

economic importance at the present time is rosette disease, which was particularly heavy at Urambo in 1948-49. The investigations so far have been designed to study the biology of the aphid which transmits the disease and methods of controlling it. Attention has also been given to diseases causing losses in the seed-bed and of the young seedlings, entailing the study of a range of seed-dressing materials. Besides the study of the insect vector of rosette disease, the main entomological work was concerned with the pollination of sunflowers. The control of the blue bug pest of sorghum and sunflower was also studied. Analysis of the oil-content of developing groundnuts from experimental plots indicate that the smaller kernels have a lower oil-content and that shrivelled kernels show a lower proportion of oil than smooth ones of the same size-groups. Conversely, in Tanganyika, the larger the seed the more vigorous the seedling and the sooner it emerges from the soil.

The Scientific Department maintains close relations with Government officials engaged on similar work in East Africa by means of the Corporation's Scientific Committee, of which the director and deputy director of the East African Agricultural and Forestry Research Organization and the director of agriculture, Tanganyika Territory, are members. The Department is also linked with the Agricultural, Research and Technical Department in London, and, in addition, a close liaison is maintained with other scientific and technical work outside the Corporation, at home and overseas. While for the time being the existence of such a vigorous Scientific Department may well have a stimulating effect on the agricultural research at present being co-ordinated in East Africa under the East African High Commission, the nature of the work is such that the question may well arise, ultimately, whether it would not be more effectively prosecuted, with less risk of duplicated effort, under the auspices of the East African Agricultural and Forestry Research Organization when that has been fully developed.

Most of the work of the Operational Research Unit in 1949 dealt with field trials of agricultural equipment in use or of potential value, particularly planting-machines and machines for harvesting groundnuts, the two operations where there is most need of improvement. Work on ridge planting of groundnuts gave promising results under close supervision, and modifications to combines for harvesting sunflowers have proved of great practical value. Considerable attention continued to be given to the machines used in, and the techniques of, land-clearing, and as a result of investigations of chain-felling technique and root-cutting the manufacture of two prototype machines was put in hand. The bias of future work is to be towards an assessment of the performance of equipment during normal operations.

Included as Part 5 of the Overseas Food Corporation's report is the second annual report of the Queensland-British Food Corporation for 1949-50. The area of 29,286 acres sown to sorghum gave a final yield of about 316,000 bushels or 80 per cent of that originally estimated, due partly to the succession of extremely heavy frosts in May, but principally to lodging, especially in the variety 'kalo'. Results obtained on an area of about a hundred acres sown to sunflowers justified the opinion that this crop will be of value, not only to provide vegetable protein for feeding to pigs, but also as a rotation crop with grain sorghum. Despite severe frosting and local flood damage to the plot, about 400 lb. of seed per acre

was harvested. The area sown to sorghum was increased to 66,432 acres and most crops are making satisfactory progress, generally the later-planted crops, and the areas re-sown, promising the best results. A scientific committee is being established on which it is proposed that the University of Queensland, the Queensland Department of Agriculture and Stock, and the Commonwealth Scientific and Industrial Research Organization should be represented, under the chairmanship of the deputy chairman of the Queensland-British Food Corporation.

## THE COCO-DE-MER OF THE SEYCHELLES

THE coco-de-mer palm of the Seychelles, *Lodoicea seychellarum* (or, to give it an earlier but misleading name, *L. maldivica*), has for several reasons long been familiar as one of the most remarkable of endemic plants; but while some things about it are well enough known, others are not, and Mr. Durocher Yvon, who has a wide first-hand knowledge of the plant, has done a useful service in re-stating the facts in a recent well-illustrated paper\*.

The Seychelles comprise two groups of islands, one coralline and one granitic, and *Lodoicea* is native only on two of the latter, Praslin and one of its satellite islands, Curieuse, which together have an area of less than twenty square miles. There are traces of its former existence on a second satellite, Round Island. Formerly it must have had a very complete and even distribution over these islands; but to-day it occurs mostly in scattered groups or as relic trees. It still grows, however, under more or less natural conditions in the Vallée de Mai and in one or two other nearby reserves, on Praslin, where there are estimated to be four thousand trees. The palm grows in a deep red lateritic soil derived from granite, and under natural conditions is definitely a hill-side species which is seen at sea-level only on spurs of granite. It does not grow, as the coconut does, in maritime sand.

The fruits, which are often but mistakenly called double-coconuts, are the best-known part of the tree's story, and are said to be the largest fruits known, often being eighteen inches long and more than three feet round. Each is a fibrous drupe with a bilobed endocarp containing, when mature, an endosperm of ivory-like consistency. In this state the fruit generally weighs about 25-40 lb., though abnormal specimens of 90 lb. have been recorded. The specific gravity of the fruit when ready to germinate is about 1.2, so that it sinks in both fresh- and sea-water; but if the endosperm decays it will float, and it is in this non-viable condition that it has been cast up on the shores of the Maldives and of India. *Lodoicea* is dioecious; may reach a height of 100 ft.; takes twenty-five years to mature, and the fruits take more than six years to ripen. Wind pollination is the rule; but the flowers are visited by insects.

There is much else of interest in Mr. Durocher Yvon's paper, especially perhaps his accounts of the mature root system and of the method of germination; but this note is concerned rather with stressing the geographical problem that *Lodoicea* presents. Here

\* Durocher Yvon, F., "Seychelles Botanical Treasure; the 'Coco-de-Mer' Palm (*Lodoicea maldivica* Pers.)", *La Revue Agricole de l'Île Maurice*, 26, 69 (1947).

is a species of palm so unlike others with which it is associated as to have been accorded generic status, of which there is not even trace outside what is virtually a single island of one equatorial oceanic group, six hundred miles from any large land area—a palm moreover which, despite its enormous fruits, naturally colonizes steep hillsides, and which cannot establish itself on sandy sea shores, nor indeed even be dispersed in a viable state by ocean currents because of its specific gravity. What might not be learnt could we but see clearly the whole phyletic and geographical history of such a plant!

