyzed. These include the Banks for Cooperatives, the Farmers Home Administration and the Rural Electrification Administration.

The book contains an excellent general discussion of Federal lending and loan insurance programs for housing. The study shows that in 1953 about 43 percent of the home mortgage debt was composed of insured and guaranteed loans. The program has encouraged mortgage loans for housing with full amortization.

In summarizing the lending experience of Federal Credit agencies in general, the authors draw three main conclusions. First, the record is exceptionally favorable in programs that provided for refinancing of debts in default during the depression of the 1930's. Second, the experience generally is unfavorable in supplying credit to farms and firms which, because of some weakness, could not get credit through private lenders. Third, cooperative financial institutions sponsored by the Federal Government have fared well as lenders.

***E. C. Johnson***

*Capital in Agriculture—Its Formation and Financing Since 1870.* By Alvin S. Tostlebe. Princeton University Press, Princeton. 232 pages. 1957. $6.00.

A STUDY of long-term trends in capital formation and financing in the United States was begun by the National Bureau of Economic Research in 1950. This is the second report in that series. Findings previously published by Dr. Tostlebe in the National Bureau's Occasional Paper 44, *The Growth of Physical Capital in Agriculture, 1870–1950*, and in "Trends in Capital Formation and Financing Agriculture," *Journal of Finance*, May 1955, are included in this book.

The purposes stated by the author were "to measure and analyze the growth of farm capital over the eighty year span from 1870 to 1950, to analyze for as much of this period as possible the financing that accompanied it, and to extract from this historical survey suggestions as to prospective future trends in capital formation and financing in agriculture." Within the limitations of the data available, Dr. Tostlebe reached these objectives and at the same time made an enduring addition to the working tools of agricultural economics. It is a valuable contribution to the historical studies that describe the development of agriculture in the United States and provide bases for projecting trends in the future.

The more important sources of data used were Census and Bureau of Agricultural Economics reports; Goldsmith's *A Study of Savings in the United States, 1897–1949;* Strauss and Bean's *Gross Farm Income and Indices of Farm Production and Prices in the United States, 1869–1937;* and Atkinson and Jones' *Farm Income and Gross National Product* (*Survey of Current Business*).

The analysis shows by regions the growth of various classes of physical and financial assets, variations in capital per farm and per person, the relation of capital to product, and sources of farm capital. Capital and output per person engaged in agriculture rose throughout the 80-year period. The same trend was observed in output per unit of capital. The regional comparison revealed strikingly the influential role of capital as a determinant of productivity of labor.

The increase in output per person could not be attributed entirely to the increases in capital per worker. Capital efficiency also rose as a result of improvements in equipment and in methods of livestock and crop production.

Capital increased much faster when farm income was favorable, and this was the main source of capital accumulation. New capital was estimated to total $78.9 billion from 1900 to 1950, of which 75 percent originated from gross farm income, 22 percent from credit, and 3 percent was represented by savings in the form of financial reserves.

Dr. Tostlebe expects these trends to continue into the indefinite future. Capital growth in the aggregate will occur, however, "only in times of reasonable prosperity" at an average rate that is likely to be substantially less than 1 percent per annum. Machinery, productive livestock, and cash balances will grow more rapidly than capital represented by land, buildings, and stored crops. Income will remain the major source of capital, but credit, especially non-real-estate credit, will gain in importance.

The material is organized and presented in the workmanlike way that characterizes National Bureau studies. Readers will find the main results and conclusions in the summary in chapter 1. In the Foreword, Dr. Simon Kuznets calls attention to some of the more significant findings in the study. The nine appendixes will be helpful to students concerned with sources and methods.

***Russell C. Engberg***

*Farm Crisis: 1919–1923.* By James H. Shideler. University of California Press, Berkeley. 345 pages. 1957. $5.00.

THE THESIS of this work is that the period 1919–1923 was "a crisis standing as a basic event in the history of agriculture." This period is singled out from earlier economic crises because it marked a turning point in the attitude of farmers toward governmental intervention in economic affairs. "During the 2½ years of Harding's presidency, agriculture led a movement away from *laissez-faire* to Government participation in business affairs, one of the great economic changes of the twentieth century."

