

SELECTED ARTICLE

The Man and the Plant.

By H. MARTIN LEAKE, M. A. Sc. D.

Cotton is an agricultural product, the product of a plant. Its successful cultivation, apart from the financial aspect, must conform, therefore, to two requirements. It must provide both the essential conditions which the nature of the plant as a living organism demands, and the amenities which man, the producer, considers to be his due in return for his labour. But there is no question as to which of the two is the more fundamental. The plant is a sentient, but unreasoning, organism and can only adapt itself to a certain limited range of conditions. The plants in a greenhouse will die if left unwatered for a few days, and the fact that the absence which led to the neglect was unavoidable makes no difference to the result. With man the vital limits are wider, but he is reasoning and not only can, but does, voice his protests in strikes and rioting long before those limits are reached. This is a simple proposition, but one which is frequently over-looked. The human requirements, for the above reasons, assume primary importance, and the protest of the plant, because silent, is ignored.

The cotton plant, with plants in general, will only grow and mature its crop if the conditions, and the environment, fall within somewhat narrow limits. If rainfall, air-humidity temperature and so on transgress those limits failure will result, though a time-factor is here involved, the extent of the injury being dependent on the duration of the exposure to the adverse factors. These are physical factors, but they are not the only ones concerned; there are the factors concerned with the soil also physical factors, and there are biological factors which influence the resultant crop, weeds, pests and diseases. It is the function of the successful farmer so to alter the conditions existing in nature that the plant throughout its growth is never subjected to such adverse conditions. It is an objective rarely, if ever, attained, for man has only a partial control over the environment. Herein lies the fundamental difference between agriculture and industry; in the latter the conditions are under the full control of man.

There is here implied the dependence of success on a detailed knowledge of the particular plant in relation to the environment, and it is a knowledge which is of two kinds. There is the knowledge which concerns the effect of those rapidly changing factors of the environment, seasonal and daily changes of temperature and rainfall. These require immediate action, and decisions must be taken by the cultivator himself. It is knowledge which has been acquired by farmers of all races in greater or less degree as the result of the accumulated experience of generations. Then there is the knowledge of those more subtle influences, nature of the soil, availability of plant food, the life-histories of the various pests and diseases and so on the prerequisite to control. These are technical matters which require and technical investigation to acquire and technical control to apply.

It is possible, in view of the above, to define agriculture as the adjustment of the environment to the needs of the particular crop plant—perhaps the most comprehensive definition of agriculture there is. To achieve this objective three conditions must be fulfilled: skill on the part of the farmer, technical investigation, and technical control. But there is a further aspect. Where the conditions of growth cannot be sufficiently altered to suit the plant's requirements, it is often possible by careful search to find a variety which is capable of

growing under the conditions better than any variety hitherto available. It is a process which has been adopted instinctively through the ages and now forms a standard operation with all crops and in most countries. But recent advances in the technique of plant breeding have gone further and rendered it possible within reasonable limits to manufacture varieties having the desired adaptability. This alteration of the plant to suit the environment is a matter for technical investigation.

The human aspect demands requisites of a different nature. Primitive man is readily satisfied with little more than the absolute essentials to maintain life—food and a minimum of clothing and shelter—but this simple state is everywhere passing. With the spread of education, news and facilities generally, he is coming to recognize that there is a more desirable standard of life only to be obtained by the retention of a larger fraction of the return for his labour. It is inevitable that this urge on his part should bring him into conflict with those who handle his product and are naturally unwilling to reduce their share of the return. As long as demand exceeded supply, as was the case until early in the present century, this adjustment could be made within reason at the expense of the ultimate consumer. But latterly, contracted demand and vast increases in supply have made adjustment by such a method impossible. These forces have created conditions under which not merely has it become impossible to maintain the progressive advance in labour's material welfare, but actual reduction has taken place in some cases. If the labour force engaged in tropical agricultural production has progressed in its views as to what constitutes an adequate standard of life, it has not yet learned to appreciate the influences at work which restrict its capacity for earning. Herein lies the stimulus to the unrest which has characterized recent years not only in the tropical colonies but in general. Being capable of action labour has protested, and often with violence, and the strength of the movement of unrest has forced the human needs to the front, not infrequently to the neglect of the more fundamental needs of the silent plant. In practical life it is no answer to say, if the facts do not fit the theory, so much the worse for the facts. Facts have an unpleasant way of asserting themselves, and a solution to the present problem can only be sought through a recognition of its dual nature. The solution will not be found through argument on *a priori* grounds; the best approach will be made through a review of the various systems found in action and of the response in each to the changed conditions.

