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Book Reviews

Alluvial Empire.

By Robert W. Harrison. Pioneer Press, Little Rock, Arkansas. 344 pages. 1961. \$8.50.

HISTORY of the Lower Mississippi River Valley usually has been concerned with the "lilac-magnolia" period of *ante bellum* existence—a sort of romantic idyllic life in which no one worked—or if they did, it was done while twanging a guitar or banjo. In *Alluvial Empire*, Harrison has shown us that much of the lower valley history has been concerned with real work—with ditching and draining, with land clearing, and with the innumerable miles of levees for the controlling of floods. Drawing upon his years of study of the economics of the Valley, Harrison has written a sort of summary, yet an all-inclusive work on land clearing, drainage, and flood control. This is the first of a promised two volume work, the second volume to be concerned with a land settlement history.

In the presentation of his material, the author has wisely oriented his approach within the physical aspects of the river watershed and the development of its deltaic flood plain. The herculean efforts required for drainage and flood control are presented, followed by a section on land clearing and the newer technology (new for the Mississippi Valley) of land forming.

One can follow chronologically and organizationally the gradual growth of public interest in economic development of the Alluvial Empire from the early formation of the very small, few-families levee or drainage districts to the concern of the States and finally to the establishment of Federal interests in these matters, particularly in flood control. Perhaps it was to be expected that national concern for extensive destruction to life and property by floods would be a long time developing; however, one is hardly prepared to find it was not until 1928, following disastrous floods in the Valley in 1927, that flood control for the Valley was "at least firmly established as a na-

tional responsibility." Since that time, it is apparent that a large proportion of the total Federal effort in flood control has been concentrated in the lower Mississippi Valley or on works that will protect the Valley.

The volume brings up to date the story of Federal contributions by including the more recent Federal actions (Public Law 566, as amended), which have placed the U.S. Department of Agriculture in the flood control picture in its upstream phases.

Harrison has presented a studious work in this volume. It is well written and organized and is a real contribution in the manner of the economic historian. If there is a criticism of the book, it is that there is no specific section or chapter which indicates lessons that have been learned, or that should have been learned in battling the flood and drainage problems of this extensive Empire. Surely out of all the tragedy, the attempts at control and development, the successes and failures, there must be some comprehensive plan or scheme of development to control floods and to drain and develop the still untouched rich lands. Harrison probably did not have this as one of his objectives, but there must be in all the history of the river some "logical" plan of development against which the present segmented and compartmentalized effort might be evaluated.

For students and for those with an interest in the economic history of the Lower Mississippi Valley, this is a "must" book.

John H. Southern

Lecture Series In Honor of the United States Department of Agriculture Centennial Year (1962). Edited by Wayne D. Rasmussen. Graduate School, U.S. Department of Agriculture, Washington 25, D.C. 74 pages. 1961. \$1.

THIS BOOKLET contains five lectures by distinguished agricultural leaders, with a central theme of "Growth Through Agricultural Progress." It should be required reading by students

and workers in various fields of American agriculture.

Profile of the USDA—First Fifty Years, is the subject of the first lecture. Vernon Carstensen gives a good picture of the evolution of Federal agricultural activities from a small beginning in the U.S. Patent Office in 1839 until about 1912. Three acts of monumental significance were taken in 1862: (1) Creation of the USDA; (2) The Homestead Act; and (3) The Morrill Act, providing for the Land Grant Colleges. It seems fitting that a Democratic Administration, in true bipartisan fashion, should celebrate in 1962 what Abraham Lincoln and the Republicans initiated a century ago.

Remarkable progress has been made in developing the functions of the USDA—with one exception, namely the establishment of an agricultural museum. In this respect the USDA has gone backwards in the Twentieth Century, contrary to trends in the last generation.

The Department as I Have Known It by Henry A. Wallace is more than a memorial. It was a thrilling experience for those who were fortunate enough to attend this lecture. Mr. Wallace has been "in rather close contact" with the USDA "for more than half of its existence." He grew up with the Department, and, like his father, served as Secretary of Agriculture in a difficult period of agricultural adjustment.