Farmers' experiences with the Food Administration's minimum prices and controls are stressed as an influential factor in shaping their demands for governmental intervention to change agriculture's relative economic position during the postwar crises. The author notes that farmers did not know what to ask for and were not united on a plan or remedy until late in 1923 when major farm interests joined in promoting the McNary-Haugen plan for raising farm prices. By this time, the agricultural crisis had merged into what the author calls a chronic agricultural depression.

The book is organized on a chronological basis with special emphasis given to farmer self-help solutions, the cooperative-marketing remedy, the

Harding administration, agricultural reform legislation, and the persisting farm problem. An impressive array of sources is listed and discussed in the author's bibliographical notes. He has consulted the records of major governmental agencies, including records of governmental conferences and meetings, private manuscript collections, Federal documents and official publications, State publications, and newspapers and periodicals for the period covered. Mr. Shideler has also interviewed or corresponded with persons involved in or close observers of agricultural development during the 1920's. With this full coverage of sources it is unfortunate that the footnotes are relatively inaccessible; they are organized by chapters at the back of the book. But the usefulness of the book as a reference work is greatly enhanced by an unusually well-organized and detailed index.

Although Mr. Shideler does not compare post-World War I conditions and problems with those of post-World War II, the wealth of factual material he presents on governmental activities and farmer reactions provides a basis for drawing analogies. Readers unfamiliar with the events of 35 years ago may be surprised to learn that in the immediate postwar period, a direct-payment plan for wheat producers was favored by Secretary Houston to make up the difference between the market price for wheat and the guaranteed price of $2.26 a bushel; that in 1921 a farm journal urged farmers to "bank" their fertility in the soil by raising less corn and more legumes; and that in 1920 a bill providing for the fixing of minimum prices for staple crops on a cost-of-production-plus-profit basis and for the purchase of unsold surpluses for sale abroad was introduced into Congress.

The chapter on the Harding administration will be of special interest to government personnel. The author discusses the competition between the Department of Agriculture and the Department of Commerce over the development of marketing research and service work. He states that Secretary of Commerce Hoover considered agriculture an extractive industry and argued that functions of the Department of Agriculture should be confined to production on the farm.

Some may feel that Mr. Shideler has over-emphasized one 5-year period in the evolution of the farm problem, which has been developing since the Civil War. Others may consider that the turning point in farmers' response to economic crisis and depression occurred in 1932 when acute dissatisfaction was registered in the voting booths. In any event, the author has provided a comprehensive and valuable history of a critical period that should be read by everyone concerned with agricultural policy.

*Gladys L. Baker*

*Manual of Nutrition.* Fourth Edition. Prepared by Members of the Scientific Advisor's Division (Food) of the Ministry of Agriculture, Fisheries, and Food. Philosophical Library, Inc. New York. 67 pages. 1957. $3.50.

THE SCOPE of this book is broad. It includes a discussion of the major nutrients—their sources and role in the body; energy needs; digestion of foods and absorption of nutrients; recommended nutritional allowances; composition of foods; cooking; and meal planning. The subject matter is so arranged that the manual can serve as a basis for nutrition lectures.

Because of its comprehensive nature and small size—about 70 pages—the manual can give only an overview, or highlights, of the present status of nutrition, rather than a more complete account. Even though the complex science of nutrition is presented in a simplified form, it may be difficult for the general reader to understand unless he has a sound background in science.

To round out the nutrition picture, the effect of cooking on different essentials and on foods is included, as well as the nutrient composition of foods. The need for providing adequate diets is emphasized, and suggestions for meeting nutritional requirements of different groups of individuals are included.

Certain sections, although interesting, may be of limited usefulness to many in the United States. This is mainly because the book, which was prepared in the United Kingdom, applies nutrition principles in light of British dietary habits, food supplies, and viewpoints on nutrition, and these factors are not always the same as those found in the United States. For instance, the part that deals with recommended nutritional allowances is in terms of the dietary allowances proposed by the British Medical Association. The amounts recommended for some nutrients differ from those set up by the National Research Council of the United States, primarily because of the difference in the philosophy underlying the purpose of these two dietary standards.

In the main, however, those interested in gaining a general understanding of nutrition and the importance of different kinds of foods to health should find this manual a handy reference. This is particularly true because so many aspects of nutrition are brought together under one cover.

*Louise Page*

*Moderne Methoden in der Agrarstatistik* (*Modern Methods in Agricultural Statistics*). By Heinrich Strecker. Deutschen Statistischen Gesellschaft, Munich, Germany. 142 pages. 1957. 17.50 Deutche Marks (about $4.50).

