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BOOK REVIEWS

Long Term Projections of Agricultural Supply and Demand: Australia 1965 to 1980. By F. H. GRUEN and others. (Monash University: Department of Economics, 1967.) 2 Vols: pp. 587, \$12.00.

These two volumes give a detailed account of the projections of Australian agricultural production and trade to 1980 prepared by a Monash University team for the United States Department of Agriculture. Methods, assumptions and data used in the analysis of domestic demand and supply and of international price formation are set out with admirable clarity. Although in places rather novel and sophisticated quantitative techniques are used, obfuscating displays of econometric virtuosity have been rigidly abjured. Hence this book can be profitably read—indeed is being read—by less numerate economists and laymen.

Following a comprehensive summary and introduction, the underlying projections of population and income growth in Australia, with upper and lower limits, are described. Forecasts made by Borrie and Rogers, appropriately extended, are used in respect of population. Evaluation of such factors as mineral discoveries and improved national economic management and international comparisons lead the authors to predict a "most likely" growth rate of GNP between 1965 and 1980 of four and a half per cent per annum.

Chapter IV analyses Australian post-war demand for all main farm products with the exception of wool and sugar. Wool is considered separately in Chapter IX, while sugar was not included in the U.S.D.A. specification. Retail demand by broad commodity groups (food, clothing, vice) is firstly analysed in the framework of a complete additive preference demand model. In the second section a hybrid model derived partly from Pearce and partly from Leser, and employing a predetermined value of Frisch's money flexibility, is used to obtain a demand elasticity matrix for broad commodity groups within the food sector. The greater part of the chapter, however, is devoted to an analysis of demand for individual commodities, using more familiar single logarithmic equation models. The statistical analysis of demand for each commodity is accompanied by documentation and verbal explanations of trends. The authors, moreover, make sensible use of similar studies made both in Australia and overseas. Such amplification is valuable, particularly in the case of commodities such as liquid milk or butter where meaningful statistical results were not obtained, or commodities such as cotton or poultry meat where available data did not allow statistical analysis. The demand models at different levels of aggregation are of interest not only as bases for the ensuing forecasts, but also in their own right. The three groups of models, however, might perhaps have been more thoroughly integrated. Assuming constant retail prices, forecasts of domestic demand are then made for 1970, 1975 and 1980.

Chapter VI is the most interesting from a methodological point of

view. An ingenious six sector supply model is developed (comprising wool, lamb, wheat, coarse grains, beef and dairying). The model makes operational the well-worn teaching device of the production possibility curve to estimate partial elasticities of transformation (assumed constant) between competing sectors with respect to expected prices. Appropriate shifters of the transformation curve are built in to represent the influence of past investment, induced and autonomous, technology and drought. The elegance and computational economy of this model will surely ensure its wider use. Supply of other commodities outside the six sector complex is analysed by single equation models or verbal argument.

The six sector supply model reappears in the next chapter in a predictive role. Constant prices are again basically assumed but prices are made to vary stochastically around the assumed level, as also are an index of drought and other exogenous variables, by Monte Carlo methods. Projections are made first in decision units (e.g. acres, adult sheep) and are then converted to natural commodity units by yield trend equations. In forecasting supply of other commodities at constant prices more traditional methods are again used.

In the next chapters the "balance sheet" approach is used to forecast future world prices. Demand and supply forecasts assuming constant prices are first made for major regions. (Except for wool quite crude methods are used, but thorough use is made of previous studies, particularly by F.A.O. and U.S.D.A.) Future prices in the forecast years are then predicted according to imbalances between forecast export availabilities and import requirements. Wool is given a more thorough treatment in a separate chapter.

The final stage of the analysis consists of reworking the Australian production and consumption (and therefore trade) projections in the light of the predicted world prices. Inevitably many intuitive judgments have to be injected at this stage.

The actual projections of production and exports are broadly in line with common opinion, though some may think their beef forecasts too conservative and their wool forecasts over-optimistic (with the benefit of hindsight it seems the forecast expansion of synthetic wool type fibres may well have been too modest).

In general this work is a model of how such projections should be made. The besetting sins of most such efforts are scrupulously avoided. "Guesstimates" are not overly rationalized or glossed over; the authors have been prepared to state most likely outcomes; most recent data has been incorporated; and econometrics and judgment are combined in an intelligent and lucid way.

Such criticisms as can be made are either trivial (the absence of percentage changes in most of the tabulated projections), unfair in the light of the constraints of data and specification (scant treatment of marketing margins) or a matter of individual judgment (the perhaps excessive influence ascribed to margarine quotas).

Rather, the authors are to be commended on a most useful piece of applied research which will undoubtedly enhance the status of economists, particularly in the business community but also among farmers and agricultural scientists.

I. M. STURGESSION

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Studies in the Development of Agricultural Economics in Europe. By J. Nou. (Uppsala: Almqvist and Wiksell, 1967.) Pp. 611.

