

## Coconut Research.

WE are indebted to the Madras Presidency for a considerable proportion of our knowledge of the Coconut palm and it is an interesting coincidence that the work under review\* appears just fifty years after the publication of the little monograph of J. Shortt (Madras, 1888), and fifteen years after that of Sampson's well-known book, which also originated in Madras.

Literature on the Coconut palm and its products is abundant but widely diffused through a variety of journals all over the world, in scientific periodicals, technical papers, reports of Departments of Agriculture and the like; to a worker in any one country the original articles are often not readily available and the publication of a new collected work on the palm must always be of interest. It is a disappointment, therefore, to find the present monograph hardly adequate as a review of available knowledge, and to this criticism further reference will be made. The volume is nevertheless welcome for its presentation of the considerable amount of data collected at the four Coconut stations of the Department of Agriculture, Madras, during the past eighteen years, since much of this data had not been previously published, and since what had been published was mostly not easily accessible to the general reader.

That the volume gives most prominence to the industry and research in Madras is perhaps not a cause for criticism. The complaint was levelled against the two earlier editions (1914 and 1921) of E. B. Copeland's classic *The Cocconut*, that the Philippines were therein given a prominence not justified by the status of their coconut industry. In the third edition (1931) Copeland amply justified his procedure in that his work took as its basis the physiology of the palm, which is the same all over the world, and the author of the present monograph could make somewhat the same claim. Thus the botanical chapters III to VI, especially that on "Floral Biology", contain much interesting new material.

The method of approach to practical problems by which fundamental research precedes applied research, though apparently roundabout, is usually economical in the

long run. Broadly speaking, fundamental research provides a working hypothesis upon which the applied worker can base his field trials; as a recent writer expresses it, "It is evident that, equipped with a guiding principle, the applied worker can design his experiments with greater economy than previously and can expect to obtain conclusive results much earlier."

Had, then, the author's aim been to present an account of data collected at the Madras Stations (which he does), the reviewer's scope for criticism would have been restricted. Dr. Patel, however, in his Preface, states that the aim is "to present all the available information of importance, incorporating the unpublished results of the research carried out by the Department," and the title of the book, *The Coconut—A Monograph*, surely implies something in the nature of a complete and coherent scientific treatise on the subject. Admittedly an author making a claim like the above is entitled to elaborate the account of the work of his own department, especially where this is being reported for the first time, and in discussing this work in relation to the general body of knowledge to refer the reader to the literature for details of the latter. But this implies the provision of an adequate bibliography. The work under review is equipped with a Bibliography of eight and a half pages containing 194 references, but this is so marred by errors and misprints that its utility is seriously impaired. Lack of care in ensuring the accuracy of literature references is such a common fault in Indian scientific publications and one to which attention is so seldom drawn, that the reviewer feels that he has a duty to Indian science in general to elaborate his criticisms on this score in the present instance.

Names of authors are frequently misquoted; Philippine names seem particularly to have suffered in the present bibliography. Aurelio Cruz, for example, appears indexed under A, instead of as *Cruz*, *Aurelio*; Pantaleon U. Bacomo comes under the P's, instead of as *Bacomo*, *Pantaleon U.* and so on. By the same error of transposition the Director of Agriculture of British Guiana appears as *Sydney*, *Dash J!* The well-known publishers of *Tropical Life*, appear in three different styles, the most humorous perhaps being "John Balesons,

\* *The Coconut: A Monograph*, by J. S. Patel, M.Sc. (Cornell), Ph.D. (Edin.). Pp. vii+313. (Government Press, Madras). Price Rs. 3-12.

Daniels Sons, Limited," and after two unsuccessful attempts the compiler gives up the attempt to reproduce "John Bale, Sons and Danielsson, Ltd." and refers to *The Tropical Life Publishing Dept.*" These are perhaps minor points, though not the only examples which could be quoted. But what can be said of the quotation of Prudhomme's well-known book, published in Paris in 1906, as "*Prudhomme, E. (1906). Dans les principaux Pays de production coprah, Huile, fibre de coco et dérivés divers. Par. Paris*"? The title-page of the work in question reads "*Le Cocotier. Culture, Industrie et Commerce dans les Principaux Pays de Production. Coprah, Huile, Fibre de coco et Dérivés divers. par E. Prudhomme.*" It would suffice to quote simply "Le Cocotier", without the subtitles. The author has perhaps been wise in not giving a single other reference (one to a Tamil work excepted) to a non-English publication, not even to the essential works of Preuss and Hunger. Even worse is the confusion in one or two references between *The Tropical Agriculturist* (published in Ceylon since 1881), and *Tropical Agriculture* (published in Trinidad since 1924). Neither is there much to be said for the eleven references to *The Experiment Station Record* (the abstracting journal of the U.S. Department of Agriculture), since in these cases references are not given to the original articles. It is, moreover, very common for periodicals dealing with Tropical Agriculture to reprint articles from other journals concerned with the same subjects. This has led the author to give two or more references to one and the same article in more than one instance. Not that there is great harm in this. Workers in the tropics generally have very limited library facilities and in such cases may have available a journal in which a particular article has been reprinted or abstracted, and not that containing the original article. But surely it is better for the bibliographer to exercise a little care and to aim at some standard of literary exactness. In referring to a particular article, the original reference should be given first, followed by references to reprints of the article in other journals and then by reference to summaries in abstracting journals. For example:—

Galvez, N., Moreno, R., and Lava, V. G., (1928), Chemical Studies on coconut products. II. Utilization of the coconut.