THE JANUARY 1955 ISSUE of this journal carried a translation of a short but impressive paper by Dr. Strecker on "Sampling in West German Official Agricultural Statistics." The author has now produced a much more comprehensive treatment of the subject. Published as Number 8 in a series of bulletins issued by the German Statistical Association, the text describes remarkable advances in the application of modern viewpoints and techniques to collection of agricultural data in West Germany during the last decade. It is an outstanding example of what can be accomplished in a compatible marriage of theory and practice.

Although the guiding hand of the mathematical statistician is clearly in evidence, major emphasis is always on the practical job to be done. After giving a summary of the history and evolution of census and sample-survey methods, particularly with reference to agricultural statistics in Germany, the author proceeds directly to descriptions of recent research studies and modernized operating surveys conducted in his country. These cover such topics as preliminary sample tabulations of agricultural census data, use of sample surveys to check the accuracy of a census, the replacement of censuses by sample surveys, farm population and labor-force surveys, milk production surveys, crop and livestock estimating, and the use of objective preharvest samples for estimating yields of field crops and fruit.

These are all discussed in detail and cover the practical operating aspects of each problem as well as the statistical theory. Numerous tables show the sample allocations used and the results of the work. Illustrative diagrams and maps help give a clear picture of operations.

The planning of each study or survey and the analysis of the data are in accord with the most modern statistical viewpoints in all respects. Although the particular sample designs and working procedures described are, as one would expect, largely geared to administrative, cultural, and other factors characteristic of West Germany, every agricultural statistician anywhere in the world can find much in the book that he can use.

The reviewer knows of no other publication in the field of agricultural statistics in which the subject is discussed in such breadth and detail or with such a happy blending of theory and applications.

An English summary is appended for those who do not read German. But any reader who is sincerely interested in the subject stands to miss much if he does not read the entire text in the original or have it translated for him. With true Teutonic thoroughness, the author lists an extensive bibliography, much of it consisting of recent German publications, as well as references to works familiar to statisticians in this country. The book is also well indexed.

Agricultural statisticians in this country should be particularly interested in the professional approach displayed in the designs of the surveys, the meticulous attention given to optimum sample allocations and the estimation of sampling errors in sample surveys, and the measurement of reporting errors in censuses. The relationship of sample surveys to complete censuses is another topic on which the author's views are of interest.

A few specific procedures are particularly worthy of mention. In designing an area sample for surveys of hog producers, tracts of land were put into 3 strata on the basis of numbers of breeding sows reported in those tracts in the most recent livestock census. The problem of choosing class intervals for the 3 strata in such a way as to minimize the sampling error, for a given sample size, was subjected to thorough analysis. The methods used were developed by the Swedish statistician Tore Dalenius, partly in cooperation with Margaret Gurney of the U.S. Bureau of the Census. But the mere fact that this was taken into consideration at all, testifies to the thoroughness with which the sampling problem was investigated. In fact, a number of alternative sample designs and sampling units were appraised, with the help of past census records, before the area sample was adopted as the most desirable.

Another example is to be found in the description of monthly mail surveys to estimate milk production. The problem of non-response is discussed fully. But a more eye-catching feature of these surveys is the device of staggering the survey over 6 specified sample days in each month to allow for trends in milk flow during the month.

Some minor misprints are present, as in any first printing. The following were pointed out by the author himself in a note to this reviewer:
1. The factor $n_{ij}$ that should accompany $N_{ij}-1$, and the factor $n_j$ that should accompany $N_j-1$ were omitted in the last two equations on page 21.
2. The reference to "4 days" on page 22 should have read "42 days".
3. The upper limit given on page 23 for the class interval on size of land tracts in stratum 2 should be 2 hectares instead of 1 hectare.
4. The word "objective" in the fourth line of page 57 should read "subjective".

***Walter A. Hendricks***

*The Theory of Economic Growth.* By W. Arthur Lewis. Richard D. Irwin, Inc., Homewood, Illinois. 453 pages. $7.20.

ANYONE who has devoted much thought and study to economic growth and development is struck by the complexity of the subject. This is true whether it involves an entire economy or a major industry. Many of the things that need to be known and understood cannot be foreseen. Even if we could evaluate all of the forces that influence economic development, the human mind probably could not encompass the many variables and the infinitely complex systems of relationships among variables which are likely to prevail in a growing economy.