The connotation given to agricultural economics varies from author to author. In its strictest meaning it is simply the application of the theory of economics to one sector of the economy. In this sense it has no separate life as a scientific discipline at all. This is not to say that the study of the agricultural sector has not been important to the development of economics: it clearly has. Many of our present concepts can be traced back to the Physiocrats (Adam Smith called Physiocracy the Agricultural System): e.g. the circular flow, the net product, input-output analysis, and national income analysis and (if we count Turgot as a Physiocrat) we can include the law of returns to variable proportions. The fundamental importance of agriculture in Classical Economics is reflected in the controversy over the nature of rent and the abolition of the corn laws; the position of agriculture for Smith in the hierarchy of investment; the principle of population; and the stationary state. By contrast, Neo-Classical Economics was little interested in agriculture, though in Germany the name of von Thunen reminds us of other contributions to economic theory coming from the study of agriculture in the 19th century. In the last fifty years, however, especially in the United States, agricultural economics has become an important discipline in its own right and it has probably expanded the horizons of economic theory in such areas as demand, production functions, and, more recently, development economics. It would be a fascinating study to investigate the extent to which the study of agriculture has enriched economic analysis. But this is not to admit that there can be a history of agricultural economic theory which is separate from the history of economic thought and can be studied apart from it. Or agricultural economics might be taken to mean the historical study of the gradual application of disciplined thought by economists (and others) to the economic problems of agriculture. It would be of great interest, for example, if we had for Australia a study like Goodwin's *Economic Enquiry in Australia* applying to the more limited area of the agricultural sector. A scholar studying a particular sector like agriculture finds he is, however, tempted to go well beyond the strict bounds of economics and it is well that he should do so. Perhaps this explains why the term agricultural economics is often given a very extended meaning. This was the case, for example, with the Taylors' *Story of Agricultural Economics in the United States*. It is also true of the area covered by the book by Nou being reviewed here. Nou covers a very wide area in his book including such topics as agricultural history; agricultural geography; types of farming, farm intensity, and location of different types of agricultural production; family and peasant farming; valuation of farm assets and real estate; rents; labour and capital as farm inputs; productivity and productivity measurement; farm records, farm accounting, farm management, the farm as a business unit, and farm planning; and agrarian policy. In Nou's book the discussion of these topics is not drawn together in individual sections but is distributed under the various authors and by different countries.

After a preliminary chapter, Nou refers to the existing history of agricultural economics in Europe and provides a bibliography for those

wishing to pursue their studies further. This is followed with a chapter on the Physiocrats and a chapter on Arthur Young. He then devotes three long chapters to the development of agricultural economics in Germany giving special attention to Thaer (1752-1828) and to Thunen (1783-1850) and their many disciples and to agricultural economics in the first half of the twentieth century. There follows a chapter dealing with "the emergence of an independent agricultural economics tradition in Switzerland during the first half of the 20th century" and another covering developments in Italy for the same period. The following chapter is of special interest dealing as it does with the development of a special family farm doctrine in Russia during the first three decades of the 20th century. The final chapter takes the form of a summary.

The book is almost encyclopaedic in its coverage: there are well over 700 names listed in the index. But there are some unexpected omissions. As far as England is concerned there is a chapter on Arthur Young, but there is no discussion of Sir James Steuart (see, for example, S. R. Sen, *The Economics of Sir James Steuart*, Chapter 5) and no reference to the discussions by the Classical Economists that could surely be classified as "agricultural economics". There are very few references—and those only in passing—to later work in agricultural economics in England. The chapter on the Physiocrats is disappointing. Perhaps List might have warranted a mention in the chapters on Germany if only because of his views of the place of agriculture in the national economy. But a very large number of authors are mentioned: an Australian is hardly in the position to evaluate the list. But he is entitled to offer some critical comments. There is very little history of economic or other types of analysis in the strict sense. The book tends to be a catalogue of names, schools, and publications and the contents of publications. The book is very learned: but it is doubtful if it could be called a work of scholarship as I understand the term. As a book it is dull. Perhaps it is best to describe it as an annotated bibliography: as such it is no doubt very useful and a worthwhile contribution.

JAMES P. BELSHAW

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Individual Freedom and the Economic Organization of U.S. Agriculture.

By F. BREIMYER. (Urbana: University of Illinois Press, 1965.)

Pp. 314, \$US6.50.

In this graphic account many readers will recognize a drama familiar, though with an American accent. Family Farmer, the hero, is threatened by Vertical Integrator, the villain. Long on the scene, VI's threat is suddenly sinister because of help from Horizontal Combination. Price elasticities declining in demand and increasing in supply favour VI and HC, especially toward the retail end of the marketing stage. Increasing market dependence exposes FF to blows from all directions. Will FF survive? Should he? If he should, how can his survival chances be improved?

Some hold that FF can defend himself if rules of conflict give him a fair go. Economic freedom generates social optima and survival of institutions necessary thereto. The author cites the historic coincidence of

Adam Smith's tome and the American Declaration of Independence. He ascribes less importance to the predictive accuracy of Smith's logic than to abundant land in the new continent. While the fragility of the family farm was masked, however, its benefits became evident: it is versatile, proficient and responsive to challenge (especially from nature); it accords with "democratic values" (more "complete" individuals are produced); it tolerates varied managerial skills and is relatively free of the *internal* conflict which mars industry.

To view FF's demise as inevitable is to court an industrially-directed agriculture. Its benefits are described in Earl Coke's glowing promises: it would rid U.S. agriculture of chronic over-production and low prices, be more responsive to the market and increase mobility of capital and labour. Those who have struggled with stubborn policy problems of the past thirty years will not ignore such promises.

Hired labour would replace family labour; there would be capital from outside agriculture and capital from within, large farms and public experiment stations in research. Land ownership would shift to non-operators and management would be supplied by professionals. Views will vary on such "costs", but Dr. Breimyer's views are clear. For example, transfer of land ownership, relieving farm operators of financial requirement and risk of ownership, would deny farmers benefits from land values increased by technical progress. Capital gains can substitute and have substituted for low current income.

But the principal cost is loss of the farmer's individual freedom. The concept of freedom is discussed with unusual care. Evidence is cited that denies integrated broiler producers feel they have lost valued freedoms: integration, however, destroys markets, thus denying alternatives to non-integrated farmers. Integrated farmers, too, lose an outlet important at least in bargaining. To infer a welfare increase from acceptance of contracts is only part of the story if a commodity market is displaced.

It is difficult to reveal in brief all the careful qualifications modifying the author's conclusions. He does not argue naively to save the family farm whatever the cost. His plea is to include freedom and dignity among outcomes. When these are assigned positive values the family farm becomes supportable even if some sacrifice in efficiency is necessary, though the equilibrium in trade-off is not identified.