The Land-Grant Colleges: Past and Present by James H. Hilton is an interesting and moving account. The impact of these colleges on our agriculture and our society makes one wonder what would we have done without them. They have provided practical training through teaching, research, and extension, adapted to a dynamic and interdependent society. They also have provided "equal access to educational opportunity" and have had a world-wide influence through the education of students from many countries. Dr. Hilton suggests that "perhaps the single most important overall curriculum problem facing the land-grant colleges and universities today . . . is the need for finding a fruitful balance between specialized training in the professions and sciences on the one hand, and broad education in the social sciences and humanities on the other."

Contributions of Agriculture to Our Economy by Jesse W. Tapp is a scholarly analysis though, in many instances, of a qualitative nature. The role

of agriculture is evaluated as a user and producer of capital, as a market for industrial products, and as a producer of exports whereby needed foreign exchange has been obtained. Agriculture's contribution of surplus labor to urban industries, however, through other eyes, might be counted as an urban contribution to the relief of unemployment and underemployment among the surplus farm population. Moreover, except for the reaper, most of the machines associated with the technological revolution in agriculture were invented by urban folks.

Agriculture, Today and Tomorrow is reviewed by Secretary Orville L. Freeman in the fifth and last lecture of the series. Goals and challenges for agriculture are discussed in relation to "the scientific and technological revolution that dominates the age in which we live." One of the main goals discussed is an "adequate" or "fair" reward for farmers, whereas in the United States today "the average per capita farm income is less than half that of the non-farm population." This comparison suggests another challenge, namely to develop a more meaningful comparison in terms of relative well-being. The cost to city folks for eggs, potatoes, and tomatoes of equal nutritional value is considerably higher than for farmers, housing costs more, and the cost of travel to and from work is far greater. Consequently they need a considerably higher money income (net after paying taxes) to live as well as farm families do.

Arthur G. Peterson

Sample Design in Business Research.

By W. Edwards Deming. John Wiley and Sons, New York. 1960. 631 pages. \$12.

EVERYONE engaged in statistical surveys will benefit from the many new ideas for enhancing the effectiveness of sampling techniques given in this book. In the main contribution alone the survey statistician and research worker is given reason enough to keep the book for ready reference, because only here can one find the statistical and practical advantages of the "replicated" sample design given in useful form.

For statisticians there is a veritable laboratory of subject matter in household and business inquiries, inventory control, auditing, and related

fields. For nonstatisticians there are lucid explanations of methods for working with difficult populations and for recognizing and handling errors from nonsampling as well as sampling sources.

The 21 chapters are well indexed and organized into three parts on standards of statistical practice, replicated sampling designs, and some theory useful in sampling. Statistical workers as well as teachers and students will be interested in the excellent examples at the end of each chapter and the explanatory appendices for use in setting up field operations. Reference citations are conveniently placed at the bottom of the page where used and provide a thorough background of standard works in sampling. Former associates of Dr. Deming will recognize the author's tireless efforts to improve the quality of surveys and the application of sampling techniques.

The concept of the multiple discipline for combining the efforts of the sampling statistician with those of subject matter specialists is emphasized with specified duty standards and responsibilities for each. This concept is often attributed to the field of operations research. The responsibility for selecting the proper statistical theory is assigned to the statistician; nonsampling errors largely to the subject matter specialist. Problems of field conduct and interviewer supervision are shared by both. The final task of analysis and use of data as an aid for decision-making is not specifically assigned, but the need for executive participation and additional consultants as required is implied.

The project director, administrator, or legal counsel benefits from a refreshing simplicity and clarity of methodology which may otherwise have been ostracized by technical theory and intricate formulation. If there has been need for a breakthrough in sampling to overcome objections from workers demanding more simplified designs, it has now been provided. Dr. Deming has greatly expanded the area of application of the sample and introduced shortcuts and savings to many business operations. In legal evidence the advantage of the sample is demonstrated by a comparison of the operational error in the complete coverage with the sample estimate of error.