Mr. Lewis, the Stanley Jevons Professor of Political Economy at the University of Manchester, is aware of the dimensions of his undertaking. His book presents no precise well-defined models of economic growth. The title, *The Theory of Economic Growth*, hardly describes its contents. As the author points out in his introduction, he is presenting more of a map of economic growth the scale of which is very large and permits little detail.

Though the focus of the study is growth in output per head, it is interesting that Mr. Lewis is concerned primarily with human behavior and only secondarily with the natural resources with which a nation might be endowed. Thus he recognizes the tremendous importance of human behavior, accidents of history, and plain fortuitous events in shaping the economic development of a nation.

Lewis believes that the proximate causes of economic growth are principally three: (1) The effort to economize, that is, to get the most out of limited resources; (2) increases in knowledge and their application; and (3) the amount of capital and resources per capita. What he is particularly interested in, however, are the fundamental forces that lie behind these proximate causes. Accordingly, he inquires into such matters as the environment most favorable to growth, institutions that encourage innovations and investments, social beliefs and ends, religion, and other forces which motivate human actions. Mr. Lewis relegates to the latter part of his book factors to which economists typically give special emphasis, such as those influencing capital requirements, savings and investment, population, labor force, market development, mobility of resources, and the like.

Many of the facets of economic growth transcend the boundaries of contemporary economic theory. A realistic appraisal of economic growth and development must go beyond the usual subject matter of the economist and into the domain of the sociologist, anthropologist, historian, philosopher, and political scientist. Attempts to develop comprehensive models of economic growth without reference to these other domains are likely to be unrealistic and often sterile.

Despite Mr. Lewis' very substantial effort to fill some of the gaps in our knowledge of economic growth, I think he would probably agree that we are unlikely to develop a theory that is completely realistic and satisfactory. But even from somewhat oversimplified models of economic growth, it is possible to make appraisals that are useful for many analytical purposes. Since man's experience provides much of the basis for such appraisals, the resultant projections probably tend to be conservative. But they can be used to indicate the nature of many underlying trends and to obtain some general ideas of the economic magnitudes that can be expected in the process of economic growth.

Although persons working on specific problems of economic growth, such as agricultural production or the demand for farm products, will not be able to take into account all the forces that Mr. Lewis mentions, his book brings into focus both the complexities of the task and many of the specific forces that must be considered in appraising past and prospective economic growth. Any student or research worker who embarks on an undertaking in this general area will do well to devote considerable attention to this book.

***Rex F. Daly***

*The Great Siberian Migration.* By Donald W. Treadgold. Princeton University Press, Princeton, N. J. 278 pages. 1957. $5.00.

DURING THE HALF-CENTURY between the emancipation of serfs and World War I, about 6 million persons migrated from European Russia to Siberia. Although this migration siphoned off only a tenth or so of Russia's tremendous natural increase of population during this period, the economic and social opportunities that it engendered profoundly affected Russian society as a whole. The image of a new kind of peasant, self-reliant, wealthy, and strong-willed, came into existence. A new alternative appeared in Russia's fateful dilemma of reaction or revolution. And the agricultural surpluses from newly cultivated Siberian lands accelerated Russian industrialization by providing both cheaper food and exports.

The economic effects of the Siberian migration have proved to be long-lasting, for Western Siberian agricultural surpluses later provided food supplies essential to the Soviet economic development of the Urals, of Central Asia, and of the Far East. The social effects proved, on the contrary, to have been transitory, for Stolypin's farsighted reforms, which might have given Russia a free and stable society patterned on Siberian experience, were nullified after his assassination in 1911.

Professor Treadgold's well-written and stimulating volume sketches the history of the great Siberian migration. Undertaking the treatment of a large and complex subject in a relatively brief compass, the author has chosen to indicate its many facets without treating any one in an exhaustive manner.

He analyzes the migration to Siberia from three viewpoints: (1) Its relation to major turning points in Russian history, such as the conquest of Siberia, the emancipation of the serfs, the construction of the Trans-Siberian Railroad, and the Russo-Japanese War; (2) the effects of migration upon the economic and social condition of the peasant; (3) and the Siberian migration as an intellectual and political issue in pre-revolutionary Russia.