Recommendations are: Publicly-supported education to improve managerial skills of farmers; and co-ordination in procurement of supplies, including loans, and in sale of products, including wider use of marketing orders and bargaining associations. The author holds co-operatives in high regard for their promise in useful response to the challenge. Yet his perceptive discussion on requirements of co-operatives is a needed antidote for excessive claims sometimes made for them.

How likely is an industrially-directed agriculture? Those already alarmed will find Dr. Breimyer's arguments persuasive. Others will describe analogies drawn from the broiler case as too easy. (He does not rest his case on this alone.) It can be argued that broilers constitute a new industry instead of a displacing one. Still others will argue that industrial direction will be substantially retarded if not arrested by the competitive strength of established farmers and the high returns from off-farm investments available to potential integrators. Yet if industrially-

directed agriculture becomes as serious and pervasive an alternative as is suggested by Dr. Breimyer, it is important to consider all relevant outcomes. Dr. Breimyer reminds us with sober analysis that individual freedom is among them.

Those acquainted with Dr. Breimyer's articles and public appearances will not be surprised to find a high quality of literary content. Useful for professional economists and graduate students, the book has wider appeal. It can be read with ease and profit by farm leaders and others with policy responsibilities, as well as by interested citizens. It will be fascinating to those in other countries who view U.S. agricultural policy with concern, morbid interest or simply amusement.

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A Manual of Australian Agriculture. Edited by I. MOLNAR. (Melbourne: Heinemann, 1967.) Pp. 867, \$17.50.

The second edition of this well established manual has been expanded to include sections on wines, farm electricity and more on tropical pastures. As well, most tables have been updated to 1963/64. In fact, little new of any significance has been added.

The work resulted from a vast effort by its editor, Dr. Molnar, who engaged the skills of well over one hundred local specialist contributors. The major sections are devoted to pastures, crops, livestock feeding and breeding, husbandry and disease control, fertilizers, climatology and irrigation. A "miscellaneous" section contains information on trees, land values, marketing, share farming and a glossary of economic, legal and statistical terms.

It is appropriate that the first section of a manual of Australian agriculture should be climatology. However, the subject has been treated in a very superficial manner (6½ pages of a total of 840). The information is of very little practical or prescriptive value to either the production economist, the economic policy adviser, the farmer or the extension worker. A fuller discussion of drought, climatic variability, rainfall probabilities and the role of temperature and water in both our southern and northern agriculture is surely warranted.

The soil and fertilizer section deserves similar criticism. Though quality is not a function of the number of pages written, mention should have been made of the outstanding achievements of Australian agricultural scientists in such fields as: 1. Determination of the nutrient status of the major Australian soil zones and types; 2. Establishing input-output relationships of fertilizer with crop and pasture production; 3. The trace element "revolution" and its effect on pasture and animal production. The manual's main comment on trace elements is that "trace elements are commonly applied with many times their weight of superphosphate".

The chief emphasis in the pasture section is taxonomic. However, some space is devoted to agronomic aspects of the main species, together with general recommendations on their establishment and uses. Even though local research into stocking rate has provided the Australian livestock industry with one of its most important technological develop-

ments of the past fifteen years, little mention has been made of even the broad findings in this field.

Each of the cultivated broad-acre crops is systematically and fairly fully discussed under the headings of 1961-63 Australian acreage and yield, general description, cultivated species, pests and diseases, cultural methods, harvesting, uses, marketing, main regions of production by sales, and world statistics.

Fruit crops are even more thoroughly described; there is also a detailed section on horticultural pests and diseases, with recipes for control. (With the rapid developments occurring in the agricultural chemical industry, such recipes can quickly date.)

Livestock management, diseases, breeding, feeding and husbandry occupy three hundred pages of the text. From the economist's and extension worker's point of view far too much attention has been given to the disease aspects—the Vets seem to have been given their head! If it were considered appropriate to refer the reader of the climatology section to publications of the Bureau of Meteorology for further information, there seems no reason why he similarly should not have been referred to one or other of the very good Australian texts on animal diseases.

The genetics and breeding section is well written and has sufficient quantification to be of value to the farm management consultant or economist.

The livestock feeding chapter ought to be one of the most valuable in the book for the farm economist, as livestock nutritionists have long been interested in input-output relations and diminishing returns. Unfortunately, a good deal of this work is out of date—no reference is made to the work of Wallace, Lambourne, Hutton, Coop and others who have worked with the grazing intake and energetics of animals at pasture. Heavy reliance in the dairy section is placed on Hewitt's "Feeding Farm Animals", which is based fundamentally on stall feeding. The rations proposed for dairy animals at pasture could be called into question in the light of Wallace's work. The beef cattle feeding section refers mainly to work with stall-fed animals and certainly needs modification to take account of local experience. The wool segment lacks discussion on the factors contributing to fleece weight (disease, nutrition and genes); also no mention is made of the importance, cause and prevention of wool faults.

A nice balance of basic principles and sound practical information is a feature of the machinery section. The irrigation component has a detailed discussion on layout, types of irrigation, techniques and structures, and importance of stream flow, but lacks detail on techniques for predicting crop and pasture moisture needs from soil and climatological data. Spray irrigation is also treated too briefly, and some mention of the general economics and benefits of irrigation would not have been out of place. I fail to see the need for prescriptive comments of the kind given on p. 762, viz. "June and July—clean and top up channels. Repair fences and machinery. From manure bags make sheets to cover [hay] stacks and bag stops for channels".

The discussion on fencing takes little account of the major advances in cost-reducing fencing techniques developed over the past decade.