*Philippine Agric.*, 1928, 17, 163-68. Reproduced in *Trop. Agriculturist* (Ceylon), 1928, 72, 41-44. Abstr. in *Chem. Abstr.*, 1929, 23, 295.

Other faults noticed have been occasional omission of page numbers, incorrect spelling of foreign place names, and some confusion in titles of journals, when, as often happens, these have been altered by the publishers at some stage of their history. Thus the *Malayan Agricultural Journal* appeared from 1912 to 1921 as the *Agricultural Bulletin of the Federated Malay States*.

The reviewer, in thus elaborating the often minor faults of the bibliography in the book under review, does not intend to imply that it is an outstandingly bad one of its kind. Many worse have come to his notice, and he recollects a particular, rather pretentious, work which achieved the masterpiece of four gross errors in a single line of literature reference. Rather does he wish to do a service to Indian science by suggesting that the value of published work can be much increased by a little care to avoid inaccuracy.

The present bibliography can, however, be further criticised on the ground of inadequacy; it is nowhere near to being a satisfactory review of the literature. As mentioned above, no reference to important German and Dutch work is to be found at all, nor, except for an occasional mention of Prudhomme (spelled "Prudhoum" in the text), to work in the French Colonies. The limited scope of the bibliography can perhaps be indicated by the fact that of the 194 references, 43 are quoted from the *Malayan Agricultural Journal*, 28 from the *Tropical Agriculturist* (Ceylon), and 25 from the *Philippine Agriculturist*, a total of fifty per cent. from three journals. It is even more striking to mention that a bibliography on the Coconut palm and its products, in course of preparation by a colleague of the reviewer, already contains over 2,500 original references.

One does not necessarily expect such an encyclopædic review; but one is entitled to expect that the author of a scientific monograph shall have exercised some critical faculty in surveying the literature, especially when he claims "to present all the available information of importance". It is unfortunately the reviewer's opinion that the author has not made that extensive survey of the subject which would justify such a claim and his bibliography is in no sense a "selected" one.

The chief value of the book therefore remains in its presentation of some new data. Even here the facts brought forward are not well digested. The author might ponder the following: "A vast number of observations without order or regularity is not unlike a confused heap of stones, lime, beams, and rafters requisite for constructing an edifice, but which being combined with no skill fail in producing the proposed effect" (T. Bergmann, *De indagando vero*, 1779). For this reason, *i.e.*, a disconnectedness in treatment, the book is by no means easy to read. The author's use of mathematical analysis is commendable, but the general reader will find it heavy going, and the author has not entirely succeeded in his design of presenting, at the end of each chapter, the main conclusions in simple language.

In complaining of the inadequacy of the account of present knowledge, the reviewer is not referring to the omission of fairly recent work. He appreciates that it is impossible to make a book of this nature "up-to-the minute", and that an author must set a time-limit, about 1934 in the present case. Since this date there has been much activity in the field of Coconut research.

Systematic research on the Coconut palm started rather late. The Philippine Islands were early in the field, with the help of American scientists from about 1906, but it is only comparatively recently that other producing countries have organised scientific work. A Research Institute with a full-time staff commenced operations in Ceylon in 1933; the Department of Agriculture, Straits Settlements and Federated Malay States, appointed in 1929 a full-time officer for Copra Research; notable entomological work has been done recently in Fiji; stations in the Dutch East Indies are devoting much time to the study of the palm. Other examples could be given, and it is clear that the next few years will see considerable advances in knowledge.

In the meantime, as the author of the book under review himself points out, there are enormous gaps in our knowledge. On the general subject of manuring, data are scanty and conflicting. Field experiments on Coconut palms take a long time, which is one of the reasons why so few have been started. So far, in fact, only one manurial experiment employing modern technique has been reported, that carried out in Ceylon by Imperial Chemical Industries

(India), Ltd., whilst the Coconut Research Scheme of Ceylon, commenced a comprehensive N.P.K. experiment in 1934, after a careful preliminary study of the experimental errors involved in such experiments.

On cultivation methods, still less reliable information is available, and in any case each country will have its own problems related to its own conditions of soil and climate. In several countries controversy rages round the utility of green manures and cover crops, and here again the paucity of information is illustrated by the fact that the present monograph scarcely touches these questions at all.

A popular account of the Coconut palm of a wildly enthusiastic nature in 1914 described coconuts as "The Consols of the East". Technical development and competition in the oil and fat industries have discounted former advantages possessed by coconut oil in the world's markets. In the face of trade depressions, tariff barriers and intense competition the producer has to consider, as he had not twenty years or even ten years ago, how to reduce to a minimum his cost of production. The answer is not to abandon cultivation and manuring, as many have done, regardless of the obligations to future generations which the ownership of land implies, but to evolve, with the aid of scientific research, the most efficient and economical methods of working.

There is a tendency in times of depression to regard research as a luxury. It is, however, false economy in the long run to cut down research expenditure at such times. What is wanted to enable the coconut industry to maintain itself successfully is more research, not less, and more application of the results of research.

The publication of the present monograph, in spite of many faults to which attention has been drawn, will undoubtedly do a great service in calling attention to this need for continued research on the Coconut palm and its products, and in stimulating workers in the same field elsewhere. The reviewer would acknowledge that he has found the perusal of the book provocative of ideas, particularly on the methods of attack on the many outstanding unsolved problems.

The book is, then, one to be welcomed, but it might have been so much better.

R. CHILD.