It is in relation to the last theme that Donald Treadgold makes his most significant contributions. In essence, he summarizes the tragedy of

Tsarist Russia as follows (p. 60): "By its nature the intelligentsia was anti-official above all else, and accordingly fostered the notion . . . that the peasant himself was a helpless, passive victim of history, incapable of either achieving or suggesting solution. Because the intelligentsia felt that the educated intellect was the crucial and indispensable weapon in the revolutionary arsenal, they not only dismissed the opinions of the unlettered peasant, but also neglected his deepest attitudes." This arrogance blinded Russia's leaders to the lessons of the Siberian migration, and led finally to their own destruction.

Some aspects of the volume would have benefited from additional research. For example, an examination of the considerable bodies of Russian peasant customary law would have shown that the Russian peasant institutions were founded upon well-developed concepts of private property and individual welfare. The Siberian migration lessened State and landlord interference with peasant institutions, and it destroyed an imposed rather than indigenous collectivism. The *mir* owes more to Peter's tax regulations than to any peculiarities of the Russian psyche.

In sum, Professor Treadgold's volume may be recommended as a readable and thoughtful introduction to a little-known aspect of Russian history. I hope that it will be joined, in time, by the results of more definitive investigations.

***Demitri B. Shimkin***

## Selected Recent Research Publications in Agricultural Economics Issued by the United States Department of Agriculture and Cooperatively by the State Colleges [1]

BOGARDUS, R. K. A WAREHOUSE LAYOUT FOR A FRUIT AND VEGETABLE SERVICE WHOLESALER IN A TERMINAL MARKET. U. S. Dept. Agr. AMS–232, 10 pp., illus. March 1958.

Designed to provide service wholesalers with guides for the layout of a warehouse within a modern terminal market facility, this report places special emphasis on storage requirements, materials-handling methods, warehousing efficiency, and structural changes required in modern terminal buildings to accommodate the suggested layout.

BONSER, H. J. PART-TIME FARMING IN THE KNOXVILLE CITY-COUNTRY FRINGE. Tenn. Agr. Expt. Sta. Bul. 270, 34 pp., illus. September 1957. (Pub. 28, Southeast Land Tenure Com.)

This study (made in 1951) is a follow-up of one made in 1946 in the same area. Between 1946 and 1951, the average size of farms increased; numbers of livestock kept decreased; acreage planted to corn decreased; average value of investment rose; total costs increased; amount by which estimated total income from the farm exceeded costs decreased; and family labor earnings from all sources increased.

BRENNAN, M. J. PROGRESS REPORT ON COTTON PRODUCTION RESPONSE; WITH SPECIAL APPLICATION TO THE SOUTHEAST. U. S. Dept. Agr. ARS 43–72, 31 pp., illus. April 1958.

From 1943 to 1950, when acreage allotments on cotton were not in effect, the acreage of cotton decreased. Substitution of hay and peanuts for cotton in response to relative changes in price may explain the changes in cotton acreage before 1949. After that year, the effect of off-farm work on cotton acreage became increasingly important. Tentative acreage-response functions for cotton were constructed for each of three regions: Southeast, Mississippi Delta, and Southwest. More precise formulations of acreage and production response are needed.

BUTLER, C. P., AND LANHAM, W. J. AN ECONOMIC APPRAISAL OF THE CONSERVATION RESERVE PROGRAM IN AREA III B, UPPER COASTAL PLAIN OF SOUTH CAROLINA. S. C. Agr. Expt. Sta. AE 135, 59 pp. February 1958.

The immediate effect of the Conservation Reserve program in this area was to reduce acreages of corn, oats, and soybeans on participating farms. The Acreage Reserve Program operated to reduce acreages of cotton. Reduction in these acreages meant more idle cropland in 1957. The effect on total farm production may have been smaller than was reflected by the changes in acreages. The labor force was reduced more on the larger than on the smaller farms because of the programs. Many participating operators used the program as a means toward retirement. Purchases of fertilizer were reduced. Effects on farm income varied.

CARPENTER, FRANCES, AND BURLEY, S. T., JR. MEASURING COTTON FIBER LENGTH: THE TRUNCATED ARRAY METHOD. U. S. Dept. Agr. Mktg. Res. Rpt. 217, 15 pp. March 1958.

This report summarizes the investigation and evaluation of several suggested techniques and methods for measuring the length of fibers in a sample of cotton. A shorter technique, called the truncated array method, was compared with three other methods, and the results analyzed.

[1] State publications may be obtained from the issuing agencies of the respective States.