In summary, the manual is a convenient source of information on the technical aspects of a wide range of Australian agricultural industries. The agricultural economist and farm management worker may find it handy. It is certainly not an "essential tool of trade" because it is neither up to date on many of the important technological aspects which underlie sound economic and farm management decisions, nor does it treat other aspects, especially climate, fertilizers, plant-animal, plant-soil and soil-water relations, in sufficient depth.

J. P. MAKEHAM

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Agricultural Policy in Britain: Selected Papers by E. F. Nash. Edited by G. McCRONE and E. A. ATTWOOD. (Cardiff: University of Wales Press, 1965.) Pp. 168, 21s.

E. F. Nash was Professor of Agricultural Economics at the University College of Wales, Aberystwyth, from 1946 until his death at the age of fifty-eight in 1962. Nash's absorbing interest was British agricultural policy and the theme which runs through much of his work is an emphasis on the need to formulate policies based on the true economic interests of the nation. This book takes the form of a collection of some of his writings drawn from a variety of sources and representing some of the foremost contributions to the development of thought on this subject.

Nash belonged to that relatively small but distinguished school of liberal agricultural economists who raised up their voices in opposition to the protectionist agricultural policies which took shape in Britain in the post-war years. In these papers he sets out with admirable clarity the reasons why, in the long run, such policies are doomed to create more problems than they solve. With almost surgical precision he dissects the various arguments advanced for subsidizing farm prices and lays bare their basic fallacies. In Nash's own words (p. 27):

"The fatal defect of a protective system is that it conceals from farmers and landowners the information necessary to determine what kinds of output are most valuable and which productive systems are most efficient. The only kind of price system which escapes this defect is that of the free and unprotected market. Payments for productive effort must be made according to the value of the effort and must not be influenced by the desire to alleviate hardships or the conception of a 'just' reward."

Despite the logic of the point of view which was put forward by Nash and a few other economists, a study of recent agricultural history in Britain reveals that their warnings went largely unheeded by the policy makers. The limits eventually imposed on the extent of protection afforded to British farmers were set primarily on the basis of political expediency. A direct subsidy bill of about £350 million sterling (\$700 m.) appears to be the maximum that is politically acceptable. Thereafter support takes less direct forms, such as import controls and tariffs or, in the case of milk, minimum retail prices. As Nash predicted they would, these policies are beginning to reap their own rewards. For

several products embarrassing surpluses are beginning to appear. For other commodities further expansion of production, which present price levels and advancing technology imply, can only be absorbed by breaking tacit or explicit trading agreements with overseas suppliers. British agricultural policy appears to be approaching a cross-roads. The alternatives are continued protection, made possible by extension of production controls and a corresponding loss of freedom by farmers, or else the adoption of the kind of policies advocated by Nash, designed to bring about the agricultural adjustments needed to bring production more into line with the economic and political interests of the nation. It remains to be seen which course will be chosen.

A question which is raised by the past course of events in Britain is how it was that Nash and those who thought like him were unable to convince the policy makers of the logic of their point of view. A complete answer to this problem is not easily found, but a good part of the solution must lie in the astonishing power of the agricultural lobby in British politics. The agricultural economists who opposed protectionism must also be apportioned some of the blame. They showed a remarkable reluctance to put forward workable alternative policies to ease the severe social problems implicit in the radical agricultural adjustments that a policy of *laissez-faire* would have created. In some of his later writings Nash did commit himself in favour of personal annuities in place of subsidies, payable to all those at present engaged in farming and unrelated to future output. This proposal is discussed in two of the papers included in the book. But the idea was developed too late, too sketchily and with too little regard to the political realities of the situation to stand any real chance of whole-hearted adoption. Perhaps there is a lesson here for those Australian economists who advocate a more rational approach in certain areas of policy-making in this country.

This book is an admirable distillation of the contributions Nash made in his chosen field of study. The first paper, *A Policy for Agriculture*, which was originally published in 1960, contains the most complete summary of Nash's views on agricultural policy towards the end of his life. The remaining eight papers were written for a variety of audiences between 1947 and 1960 and illustrate something of the development of Nash's ideas over this time. Topics covered include world purchasing power in relation to food production, the sources of British food supplies, the competitive position of British agriculture, and British agriculture and the Common Market. Several of the papers include useful statistical material, some of which is not readily available from other sources. Unfortunately, some of the earlier papers are now rather out of date. Inevitably, moreover, with material of this kind there is some repetition of argument from one paper to another, together with changes in literary style which can be a little disconcerting. Readers who are familiar with the subject will find little here that is new, since all the papers have been published before, but for teaching and reference purposes they may be glad to have this book on their shelf.

J. B. HARDAKER

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Co-operative Bargaining in Agriculture: Grower-Processor Markets for Fruits and Vegetables. By P. G. HELMBERGER and S. HOOS. (University of California Agricultural Publications, 1965.) Pp. 234, \$US2.25.

Revolving Finance in Agricultural Co-operatives. By H. E. ERDMAN and G. H. LARSEN. (Madison: Mimir Publishers Inc., 1965). Pp. 117, \$US3.50.

It is pleasing to note that research in the U.S. into the economics of agricultural co-operation has passed the stage of "fact finding" and is now being directed towards more narrowly defined problem areas. This transition is partly evidenced by the appearance of the two volumes under review.

Bargaining over price is one of the many functions performed by rural co-operative associations. Co-operatives performing this function in the U.S. are mainly concentrated in areas producing peaches, pears, tomatoes, peas and sweet corn for processing. There has been a realization on the part of the growers of these products that they, as individuals, are producing under conditions of atomistic competition while selling their product to buyers who are operating under conditions which appear to be widely divorced from those of pure competition. In their monograph Helmberger and Hoos present the reader with a detailed economic analysis of the bargaining process within grower-processor markets for fruit and vegetables in the U.S.