During the early history of colonial development a purely nationalistic view prevailed: development in the interests of the mother country, as witness the Navigation Laws and the slave trade. Under it arose a system of plantations worked by a labour force composed originally of slaves, and later of wage-earners often bound by indentures. With the passing of slavery a change of sentiment took place which slowly crystallized out at the end of last century in the dictum of Chamberlain: the trust for civilization. Under it, the insistent demand for the products of tropical agriculture was to be met by extended cultivation by the readiest means then available. The plantation system, and the results are to be traced in the encouragement of settlement in Kenya. It was assumed rather than argued that from such a development benefits must automatically accrue to the native populations. Another quarter of a century elapsed and a further change of sentiment took place which crystallizes out in Article 22 of the Covenant, the trust of the native populations. It was a sentiment which Lord Lugard, with a prescience in advance of his time, anticipated by a quarter of a century. The readiest means were discarded and the more leisurely method through a system of peasant proprietors was adopted, and this course was facilitated by the lessening urgency of the demand owing to the large extension in the sources of supply. It takes note of the human aspect and again, it was

assumed rather than argued that the needs of the plant would be adequately met. These two systems, existing as they do in a vast variety of forms and admixture, have supplied in the past practically the whole of the agricultural produce which comes on to the markets from the tropics. The test of their efficiency to supply both requisities is found in the reactions during the recent years of depression.

The plantation system, in its highest development, that of the large company-owned estate, is in a position to provide the requirements of the plant, financial considerations alone determining whether adequate provision will be made or not. Irrigation works will be provided if the extra return is calculated to cover the cost and processing plants to handle the product can be erected, technical control and even investigation can be organized, while much of the details of cultivation will be directed by a system of supervision which leaves little or nothing to the initiative of the manual worker. The latter is paid a fixed wage, and his interest in the success of the undertaking is limited to the chances of loss or continuance of employment. The small plantation has a lesser capacity owing to the limited financial status of the owner, but the position of the manual worker is the same in both cases.

The demand of labour here takes the form of a claim for an increased wage, which carrying as it does no incentive to greater energy, is naturally resisted as far as possible. The outcome will depend on the relative bargaining power, and where labour has an alternative field of employment, it is the employer who must yield; where no such alternative exists, it is labour that must do so. But the matter does not end there. The general reaction, especially where labour is in the stronger bargaining position, is for a resort to be made to mechanization with higher wages to a restricted labour force. It is a solution which has answered well where there is a shortage of labour as in Hawaii, but one which has had bad repercussions where there is an excess of labour as in some West Indian Islands, and notably in Cuba and Puerto Rico. There is no general solution to the problem here.

