The potential worth of the Botanist's work can be realized when one remembers that the value of the paddy crop in Madras is over 60 crores of rupees.

Oryza.

Extracts.

A Hundred Acres.

WHAT I WOULD DO WITH IT.

AN F. M. S. PLANTER'S VIEW.

In setting forth the following observations I have in mind, of course, the case of the fortunate son of Mars to whom a grateful country has apportioned on easy terms a grant of a hundred acres of agricultural land, together with sufficient funds to plant it up and keep it in good order until it brings in an income. My remaks however, apply equally to any one intending to plant up a piece of land in Malaya, and either a single hundred or many hundreds of acres in extent.

BAR SWAMPS.

Let us take it that the returned warrior is privileged to select his holding himself. If he is a wise man, he will avoid flat, swampy ground, realising that, even after spending much money on drains and their everlasting upkeep, the rubber trees that land of this nature grudgingly supports are not generally unhealthy but, having insufficient root-hold, are liable to be blown over by a capful of wind. There is already far too much swamp land in Malaya planted with Hevea, aad it is distressing to see acres and acres of trees that have been planted on land that is suitable for nothing but paddy growing, propped up with poles to prevent them from toppling over. Not only are rubber trees planted in swamy ground unhealthy themselves, but they are the prime cause of disease and deterioration throughtout the Peninsula.

LIKEWISE HILLS.

Similarly our warrior-planter will refuse very hilly land, for nobody likes climbing hills except members of the Alpine Club. Neither managers, assistants, nor coolies like mountaineering as a daily duty, and in the case of the latter, it is positive cruelty to expect coolies carrying a couple of heavy buckets to negotiate some of the precipitous declivities on which planters in the past have planted rubber trees.

A GOOD LIE.

He will avoid the two extremes and select a piece of undulating virgin forest land, for it is land of this nature that grows the best rubber; being self-draining the soil is always "sweet" and the expense of cutting innumerable drains will not appear. I am, of course, taking it for granted that our warrior had a few years' planting experience before he went Home to fight and knows that "sour" soil needs a great deal of expensive liming before it is any good.

"TANAH GOMOK."

As a matter of fact, some little heed should be given to the nature and quality of the soil. Generally speaking, if the trees in the virgin forest are well grown, then there need be little doubt but that the soil is good enough to grow Hevea as it should be grown. Expert advice regarding the quality of the soil should not be despised, but if this is not available, let the aim be to secure a soil containing plenty of "humus" or as the Malay agriculturist calls it, "tanah gomok" meaning fat or rich soil. Rubber will grow well in light sandy soil, but will lack root-hold in these conditions, and losses from windfall are bound to ensue. It will grow well in laterite and other soils, but to secure the best results one must have the best soil.

THE START ON HIS OWN.

I will now suppose that our warrior has obtained the block of land, and that, free from all financial worries, he can sit down and

map out his programme and decide exactly how he is going to plant it up. First and foremost, he should make up his mind to see things through himself and resolutely refuse to amalgamate with a group, as has been suggested. To do so would be absolutely to destroy the sentiment of the undertaking and of the intention of his benefactors, for there is something sordid about syndicates and amalgamations that would be very much out of place. It is up to our pensioner to cultivate his little plot of land himself and to make it his old age pension; to hold and maintain it with pride for all time. And with the facilities that have been given him his task is a pleasant and interesting one.

WASTE NOT, WANT NOT.

To proceed, then, with my ideas as to what should be done with a tract of a hundred acres of good agricultural land. In the first place, seeing that the balance at the bank is quite as it should be, I should, were I the lucky owner, clear the whole block straight away in preference to opening up twenty-five acres yearly for four years in succession which seems to me to be wasteful and unprofitable procedure. I should, during the successive "burns" preserve all timber that had some value either for building purposes, as good timber is worth money and should not be wantonly destroyed. Some I would sell to my neighbouring tin-mining friends, but I should retain a good deal, knowing that I should need it later in my factory and smoke-house.

CLEAN CLEARING.

The next item on my programme is clean clearing, and this has to be done very thoroughly, as I want to banish white ants and preclude the possibility of Fomes semitostos gaining a footing on my territory. This may cost a lot of money, but it is money well spent. Every old root and stump must be removed and the land thoroughly chang-kolled, or preferably ploughed.

MIXED AGRICULTURE.

Whilst this is being done, I have finally settled my planting programme, which is as follows:—Hevea: fifty acres; coffee: twenty-five acres; fruit trees—such as durians, mangosteen and rambutans: ten acres; bungalow site and land for factory and line: five acres. This leaves ten acres for further consideration and will probably be the site of a poultry farm and various other experiments.

COFFEEA ROBUSTA.

I lay particular stress on the wisdom of apportioning at least a quarter of the property to coffee. Coffeea robusta is to be preferred, as it is very prolific and will bring in revenue within a couple of years. It must not, however, be planted as a catch-crop but as a permanent one. There is a very bright prospect for coffee in the immediate future, of which advantage should be taken. I should divide the fifty acres that are to be planted with rubber into two blocks, separated one from the other by the ten acres of fruit trees, which should form a wind and disease belt and whatever price rubber may fall to, would be a sure and certain source of income in five years' time and ever after. These fifty acres I would plant up with young seedlings in baskets.