The first two sections of the monograph are, out of necessity, rather descriptive. They are devoted to discussing the environmental setting, growth and current status of bargaining associations in the U.S., together with their economic character. Section three is more analytical, however, and is concerned with analysing the consequences of co-operative bargaining within various structural settings in the processing industries, namely pure competition, monopoly and oligopsony. The authors find that a necessary condition for the existence of price gains through co-operative bargaining is the presence of monopoly or oligopsony elements in processor procurement. Close study of competition among processors reveals that this condition is met only in the case of some specialty and minor items, such as soups, where processor concentration is marked and product differentiation provides moderately high barriers to entry. The authors conclude that close competition at the processor level narrowly constrains the extent to which grower prices can be enhanced generally through bargaining. It seems, then, that bargaining co-operatives would not play any significant role in alleviating the "national farm problem".

Throughout the monograph the authors have argued tightly and based their conclusions on valid reasoning. They have provided answers to questions which are of great relevance both to existing co-operatives and to co-operatives which might in the future look to bargaining as a means of increasing farm prices. The reviewer feels that any less formal approach than that adopted by Helmberger and Hoos would give rise to answers in which one could not place great confidence. The work of Helmberger and Hoos is worthy of recognition on two accounts in particular. Firstly, it has attempted to place between the one set of covers answers to questions which have been toyed with in many

journals. Secondly, it significantly discounts the argument often put forward about research into agricultural co-operation, namely that work in this field lacks analytical economic content. Indeed, the reader might well refresh his knowledge of the concept of elasticity, price theory and algebra before reading this monograph.

Erdman and Larsen have investigated a method of financing farmer co-operatives which is rapidly becoming widespread in the U.S. and which is gaining a foothold in N.S.W. Revolving funds is a method of financing whereby members of a co-operative supply capital to their association in some way proportional to the volume of business they do with it, while periodically funds in excess of capital needs are returned to contributors in the order of their contribution. The method has been designed to eliminate the problem of members not carrying their fair share of the burden of financing their co-operative and the problem of control of the co-operative falling into the hands of a few large shareholders.

Four chapters are devoted to the historical development of the revolving fund method of financing. The authors point out that this method of financing was slow in evolving and it was not until the 1930's that it became fairly generally accepted. This section of the book presents the reader with the results of some very basic and clearly time consuming research. However, some readers outside the U.S. may find the first section of the book somewhat uninteresting. Perhaps likely disinterest in this section could have been minimized if only the authors had not drawn on so many specific examples of co-operatives to demonstrate the slow evolution of revolving funds.

The next section of the book discusses the contemporary use of revolving funds and proves to be more interesting reading. In this section the authors' aim is to clear up some misconceptions in regard to revolving funds and the financing of co-operatives in general. It is their opinion that these misconceptions have led to needless problems in farmer co-operative financing. Again the authors have presented the reader with the results of some time consuming research. The reviewer feels that a knowledge of this section of the book would be a great benefit to co-operative leaders, and especially those in N.S.W. where this method of financing is developing. For one thing, the problem of "dry shareholding" seems common in N.S.W. co-operatives and a method of revolving funds financing may help alleviate the problem.

The co-operative movement is older and more widespread in U.S. agriculture than in our own. Similarly, research in this field in the U.S. has received far more attention than in Australia. The publication of the two books under review is timely in so far as we in Australia would like to know as much as possible about the functions and running of co-operatives as research in the field permits. Perhaps their publication is not so timely for us when we consider that very little "fact finding" research into the co-operative movement in Australia has been undertaken. The reviewer feels that the two books would have more to offer the Australian reader if more was known on the basic facts of our own co-operative movement.

R. R. PIGGOTT

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Economic Development of Agriculture. Edited by E. O. HAROLDSON. (Ames: Iowa State University Press, 1965.) Pp. 314, \$US4.95.

This book is the outcome of a three-day seminar organized by the Iowa State University Center for Agricultural and Economic Development. Eighteen contributors "attempted to distil existing knowledge and experience and, where possible, to provide guidelines" for economically rational development of agriculture in underdeveloped countries. The book is designed for use in private and public research and education institutions, by "action-oriented" technical assistance workers and by administrators and policy-makers of underdeveloped countries.

Most of the major issues currently confronting developers are considered. Individual contributions cover the comparative state of play in countries which have and have not recently begun to show rapid progress, the role of agricultural development in the whole economy and external influences on agricultural development (e.g. socio-cultural institutions, trade and industrialization). In particular the book deals with means by which the agricultural sector itself can be expanded. In this last category authors examine the role of traditional and new inputs, incentive pricing, the need for overhauling and replacing institutions, ways of combining the various components of a development programme and, finally, priorities in agricultural development and in research thereon.

The book as a whole is a disappointment but there are some useful individual contributions. A. H. Moseman discusses the impressive results of the Rockefeller Foundation's long term research programme in the agricultural sciences and draws some lessons therefrom. J. F. Timmons provides a sound analytical framework for the study of land tenure problems. There is some interesting data in W. E. Hendrix's Who's Who of countries on the development ladder since World War II, and A. T. Mosher has some attractive suggestions for research on the development process in agriculture.

The book's shortcomings are due for the most part to the paucity of empirical material about primitive and peasant economies, which means that contributors can rarely present a broad but still useful synthesis applicable to diverse situations. Other authors scour the field of theory for applicable generalizations but here too the gleanings are meagre, principally because of the lack of theoretical work on the different types of traditional economies and on the processes of modernization.

Wide generalizations are made by some authors without close reference to particular conditions and where prescriptions follow, these often appear either trite, e.g. J. Blackmore on "Creating Needed Institutions", or highly suspect when considered in relation to particular countries.

There are some apparent differences in views between authors, for example on whether traditional social and cultural institutions always/ generally/necessarily impede economic progress, and again on whether single-solution programmes, such as short-term fertilizer programmes, or package multi-solution programmes are more effective in promoting development. Since no reports of discussions are incorporated these conflicts are not resolved or clarified, so that on some subjects the book speaks with several tongues.