The peasant system appears to accord more closely with the human requirements, for the peasant is his own master and works for his own benefit. But agriculture among a tropical peasantry is not founded on accumulated experience and there are not the financial resources for technical control and, still less for technical investigation. Processing plants, which may be necessary if the product is to be acceptable in a competitive market, cannot be erected, and the regulation of a seed supply, so important an item in the case of a naturally cross-fertilized crop raised annually from seed such as cotton, is impossible. Some outside agency has to provide these, and in most cases that agency is Government. There has thus arisen in place of the independent employer—between whom and labour Government could, in the last resort, arbitrate—an authoritarian control against which there is, and can be, no appeal, for the final arbiter, Government, is one partner. It is only necessary to read the cotton Ordinances, Rules and Regulations of Uganda or the like enactments of Zanzibar for cloves and copra to appreciate the extent of the arbitrary power which Government has been forced to take to itself. This is the inevitable result of the failure to realize that an uncontrolled peasantry cannot "deliver the goods". Herein lies the cause of the unrest which has in recent years characterized countries with a peasant system no less than those with a plantation system. Government, it is true has drifted rather than deliberately entered into this position, and is seeking a way out through co-operation. On the question of co-operation it can here only be said that, for success on the scale needed a standard of education is required which can hardly be attained in the time which the urgency of the problem demands.

It is not possible in the brief space at command to argue the intermediate positions of a mixed peasantry and plantation in all their varieties. Such a case is found in Mauritius, and unrest has not passed by that island. It is difficult, therefore, to avoid the conclusion that the dual requirements are provided neither by the plantation nor the peasant system alone or in combination. The remedy must be sought elsewhere.

There are fortunately in operation two developments which promise to provide the solution, one in Fiji and one in the Sudan and if the first is here taken as an example, it is because it gives in many respects a clearer picture of the principles and is less well known to cotton interests. The Fijian sugar industry in the past was worked on the plantation system with labour under indenture from India. Unrest was rife and kept within bounds only because settlement on the extensive tracts of waste fertile land offered an alternative field of securing a living, and because fresh supplies of labour were readily recruited in India. These conditions were brought to an abrupt end in 1917 when the indenture system was abolished, and an acute labour shortage followed. The solution of the deadlock was found in the subdivision of the large estates into small holdings leased to the tenantry, and the organization of a technical supervisory service of which the guiding spirit is co-operation with the tenantry. The result has been so successful from the industry's side that it places its sugar on the world's market with profit, and from the labourers' side in that an intense demand for tenancies has arisen and the whole of the area controlled with the exception of certain small portions retained for trial purposes, is now so subdivided. Here, both requisites are met and it is along such lines that the general solution of the present troubles must be sought. *The Empire Cotton Growing Review*, (16: 180-185.)

ABSTRACTS.

Soya Beans.—Arnold, H. C. —*Rhodesian Agricultural Journal* 38, (1940). 588—606.

The introduction of strains of soybeans which yield good crops of seed and also retain their seed in their pods long enough to allow a reasonable period for reaping, appear to make the cultivation of this crop economically possible. The choice of a variety suited to the district is of the utmost importance. Potchefstroom No. 184 is the best yellow-seeded and the Jubiltan strains are the best fodder varieties, but seed supplies of these are at present very limited. Rainfall and soil conditions suited to maize are the best for soya beans also. Seed requirements are 40 to 50 lb. of the large seeded and 15 to 20 lb. of the small-seeded kinds, per acre. Twenty-four inches between rows and 3 to 4 inches in the rows may be considered as standard spacing for the yellow-seeded kinds, but the distance between rows may vary from 8 inches to 30 inches if compensating differences are made in the spacings between plants in the rows. Depth of planting should be between one and two inches and on no account exceed three inches. Bacterial inoculation of the seed is advisable when the land is sown for the first time. Early and thorough weeding is imperative. Harvesting may commence when the seed reaches the hard-dough stage. The stalks should be tied in bundles and stooked as soon as they are dry enough. Three to four bags per acre could be expected from fairly well attended farm crops, though twice that amount has been obtained from well manured land.

Its high protein content makes it especially valuable for balancing foods of a starchy nature, and it can be used as a substitute for animal proteins in the diet of both Europeans and natives. The valuable nutrients, protein and oil, can be transported more economically as soya beans than is possible in the form of either maize, wheat, groundnuts or beef. Although the costs of growing would be higher, the marketing costs would be lower than those for maize.