Statistical workers familiar with experimental designs and the construction of replications for the purpose of reducing error variance by elimi-

nating heterogeneities through the analysis of variance will recognize the inherent advantages of the "replicated design." They will also be interested in the method for balancing the number of replications against the size of replication.

Viewed as a statistical device borrowed from experimental designs, the concept of the replication for purposes of data collection has had more than a century of use in European agricultural research, such as Rothamsted, England. It is only through bold application of actual survey experience as projected in this book that its usefulness is transferred from the experiment to the survey problem. The use of other experimental designs for stepping up precision and reducing survey costs is also implied and stimulated. More work is needed to overcome a problem concerning statistical inference with regard to population estimates derived from the experiment as distinguished from those of the survey. In time, we might see more use of the general concept of the experimental design, substituting the experimental "treatment" for the "multi-stage" technique, and arranging primary sampling units according to the latin-square or incomplete block factorial. Dr. Deming has projected the experimental device with a zeal that should achieve great progress in the conduct of surveys. He has set the stage for utilizing more of the theory of the experimental design in the survey technique.

The book provides excellent material for use in a practical course in sampling. Part II on sampling practice and part III on sampling theory are especially comprehensive. Supplementary reading in the books by Hanson, Hurwitz and Madow, by Cochran, by Yates, by Sukhatme, and by Mahalanobis is recommended for this purpose, particularly on the subject of multi-stage and cluster sampling. Dr. Deming pointed out in his preface that the book was not intended to displace such standard references.

Much valuable assistance is offered for surveying the elusive or difficult-to-reach universe, especially for cutting through complicated stratifications. Some gifted statisticians may feel that the replicated design does not quite match up to the savings which their mathematical abilities could produce through expert application of the cost function and disproportionate sample allocations for minimizing the total survey cost for a

specified precision goal in the multi-stage situation. For these specialists, Dr. Deming points out that the aim of the book is not limited to statistical and cost considerations and therefore does not guarantee the best possible job of mathematical optimization or of developing "glistening examples of efficiency." Advantages which tend to offset gains available in the more complicated designs are (1) a self-weighting system which is so helpful where computing resources are limited, (2) advanced standards of statistical practice to introduce proficiency in the entire job as well as in the design, and (3) the concept of "equal complete coverage" useful for isolating causes of error not attributable to sampling.

Otto Rauchschiwalbe

An Essay on Trade and Transformation.

By Staffan Burenstam Linder. John Wiley and Sons, New York. 167 pages. 1961. \$5.

THE THEORY of international trade is in the process of undergoing a thorough evaluation and reformulation. This book represents the most recent and perhaps most significant effort to reappraise the validity of traditional trade theory in analyzing the effects of trade under modern economic conditions. It is nothing less than a careful and provocative reevaluation and reformulation of accepted international trade theory.

The theory of international trade can be divided into three distinguishable but interrelated parts—welfare theory, the theory of international trade and economic structure, and the balance of payments theory. This study deals only with the welfare and structural aspects of international trade.

Historically, analyses of the welfare and structural aspects of international trade generally have concentrated on the effects of the opening up of trade under the assumption of a given level of resources of factors of production. The effects of changes in factor prices on factor totals—usually assuming a positively sloped supply curve—has been joined on to the pure reallocation analysis. This approach has led trade theorists to discuss the effects of trade on welfare and economic structure in terms of a comparison between a hypothetical pretrade situation and the situation which emerges when trade has been opened up and the factors of production have been reallocated. The

more essential task of studying the impact of trade on the process of growth and stagnation has received scant attention.

Professor Linder has endeavored to go beyond the reallocation approach to analyze the process of economic change through time under the impact of trade. In so doing, he distinguished between the effects of trade on underdeveloped countries, on the one hand, and on growth countries on the other hand. In his analysis of the process of transformation under trade, Professor Linder has departed from the traditional approach of concentrating on differences in the supply of factors of production by emphasizing the importance of differences in production functions—differences which, in turn, are generated by international differences in demand for the various tradable products.