While one can be entirely sympathetic with the aims underlying this

book, it is clear that it has been attempted well before its due time. At this stage of our knowledge an extensive and sustained commitment to *in situ* empirical research in underdeveloped countries is our chief need. Such research should ideally be complemented with an imaginative and primarily inductive approach to the development of economic theory.

R. T. SHAND

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Technological Change: Its Conception and Measurement. By L. B. LAVE. (Englewood Cliffs: Prentice Hall, 1966.) Pp. 228, \$8.60.

Agricultural Development of Taiwan 1903-1960. By YHI-MIN HO. (Vanderbilt University Press, 1964.) Pp. 172, \$US7.50.

Capital Formation in Indian Agriculture. By T. SHUKLA. (Bombay: Vora & Co., 1965.) Pp. 261, \$US6.00.

The role and importance of technological change in the economic progress of underdeveloped countries is the common aspect of these three books. The first is an extensive review of thought to date on the concept and measurement of technological change, together with an elaboration of the application of these measures in some directions. The other two contrast markedly in that the first illustrates the progressive effects of certain types of technological improvement, while the second shows how gloomy the outlook can be in the absence of the implementation of new technology to any material degree.

The recently burgeoning literature on technological change has opened the way for a study such as Lave's, as evidenced by the thirteen pages of bibliography in which the great majority of entries date from 1957. This date is highly significant in that it was the year in which Solow sparked off an explosion of literature with his fundamental paper.¹ Part One concerns different measures of technological change and their application to empirical situations. The author gives a short review of the controversy which followed Solow's exposition and of the important alternatives to this measure propounded before and (the majority) since.

Part Two concerns the impact of the recently developed measures on macroeconomic theory. Particular applications of the concepts to capital, growth and distribution models are summarized and a large number of diverse topics to which the concepts have been found to have relevance are covered. These include international trade, automation, the question of underlying aggregate production functions, and innovations and their diffusion.

The main aim of the book seems to be to provide a comprehensive review of the available literature on all aspects of technological change and this it achieves very efficiently, but the author also makes original contributions, albeit in relatively few places. Thus the effects of errors of measurement on the calculation of technological change are analysed, as is the case for the inclusion of intermediate products as a separate input. In a detailed analysis of the effect of aggregation on the measurement of technological change in United States agriculture the author concludes that this is apparently not a problem. A detailed case study

¹ Solow, R. M. *Technological Change and the Aggregate Production Function.* *Review of Economics and Statistics*, No. 39 (1957), pp. 312-320.

of the problems facing Appalachian agriculture is presented and includes an interesting quantitative analysis of the economic causes behind technological change. This is a departure from the basic approach of the author, who tends to concentrate on the mathematical and statistical aspects of the measurement of technological change and gives little attention to the economic forces which account for the results obtained. A further departure from the main aim is found in Chapter Twelve which discusses the possible dynamic and short-run problems which a developing economy might face with technological change. The final chapter presents the author's theoretical model for studying the effects of interaction between technological change and education on structural unemployment in the manufacturing sector. Overall, the book is likely to serve as a guide to the available literature rather than as a detailed text in itself.

Agricultural Development of Taiwan 1903-1960 is an interesting and significant case study in the successful development of the agricultural sector of a developing country. The study places some emphasis on the role which technological change has played in this development, provides a basic measure of the change, and extends Lave's treatment in that it isolates particular economic causes behind the change.

In the introduction the author clearly and briefly identifies the problems of development facing an underdeveloped country and the strategies suggested by the main theories of development. The hypothesis to be investigated is the one which is found to fit Taiwan's experience quite closely, namely (*pace* Schultz) that significant and rapid growth of the agricultural sector can be attained without drawing heavily on the scarce resources of the underdeveloped economy. This is achieved through the interaction of new, non-traditional farm inputs and the education of farm people in the skills to use them.

The analysis relates changes in output experienced over the period of study to changes in inputs and the size of the residual. Compilation of the required series is at times severely hampered by the scarcity of adequate data, especially in respect of the capital series. For fixed capital trends, for example, the author has to resort to an index of "animal energy in agriculture", and for working capital an index of commercial fertilizers consumed, as approximations. It must be questioned whether these series are, in fact, the best available and that further perseverance would not have uncovered closer substitutes. Nor is it proved that the narrow coverage of the approximations does not lead to significant bias: the intended justification of the approximations by analogy with Japan (pp. 81-82) is not very convincing.

Changes in productivity are calculated and analysed in terms of individual inputs. Use of the factor land over the period has some interesting aspects. Average farm size over the period studied has actually decreased and farms still average only 1.2 hectares in 1960, this providing an argument against the popular belief that agricultural development must be accompanied by a consolidation to larger holdings. While physical area of land in agriculture has remained virtually stable since 1940, total crop area has increased rapidly due to a great increase in the intensity of land use in association with a number of technology-linked factors.

Two chapters are devoted to the measurement and interpretation of

the contribution of various factors to the residual. This proves to be the most significant section of the book and holds the lesson for other developing countries. The emphasis is placed upon the importance of new, non-conventional inputs contributing to the measure of technological change obtained. The measure of technological change used is based on Solow's original 1957 paper. The author identifies the factors inducing this change and analyses them, both individually and considering their interdependence. Among them are increases in irrigation and transportation facilities, varietal improvements in rice and sugar cane, better crop rotation methods, and greater use of commercial fertilizers. Another chapter analyses the effect of rural education and research on farm output, both qualitatively and in the framework of distributed lag models. Rural education, research and extension are seen as underlying co-operative agents to the other non-conventional and conventional inputs, and are essential to give them greatest effect.

