

land from elephant grass in Buganda is eighty man-days per acre. One can well believe that the easy and quick performance of tasks which have previously required much toil would be regarded with favour in many areas, and, in fact, richer farmers already insist on having the use of tractors. Kerkham states that in Uganda there are large areas of uncultivated good land. It is emphasized that mechanization would facilitate the introduction of other improvements and, in view of this, there is every likelihood that both directly and indirectly mechanization would raise crop yields. Average crop yields, recorded in Appendix 2, are low. There is no reason to suppose that more than the fringe of improvements in production by agronomic methods has yet been touched. It is stated that mechanization will markedly improve opportunities for personal profit and will make possible increasing productivity and value of land. A recommendation is made that much of the increase in land values be retained by the authorities, so that revenue from the developed and richer areas may help development elsewhere.

The authors of the report do well to present these conflicting views, but in so doing they take no share of the responsibility for local decisions to speed up or slow down mechanization. It must be doubted, therefore, whether the following quotation (par. 157) can be read in isolation from the rest of the report, although it does have the appearance of a general recommendation. "The soundest policy might well be firmly to make economic development as rapid as is acceptable to the people and possible of execution, in most areas using all the opportunities offered to strengthen and give responsibilities to the existing Native Authorities and social groups."

The report includes some penetrating remarks on reactions between mechanization and the African way of life. It is wisely said that African farming systems are well worth examination. An elaborate programme of studies is outlined (pars. 287 and 337). Much can be done to secure and give support to native leadership, as is done, for example, in Northern Nigeria, where the opinions and experience of the administration, native authorities, development departments, religious missions and European and African commercial men have been brought together in a Development Committee. Reference is made to training and the presentation of a development scheme: those sequences and balances are best that win the appreciation and confidence of ordinary men and their wives.

Besides tractors and ploughs, other machines and implements are needed in Africa. The report refers to the prodigious expenditure of labour in the women's tasks of grinding flour and carrying water. Water supplies and small grain mills would result in worth-while saving of labour and would be economic at busy seasons, when the time saved would be put to better use.

The authors note that few agricultural officers have had experience in the use of machinery or of mechanized farming, for it has developed in England only during the past ten years. Training courses are suggested; in England a special machinery advisory bureau should be set up to deal with inquiries from the Colonies. The report contains some broad and rather vague recommendations such as "the variations of human population in relation to basic resources . . . require careful and comprehensive study", or "attempts should be made to discover the amount of European supervision that can be regarded

as optimal under different conditions". There seems to be a misapprehension about "share" payments; in the Gezira scheme of the Anglo-Egyptian Sudan it is profits that are shared; the tenants' accounts are debited with the cost of mechanical ploughing.

Since the authors were debarred by lack of evidence from reaching firm conclusions, their report could have been more brief. On the other hand, it must be commended as an interesting and comprehensive review; it will repay careful reading.

H. GREENE

SUGARCANE RESEARCH IN MAURITIUS

MAURITIUS, an island colony of Britain in the Indian Ocean, is still, in spite of the passage of a hundred and forty years, very attractively decorated with cultural trimmings derived from its French ancestry. The population of the island, now approaching the half-million mark, depend for their livelihood and welfare almost exclusively on a single commodity—sugar. A few other products, notably tea and fibre, offer some prospects of development as complementary crops, the former for the high-rainfall zone above the altitude limit for cane, and the latter for the drier regions and mainly for local manufacture of sugar bags. But, because of its suitability to local requirements both climatic and economic, which has been demonstrated by two centuries of experience and of plant introduction, it seems certain that sugar will continue to occupy a position of paramount importance in the Colony's economy.

Excluding the dependencies—small islands scattered about the Indian Ocean—none of which produces sugar, Mauritius is roughly 720 square miles in area and approximates in size to the County of Surrey in Great Britain. Despite its small size the island (a good illustration of the Scots proverb about 'guid gear going into small bulk') is the largest individual cane sugar producer and exporter of all the British Colonial territories, and it is estimated that the 1950 crop may produce more than 430,000 tons of sugar. If this estimate is justified in the bag, it will be the fourth record crop in succession.

The mounting curve of sugar production and the remarkable series of record crops owe a good deal to the local research and cane-breeding work which has been going on for the last twenty years. The importance of research has long been recognized—not least by the Chamber of Agriculture, a very active and progressive organization of producers which has been in existence for the past century—and this recognition found practical expression in the foundation of the Sugarcane Research Station, as a Division of the Department of Agriculture, in December 1929. For lack of other accommodation at the time of its formation, the new research institution was housed in the recently opened College of Agriculture, a 'temporary' arrangement which lasted for twenty years with increasing inconvenience to both.