The result is a new understanding of the major factors affecting the structure of goods produced and traded by countries and of the effects of trade on factor prices. This understanding is based on conclusions which are often different from—and sometimes diametrically opposed to—the conclusions derived from the conventional approaches to these problems.

This book makes a significant contribution to economic theory by throwing new light on a wide range of imperfectly understood problems of economic growth and development. The discussion of traditional trade theories and their inadequacies with respect to the effects of trade on underdeveloped countries is of more than academic interest, and should provide a new analytical approach for assessing the effects of trade on developed, as well as underdeveloped, countries. This subject is of utmost practical importance to current "free world" political and economic objectives.

This book should serve as an excellent reference or supplementary text for students of international trade and economic development with adequate training in economic theory. Its usefulness is not limited to those with formal training in mathematics—Professor Linder endeavors to keep mathematics to a minimum. New ground broken by this book should stimulate further research, the success of which will testify to the long-run contributions of this apparently significant piece of work.

Arthur B. Mackie

An Economic Study of Small Farming in Jamaica. By David Edwards. Institute of Social and Economic Research, University College of the West Indies, Kingston, Jamaica, W. I. 370 pages. 1961. \$4.

HOW CAN studies of type-of-farming areas in newly developing countries be conducted efficiently to indicate the real needs of farmers for assistance to rapidly increase agricultural production and income? Some type of sample survey of farms is required. This detailed report presents the experience and results of a recent farm management study in Jamaica. It is one of the few reports of such studies generally available to agricultural scientists.

Dr. Edwards, with the aid of three full-time fieldmen, conducted a survey of 87 small farms—less than 25 acres—in nine different parts of the Island by making eight visits to each farm during a year. From 27 of the farms weekly receipt and expense data were also obtained with the part-time help of 20 additional persons living near the farms studied. In the nine chapters comprising the first half of the book, a great deal of information about the farms is presented, including inputs used, production, and income estimates. An essential chapter on methodology describes the sampling procedure among other matters.

The remaining four chapters, which discuss the possibilities for change, are the most interesting and valuable part of the work for those concerned with agricultural development. Most of these chapters take up the farmers' reactions to improved practices suggested by the local agricultural officers. An amusing example follows: "Plant coconuts so that part of the nut shows, not completely underground." The farmer rejected this because if the nut could be seen lying in the ground, his neighbors, his family, or he himself might eat it!

Dr. Edwards concludes his discussion of the farmers' entrepreneurial behavior by stating that given the social and economic environment, he felt the farmers' refusal to adopt most of the improved practices suggested was sound, especially as there is little local experience to demonstrate the economic validity of the practices proposed.

This farm management survey illustrates a kind of study desperately needed for the different type-of-farming areas in newly developing countries. Such a survey is particularly valuable in

helping to understand the institutional environment in which farmers operate.

Surveys are largely limited by their nature descriptive presentations of conditions as they are. Information for the economic analysis of farm decisions concerning possible changes in enterprise combinations, type of technology, profitable levels of inputs, and so on, cannot be obtained successfully with the survey approach. Work in input-output analysis of enterprises and in farm budgeting is required as a complement to the necessary descriptive studies of type-of-farming areas, such as this Jamaican study, if farm operators are going to have the needed information to improve their income and thus aid the agricultural development of their country.

Dr. Edwards gives an excellent report of his work; it could provide guidelines for other studies of this nature. On the basis of conducting similar studies, however, the cost of this particular study in terms of man-power this reviewer feels was excessive. Careful attention was paid to land tenure and possible sources of capital, yet it is regretted that other parts of the institutional environment of the farms were not given more detailed exploration. These might include market outlets, price trends, and alternative job opportunities.

Aside from the undoubted value of the book for those interested in Jamaican agriculture, this work is a good example of the information which can be obtained in underdeveloped areas by carefully designed farm management surveys. Researchers and graduate students concerned with designing surveys in underdeveloped areas will find this thorough and well-presented study particularly useful.

Robert D. Stevens

Fruit and Vegetable Juice Processing Technology.