The text is supported by clear, concise and relevant tables, and derivation of the data is adequately explained to indicate its limitations. Other more detailed series drawn on in the text are found in extensive appendices.

Capital Formation in Indian Agriculture broadly examines the extent to which a poor economy such as the agricultural sector of India is able to add to the existing stock of physical assets, and of the implication of any growth to movements in other inputs. The period covered is 1920-21 to 1960-61 and the overall impression gained from the analysis is of an agricultural sector barely sustaining momentum, possibly having been saved from complete stagnation by the infusion of life from the Five Year Plans.

Part One provides a rather lengthy theoretical explanation of the supply of and demand for capital, and the effects that changes in supply and demand shifters have on capital formation itself and other capital/input ratios.

The virtual constancy of the capital/labour ratio over the investigation period indicates that capital formation has only just kept pace with the substantial increase in labour supply. A fairly crude measure of technological changes predictably indicates "mild" technological change, a fact borne out by the preponderance of traditional investment in agriculture. Furthermore, since the capital/output ratio has also remained fairly constant, increases in the labour supply have apparently provided the major incentive for capital formation in agriculture. Hence the rate of net investment in durable physical capital during the period 1935-36 to 1960-61 ranged from less than one to a high of only four per cent of net agricultural income.

The major part of the study is devoted to an extremely painstaking preparation of gross and net capital formation series, giving attention to movements of the relevant capital/input and capital/output ratios and particular items of capital stock. The problems of data preparation for Indian agriculture are, as might be imagined, enormous. Changes in state and national boundaries, changes of definition, and simple non-availability are frequently encountered. These difficulties have necessitated numerous adjustment, approximations and splicing of series, but the author has persevered commendably and in most cases has arrived at practically acceptable substitutes, being careful to point out

any inherent limitations to the series given. Where doubt may arise and where possible the author has calculated alternative measures and incorporated them in appendices. Unfortunately this impression of diligence is somewhat marred by recurrent and obvious errors of proof reading and expression ("denomination" for "denominator", "equipments", misplaced commas in the printing of thousands, etc.).

The results of the analysis emphasize the problem faced by the traditional agricultural sector of an underdeveloped economy. The implication is perhaps that the integrated infusion of new, non-conventional, technology-linked inputs would have similar benefits to those in Taiwan. The book should also serve as a valuable and reliable source reference for important capital data.

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Atlantic Agricultural Unity: Is It Possible? By J. O. COPPOCK. (New York: McGraw-Hill, 1966.) Pp. 238, \$US7.50.

Sometimes the most valuable contributions to discussions of agricultural policy take the form not of scrupulously neutral analysis but rather of cogent expressions of a point of view by those with something to say. Coppock's latest book is an expression and elaboration of a point of view evident in his earlier work, *North Atlantic Policy—The Agricultural Gap*.

He sees agricultural trade as a "hill of beans" magnified out of all proportion into a crisis which threatens the success of the Kennedy Round and achievement of freer trade in industrial products. "A failure to bring international order out of a complex of national disorder in agriculture does not signify doomsday's arrival." Differences over agriculture should not be allowed to block progress towards the immeasurably greater goal of economic integration in the Atlantic Community.

In Coppock's book the agricultural problem is essentially one of poor national housekeeping. It cannot simply be put on the international conference table for solution. It is true, he concedes, that "in the economically developed countries international trade in most non-tropical agricultural products has degenerated into a residual position which does not reflect comparative costs". However, making agriculture a more economic affair requires more orderliness in agricultural pricing policies. "No Geneva conclave can be expected to solve by some magic of international negotiation the problems which governments—national governments—have produced for themselves."

The Pisani-Baumgartner plan for obtaining higher product prices for temperate foodstuffs by means of international commodity agreements, which has been presented as a necessary step to clear the way for liberalization of trade in industrial products, is, Coppock points out, flawed by fatal weaknesses. It disregards the first basic requirement of a cartel, viz. provision for control of output. International commodity agreements have a poor record and cannot be expected to solve problems of occupational displacement in agriculture which have their roots in technological change.

The proposal to internationalize gifts of grain also has serious weaknesses. Paying one's farmers too much for output which cannot be sold

may be a short-term necessity, he claims, but to seek to justify it as a long-term policy in the name of development aid is scarcely worthy of the economically advanced countries. In the long run freedom from hunger will come only from improved agricultural productivity in the poor countries.

Several chapters are devoted to a review of the present position and prospects of agriculture in Western Europe and North America. Coppock finds that rapid capital formation is taking place in European agriculture while the most dynamic feature of U.S. agriculture in recent years has been the decline in labour inputs. A major exodus of labour from agriculture is an outstanding need in Western Europe, especially in Germany, Austria and Switzerland, and is compatible both with substantial reductions in product prices and a fairly prosperous agricultural sector.

Although demand for food, viewed from the farmers' angle (i.e. including demand for grains for livestock feeding) may rise in the main industrialized countries by 1.5 to 1.7 per cent per annum, their agricultural output will probably continue to increase at from 2 to 3 per cent annually for some time, given current price-cost conditions. Unless there are some important changes in agricultural policies, therefore, the prospect is one of greater national self-sufficiency and shrinking international trade in agricultural products.

Coppock puts forward a number of objectives and specific proposals for re-organizing North Atlantic agriculture. His "imperatives" include the establishment of long-term objectives concerning desired levels of agricultural production, the divorce of farm income supports from specific price support programmes, the abolition of the variable import levy system, the gradual ending of all export subsidies and internal price supports, the establishment of an "ever-normal granary" or stockpile of foodstuffs as an emergency food supply, the acquisition of non-viable farms and their disposition to viable farmers and to non-agricultural uses and the establishment of a publicly held reserve of arable land. He envisages a government agency responsible for classifying farm families into three groups—first, poverty cases to be urged to withdraw from farming; second, marginal farmers also to be urged to withdraw rather than being helped to viability; and third, viable farmers, who would be encouraged to use cost-reducing techniques.