In spite of housing difficulties, the Station more than justified its existence. Its most urgent initial task was to produce seedling canes to replace the old varieties, for long the mainstay of the sugar industry, which were 'running out'. The chief qualities required in the new canes were high yield capacity, good sugar content and resistance to drought, pests and diseases.



The new Sugarcane Research Station, Mauritius, showing part of the Entomological Division and Departmental Library

In this work the Station achieved what was to prove an outstanding success by producing the variety known as *M134/32*. By 1947 (the first year in the series of record crops) this remarkable general-purpose cane had replaced all other varieties to the extent of 80 per cent of the island's acreage in cane. Since then, more than 90 per cent of the cane area has been planted in *M134/32*. The variety has not only come up to requirements in regard to yield capacity, sugar content and resistance to the major pests and diseases; it has also enabled an extension of the acreage in cane by reason of its greater tolerance of climatic variation. Other good canes have been produced by the Station; but they have been overshadowed by *M134/32*, or they are adapted to special environmental conditions and are therefore grown only on a small scale. Indeed, it may be said that *M134/32* has been embarrassingly successful for, though it still shows no sign of weakening, there is grave danger in relying on a single variety.

In some degree this success has also tended to overshadow other achievements of the Station, such as the very thorough investigation and survey of the soils of the cane belt made by the Chemical Division, and the work on foliar diagnosis. The latter, a method of determining the nutritional status of the cane plant from leaf analysis, is now applied on a commercial scale by a special laboratory financed from the Sugar Industry Reserve Fund. The work of the Division of Botany, too, has led to valuable improvements in field practice, notably in the pre-treatment of cane setts now widely adopted, and the control of weeds by means of weed-killers. Many of the more noxious weeds of cane plantations can now be controlled by selective weed-killers, and several thousand acres of infested land have already been cleared by this means.

Research will be no less necessary in the future to ensure efficiency of production in what may well be highly competitive conditions. Breeding work must go on, and one of the most urgent problems is to find successors for *M134/32*. The most probable successor for the immediate future is another product of the Station, the variety *M423/41*, which gives promise of successfully rivalling *M134/32* and of carrying the curve of sugar production to still higher levels. Other work which is in the initial stages includes investigation of the relation between root vigour and resistance to damage by *Clemora Smithii*, the most destructive pest of cane with which the Mauritian planter has to contend, examination of the

role of certain inorganic fertilizers, especially lime and magnesia, the accumulation of data to enable foliar diagnosis to be extended to these elements, and further study of some weed species for which no satisfactory control has yet been found. The Division of Botany has recently engaged in an inquiry into the vexed question of the effects of interplanting food crops with cane.

The construction of a new building for the Mauritius Sugarcane Research Station, which was formally opened by the Governor early last year and in the midst of a minor cyclone, is an indication that the importance of future research is clearly recognized even in the phase of political re-organization through which the Colony is passing.

BROWN TROUT RESEARCH IN SCOTLAND

IN February 1948 a committee was appointed by the Secretary of State for Scotland "to supervise a programme of research into the factors affecting the number, size and growth of brown trout in Scottish waters of varying types and into measures for improving the stock". This research was proposed by the North of Scotland Hydroelectric Board and the Scottish Home Department, with the support of the Scottish Tourist Board. It aims at finding out how trout fisheries in Scotland can be improved and how trout stocks can be established and maintained in the reservoirs being constructed in various parts of the country for the development of hydro-electric power.

The research is carried out under the general supervision of a committee under the chairmanship of Prof. C. M. Yonge. The headquarters laboratory is at Faskally House, near Pitlochry, in Perthshire, and the work is directed by Mr. K. A. Pyefinch, who reports on the work for the first year in a new series of Scottish Home Department Scientific Investigation Reports, Freshwater and Salmon Fisheries Research, No. 1*. A comprehensive biological survey is being made of certain selected streams and lochs of the 700 square miles of catchment area lying along the Tummel Valley and stretching from Loch Laidon through Loch Rannoch to Pitlochry, and including the River Garry and its tributaries. This area includes a variety of different types of habitat, and it is evident that the investigations may throw new light on the reasons for the great variation in growth shown by trout in different waters. Biological investigations on the trout include the tagging of large numbers and a modern method of sampling fish populations in small streams by the use of electric currents for stunning fish within a length of stream. These researches are supplemented by seasonal observations on bottom fauna and on the plankton. Marked differences have been found in the composition of the zooplankton between the larger and smaller lochs.

Preliminary investigations have been made which will prove valuable for comparison in following the biological sequence which will develop over the area which has recently been inundated to form the new reservoir at Pitlochry.

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* Scottish Home Department, Scientific Investigations, Freshwater and Salmon Fisheries Research, No. 1: Report by the Supervisory Committee for Brown Trout Research, 1948-49. Pp. 12. (Edinburgh and London: H.M. Stationery Office, 1950.) 1s. net.