By Donald K. Tressler and Maynard A. Joslyn, in collaboration with a group of specialists. The Avi Publishing Company, Inc., Westport, Connecticut. 1,028 pages. 1961. \$19.75.

FRUIT JUICE has gained sharply in popularity among American consumers during the last two decades, to become the leading form in which processed fruit is eaten. In 1961, fruit juices—canned, frozen, and chilled combined—comprised about 60 percent of all processed fruit

consumed, fresh equivalent basis. Underlying this strong upward surge in consumption and related output were striking advances in processing technology. It is this that constitutes the core of the book under review.

The volume—*Fruit and Vegetable Juice Processing Technology*—supersedes one published in 1954—*The Chemistry and Technology of Fruit and Vegetable Juice Production*. The present work includes new subject matter as well as the more recent developments in juice processing technology. It covers juice manufacture work abroad and in the United States. Its 30 chapters are the work of 25 fruit and vegetable specialists in collaboration with the authors.

Following the first chapter, which deals with the historical and economic aspects of juice production, are 18 chapters that cover such general matters as chemistry and characteristics of juices; methods of juice extraction; concentration; flavor retention and quality control; and standards and regulations. The next nine chapters are concerned with the processing and handling of individual and closely related groups of fruit juices, and the final two chapters give similar treatment to vegetable juices. Each chapter ends with an extensive bibliography.

The comprehensive nature of this book and the fluent style of its writing make it a volume that should draw attention of readers far beyond the realm of fruit and vegetable juice processors. The latter, of course, will find it of much interest and value as a source book on the many complexities related to fruit and vegetable juice manufacture, preservation, storage, and handling. Investigators and research people in this field have here a needed and useful reference book.

Economists will find the first chapter of special interest for the many statistical series and charts depicting the growth of the fruit and vegetable juice economy. But the interest of the economist extends to such important matters as kinds and varieties of fruits and vegetables suitable for processing into juice, yields of juice per unit of raw material, quality of product, storage life, deterioration in storage and handling, nutritive value, palatability, and consumer acceptance, all of which are covered in succeeding chapters. Even the general public should find this book of interest, especially for information on particular fruit juices and processing methods.

Ben H. Pubols

The Growth of Cotton Fiber Science in the United States.

By Arthur W. Palmer. The Smithsonian Report for 1960, pages 473–508 (with 8 plates). Smithsonian Institution, Washington 25, D.C. 1961.

COTTON production had its beginnings long before the dawn of the Christian era, but only within the last 50 years a new science of textile fibers has evolved. It combines the classic disciplines of physics, chemistry, biology, and mathematics. This monograph pays tribute to the leadership of Dr. Robert W. Webb in this technological advance in the United States. Dr. Webb's life work has yielded a systematic understanding of the behavior of fibers in mass. The author, former Director of the Cotton Division of the Bureau of Agricultural Economics, held many posts in Government, the last, before his retirement in 1954, General Secretary of the International Cotton Advisory Committee.

Cotton, the author points out, is a strangely inscrutable commodity; it gives up its secrets reluctantly. The difficulty of understanding it grows out of its own complexity.

Dr. Palmer points out that cotton fibers in a bale are never uniform. Always the mass of fiber is a conglomerate of many diverse properties, commingled in a myriad of permutations and combinations. It is these characteristics as well as the physical interaction of fibers of one type against those of other types which govern the properties of the manufactured cloth.

In addressing the National Cotton Congress in 1940, Dr. Webb pointed out that the range of overall cross sections of cotton fibers based on the minimum may vary as much as 4400 percent, the wall thickness 4300 percent, and the fiber length may be as much as 4000 times its width.

To further complicate the general problem, cotton fibers attract and release moisture, causing continuous readjustment to changes in atmospheric humidity, varying their apparent length and the tenacity with which they cling to other fibers when spun into yarns. All these complexities resulted in confusion and controversy and they made it doubly difficult for manufacturers to meet the demand for rigid specifications.