These suggested solutions are rather summarily announced rather than developed from the preceding analysis.

The author writes in a readable, jargon-free style. He is not given to mincing words. Indeed, the vigour and economy of words with which he sinks the Pisani-Baumgartner proposal is impressive. A somewhat undisciplined partiality for heavy metaphor runs away with him at times.

One weakness arises, perhaps, from the fact that the book is the fourth in the series of Atlantic Policy Studies commissioned by the Council on Foreign Relations Problems and world agricultural production and trade tend to be treated as though they were a matter for purely transatlantic settlement. One would like to see more recognition of the fact that while the problems of agricultural protectionism do not make such difference to the industrialized countries and while the dimensions of agricultural trade problems may not warrant their treatment as the major "bone of contention" in international trade negotiations, nevertheless they are critical to underdeveloped countries and

other dominantly primary exporting countries. Agricultural protectionism and the consequent disruption of trade in agricultural commodities are real and significant obstacles to the enlargement of international trading opportunities for industrial products.

A further defect is that the concluding action proposals are not fully consistent with the point of view earlier expressed by the author. After dismissing international negotiations as offering no solution to problems arising from national agricultural policies, Coppock himself puts forward a set of proposals which clearly call for a far greater degree of international co-operation and agricultural supply management than has yet been achieved or ever seemed likely to be achieved.

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The South-West Region of Western Australia. By A. KERR. (Nedlands: Univ. of Western Australia Press, 1965.) Pp. 142, \$4.50.

The author, who is a Reader in Economics at the University of Western Australia, states his aim as ". . . to prepare a description and evaluation of the physical and economic resources of the (South-West Region of Western Australia) as a prerequisite to assessing its future potential". He describes in some detail the resources, population and major industries of the region. His descriptions are based on his own detailed association with the area, on research reports and on the available statistics (up to 1960-61). From the description and analysis of the various characteristics which have helped determine the structure of the regional economy the author makes some observations on the probable pattern of regional growth in the decade to 1970-71.

With the exception of the more analytical treatment of dairying and forestry, the emphasis throughout the book is on description rather than analysis and evaluation. Thus this book will be most appealing to those who are looking for a broad background to the geography and economy of the south-western tip of Western Australia. Among this set of readers would be those interested in the provision of foodstuffs and recreational facilities for the Perth metropolitan area.

The book is systematically set out, presenting first a description of the physical and then the economic and social characteristics of the region. The chapters on physical resources are "Physiography, Geography and Mineral Resources", "Soils", "Climate and Water Resources" and "Natural Vegetation and Timber Resources". The economic resources are described in chapters covering "Population and Employment", "Land Use" and one each for the timber, dairying, mining and fishing industries. Secondary industries and tertiary industries each get a chapter. There is then a final chapter entitled "Future Development of the Region". Each chapter except the last has a list of references and statistical appendix. There is a useful subject and author index for the book as a whole.

The division of the discussion into physical and economic sections leads to some repetition. This is perhaps due to the regional importance of agriculture, forestry and mining. Nevertheless, as one with little knowledge of the region, I found this an interesting book to read.

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Land and People in the Northern Plains Transition Area. By H. W. OTTOSON *et al.* (Lincoln: University of Nebraska Press, 1966.) Pp. 362, \$US7.95.

"... Depression and drouth have only accentuated a situation that has been long developing . . ."—ROOSEVELT.

The Northern Plains transition area of the United States lies between the 98th and 100th meridians, straddling the Dakotas, Nebraska and Kansas. It is the transition area between the extensive livestock and wheat farming areas to the west and the more intensive farming area of the east. The transition area was intensively settled between 1870 and 1920. This settlement was a simple business: blocks of 160 acres were laid out on a grid regardless of soil productivity, water supplies, topography, and of the level and variability of rainfall.

Both to east and west relatively stable land use patterns have developed. However, in the transition area the problems created by the settlement pattern have been aggravated by continuing uncertainty about the limits and virtues of the environment. Sometimes, with fresh memories of good seasons and high prices, people have equated the farming potential of the area with that of the intensively farmed areas to the east. At other times, and more usually, low prices and drought have forced a general adjustment towards the farming pattern that has evolved further to the west.

In *Land and People in the Northern Plains Transition Area*, Ottoson *et al.* have reviewed agricultural adjustment in this fascinating and unstable area. The book is divided into three parts: an outline of the economic history of the region, a discussion of present day economic and social problems, and a review of feasible adjustments in the transition area.

The authors have drawn on census data and on data from surveys in a central Nebraska pilot area to build up a comprehensive account of the problems that exist on the farms, in the rural community, in the provision of public services and in the small towns of the area. In relation to on-farm problems particular attention is given to farm organization and income, farm size and the problems of finance. The projections into the future and policy proposals also range across these economic and social problems and the historical part ensures a thorough understanding of how the adjustment problem developed.

Chapters that were of a particular interest to the reviewer included Chapter 12 on farm finance and Chapter 21 which deals with "the farm city as an emerging economic center". In the chapter on farm finance results are presented for a detailed survey of present sources of farm capital, factors affecting capital accumulation, the impact of drought, and farmers' ideas on financial management. This chapter also includes a study of land values and of the land market. In Chapter 21 the authors tilt at the idea that every small country town has a future and go on to try to develop principles which can be used in selecting a limited number of cities for development.

It was annoying that the first two maps (figures 1 and 2) showed state boundaries but omitted state names. Also, the overall presentation and style are workmanlike rather than attractive. Yet these are quibbles. I hope that I have indicated that this is an interesting and valuable book.

It should be useful background reading for Australian students of agricultural adjustment and policy and it must be essential reading for all who have a direct interest in the problems of the Northern Plains States.

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