RONALD GOOD

## A FURTHER EXPERIMENT IN MARINE FISH CULTIVATION

SEA fish for eating have still to be hunted, a method of food-getting long ago abandoned on land by the most advanced peoples. Many have felt that it ought to be possible to grow sea-fish under controlled conditions to give a maximum return for minimum effort and expense; but it has not been easy to see how to do it. During the Second World War, a courageous pioneer, the late Dr. Fabius Gross, initiated to this end an ambitious experiment in Loch Craiglin, Argyllshire, already reviewed in *Nature*<sup>1</sup>. The Loch proved in many ways unsuitable; but this set in high relief some of the factors which must prove of importance in any work of rearing sea fish.

An alternative loch was sought for a complementary study on the effect of fertilizers, and the adjacent Kyle Scotnish was chosen. The response of the flora and fauna to added nutrients has been assessed in terms of the neighbouring Sailean More, a very similar body of water which was left unfertilized<sup>2</sup>.

Variations in abundance of phytoplankton can be completely explained in terms neither of nutrient distribution nor of grazing of plants by animals, nor indeed of both together. The authors discuss the effect upon reproduction of physiological changes in the diatoms themselves and of environmental chemical agents which had arisen from the metabolism of earlier inhabitants of the water. The nature of these chemical agents which affect growing organisms for good or ill is one of the great unsolved problems of marine ecology. Our ignorance provides a serious impediment to attempts such as this to understand and control the cultivation of sea fish.

Nevertheless, the experiments have clearly shown that the addition of nutrients in the form of ammonium sulphate and superphosphate to sea lochs causes an increase in plankton production and in the density of bottom-living animals, and an accelerated growth-rate in plaice and flounders. Owing to the conditions for experimenting, no results could be obtained concerning the effect of fertilizers on round fish, nor could any relationship be established between the quantity of fertilizers added and the total yield of fish. For these reasons the actual economics of fertilizer application could not be assessed. These further experiments in Kyle Scotnish call, therefore, for no modification of our comment on the original Loch Craiglin reports (*Nature*, 161, see p. 631) to the effect that the experiments failed in their primary objective of demonstrating that marine fish cultivation can be made to pay.

It is sad that Dr. Gross will now never again contribute to this important but difficult field of investigation.

G. A. STEVEN

L. H. N. COOPER

<sup>1</sup> *Nature*, 161, 631 (1948), and 162, 378 (1948).

<sup>2</sup> *Proc. Roy. Soc. Edin.*, B, 64 (1950). A Fish Cultivation Experiment in an Arm of a Sea-loch. No. 1, Introduction; by Dr. F. Gross; 6d. No. 2, Observations on some Hydrographic Factors in Kyle Scotnish; by S. R. Nutman; 5s. No. 3, The Plankton of Kyle Scotnish; by Dr. D. T. Gauld; 5s. No. 4, The Bottom Fauna of Kyle Scotnish; by Prof. J. E. G. Rayment; 7s. 6d. No. 5, Fish Growth in Kyle Scotnish; by Dr. F. Gross; 4s. 6d.

## REGIONAL LIBRARY SYSTEMS IN GREAT BRITAIN

THE Library Association has issued as No. 2 in its pamphlet series a survey of the regional library systems, their development through two decades and their possibilities for the future (pp. 36; London: Library Association, 1950; 3s.; 2s. 6d. to members). This pamphlet, which is by Mr. P. H. Sewell, director of the South-Eastern Regional Library System, should be of particular interest at the present time, when the need for regional developments, in the technical and scientific field as well as generally, has been widely recognized. Mr. Sewell pays generous tribute to the help of the Carnegie United Kingdom Trust in initiating the regional system and to the leadership and administrative ability of Lieut.-Colonel J. M. Mitchell, Dr. Luxmoore Newcombe and many others whose enthusiastic co-operation has been the decisive factor in the success so far achieved. The concise picture given of the position in the various regions is only one valuable feature of the pamphlet. Equally important is the summary of the factors upon which the efficiency of a regional system depends.

First among these the author places the full-time direction of a competent librarian. All regions, he urges, should become self-sufficient in current non-fiction of the more serious type. Each region should also have access to the means of photographic reproduction both by photostat and by microphotography, and all large libraries should possess the necessary viewers. A co-ordinated system of contributing to, and filing periodicals within, each area is long overdue; and he suggests that, to supplement the service of the regional systems, the National Central Library, released from traffic in current non-fiction purchased in Great Britain, could buy on publication the most important works published in Europe and America, aided, if necessary, by the advice of appropriate national advisory bodies. The National Central Library should also become a copyright library on terms similar to the Universities of Oxford and Cambridge, or, alternatively, one of the existing copy-right libraries should participate in the scheme.

The greatest problem, however, is that of securing adequate funds for the regional systems. Regarding this, Mr. Sewell makes two recommendations: the substantial contribution of regional systems to the national inter-lending service and the real inadequacy of their finance should receive recognition both nationally and locally; and some action should be taken to ensure that these organizations, which arrange the great majority of inter-library loans in Great Britain, besides receiving the necessary financial support, also have a commensurate share in the planning of national inter-lending policy.