Fifty years ago studies were undertaken in the United States to fix standards of cotton grades. But early efforts to find definite relationships to

known and accepted constants became bogged down in a morass of conflicting results. Such was the unhappy state of affairs in the cotton industry when Dr. Webb was chosen by the Cotton Division of the former Bureau of Agricultural Economics to launch an entirely new attack on these basic problems.

After two years of preparation, a scientific staff was recruited and research facilities were set up. But the apparatus most important to the project did not then exist. That was an instrument for the separation and arrangement of individual fibers in orderly arrays according to length. Dr. Webb designed a fairly simple apparatus which was constructed by Alfred Suter, a manufacturer of scientific equipment. The Webb patent on this invention was immediately dedicated to public use. It was the Suter-Webb Duplex Fiber Sorter.

After the crop failure of 1931, deficiencies in quality resulted in cotton goods being rejected and returned to manufacturers. One frustrated producer enroute to a meeting of the American Society for Testing Materials in New York stopped in Washington and induced Dr. Webb to accept a last minute invitation to attend. Dr. Webb was called on to say a few words at the end

of the night session after all of the programmed papers had been presented. The group was electrified by what he had to say and the meeting continued until the early morning hours.

In experiments conducted later, very fine Sea Island cotton fibers were cut to different lengths and commingled in proportion to those of the bread-and-butter upland cottons naturally grown. The yarn so produced from the cut mixtures was found to be 50 percent stronger than comparable yarns spun from the coarser upland cotton of the same length. This was a fundamental breakthrough because the importance of fiber fineness to yarn strength had not previously been understood and appreciated in connection with upland cotton.

The data produced with the Chandler Strength-Tester, which had been developed in Dr. Webb's laboratories, and through other means enabled Dr. Webb to construct a set of basic equations for predicting cotton processing performance and product quality. Dr. Webb's experience in searching out the unknowns in cotton fiber technology and his pioneering in the application of basic data brought new thinking to a great industry.

B. P. Rosanoff

Selected Recent Research Publications in Agricultural Economics Issued by the United States Department of Agriculture and Cooperatively by the State Universities and Colleges¹

BARNHILL, H. E. RESOURCE REQUIREMENTS ON FARMS FOR SPECIFIED OPERATOR INCOMES. U.S. Dept. Agr., Agr. Econ. Rpt. 5, 31 pp. Feb. 1962.

This is a second progress report to determine the minimum complements of resources needed to enable farm operators on given types of farms in selected areas to achieve specified levels of earnings for their labor and management. Eight types of farms were budgeted for 4 levels of operators' earnings in 15 selected areas. The budgets describe resource requirements for efficiently organized farms making full use of improved practices and available technology.

BLASE, M. G., AND TIMMONS, J. F. SOIL EROSION CONTROL IN WESTERN IOWA: PROGRESS AND PROBLEMS. Iowa Agr. and Home Econ. Expt. Sta. Res. Bul. 498, pp. [275]-324, illus. 1961. (Econ. Res. Serv. cooperating.)

Presents methods of research and findings that show (1) extent of soil erosion in process in western Iowa, (2) factors affecting rate and extent of soil erosion, (3) indications of how erosion control may be made more effective.

BREIMYER, H. F. DEMAND AND PRICES FOR MEAT: FACTORS INFLUENCING THEIR HISTORIC DEVELOPMENT. U.S. Dept. Agr., Tech. Bul. 1253, 108 pp., illus. Jan. 1962.

Study measures the influence on beef, pork, and lamb prices of consumer income, supply of meat, price level, and other price-making factors. Production of meat in the United States increased at a rate of only slightly over one-half of 1 percent per year between 1901 and the 1930's. Its increase accelerated to 2 percent per year from the 1930's to date. The study reports the rapid increase in the economic value of meat accompanying the growth of the total economy during the last 40 years. The record for beef is especially favorable, that for pork less.

BROWN, L. R. AN ECONOMIC ANALYSIS OF FAR EASTERN AGRICULTURE. U.S. Dept. Agr., For. Agr. Econ. Rpt. 2, 50 pp. Nov. 1961.

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