WIDE PLANTING.

The experience of the last few years has shown me, and I hope, everybody else, that it is folly to put in more than 60 young plants to each acre, so let this be the outside limit. To anyone remonstrating on the score of high weeding costs, I shall reply that weeding costs are not going to hurt me at all, as every square yard of my property is going to be put under catch-crops.

CATCH CROPS.

To please Mr. Hose, I should plant up a considerable portion of the estate with hill paddy during the first year; but the catch-crops on which I shall rely to bring in revenue almost from the

start will be groundnuts (better known, perhaps, as monkey nuts), castor oil and bananas. All three should, and indeed will, bring in an income during the first year. I will not set forth a lot of wearisome figures and statistics, but will just say that I look to these catch-crops to pay for a very considerable part of the monthly cost of upkeep. Be it remembered that there are planters in Ceylon who to-day are owners of rubber and tea plantations which they have brought into bearing solely and entirely with the income that their various catch-crops have brought in.

CONCERNING TAPIOCA.

Among other catch-crops which I may plant is tapioca concerning which as a catch-crop there is much diversity of opinion. Personally, I think it has been very much maligned, and in my opinion there is little harm to be feared from interplanting tapioca, provided that the rooting up is done by one's own coolies. With the present high prices ruling, a few acres of tapioca brings in quite a good profit.

AND BANANAS.

It is advisable to plant the best varieties of bananas and to set them out between the rubber plantings in quincunx. There is a big shortage of the fruit throughout the country and a ready sale of all that can be grown may be looked for. They do not take much out of the soil, and planted, as advised, between each four rubber trees they rapidly afford shade and keep down weeds. I think, however, that I would make groundnuts and similar leguminous plants my principal catch-crops owing to the rapidity of their growth and to the fact that they improve the soil.

GOOD LUCK.

And now I think I have taken our returned warrior through the first year of his new adventure and it only remains to wish him good luck in the same. Just one last word to him, however: having only a limited number of rubber trees to look after, it

should be possible to inspect each one thoroughly and individually at least once a month, and to note any sign of disease and take steps accordingly. Indeed, he should be able to eradicate disease almost entirely.

And just one last word to the planter who differs from me as to the best way to deal with a hundred acres. Kindly put your ideas on paper and let the returned warrior have the benefit of your advice. Two heads are always better than one —

(From the Tropical Agriculturist, Vol. LIV, No. 1.)

Injurious effect of low temperature and mist on the development of rice as connected with the propagation of weeds in the Vercelli district, Italy.

In rice growing the two most important climatic factors are (1) heat and (2) light. The critical periods of rice are those during which it has an absolute need of a certain minimum quatity of heat and light. If these minima are not available at these periods the yield will be small even though the temperature be high and the days sunny throughout the rest of the vegetative period. In Nortern Italy the critical periods are during tillering and during the formation of the panicle. If at these two stages the heat is not sufficient to keep the atmosphere of the rice field at a minimum temperature of 13—14°C for the first state and 15—16°C for the second according to the variety of rice cultivated the yield in paddy may be partly compromised. In 1918 during the tillering stage at which the rice plant supplies the considerable amount of plastic matter necessary to the formation and development of the adventitious roots and secondary stems, the temperature round the rice fields was well below the normal. The result was very weak growth in hight and tillering in the late varieties of rice, whereas the weeds, much less exacting in heat and light developed rapdily and abundantly in the spaces left

empty by the scant vegetation of the rice. From the time of sowing till harvest, weeds always compete strongly with rice with a series of species of increasing harmfulness, the roots of which benefit greatly by the cultural methods and fertilisers applied to rice. Weeds are, however, yet more harmful by the growth of their aerial parts which deprive the rice of the light and heat of which it has so much need in order to give good yields. This purely vegetative competition gradually decreases the rice yield more and more. This is shown by the author's experiments aiming at determining the relation between the degree of investation by weeds and the unit of surface.

The fact that transplanted rice contains almost no weeds may be explained as follows:—Rice plants for transplantation are first grown in well fertilized soil and receive warm water. In the soil in which it is transplanted it receives much light and heat, thanks to its spacing much greater than in the nursery, so that as soon as it has taken root it developes vigorously and 15 to 20 days after transplanting, covers the whole of the rice field, suffocating and killing the weeds which have grown.

The causes of the excessive growth of weeds in rice fields being known it is more easy to find methods of prevention. Among these methods are:—

(1) Arranging for the critical period to coincide with the most favourable weather conditions; this may be done by adjusting the time of sowing

(2) Cultivating early varieties, with a short vegetative cycle.

(3) Modifying the weather contitions artifically during the critical period by transplanting. Transplanted rice receives more light, as a result of the regular distribution of the plants in the field, and the soil and water are warmer because the water is more exposed to sunlight, and the soil submerged only in June, at

the time of transplanting, has before this period a special physical texture and contains much air which enables it to have a temperature more favourable to the development of adventitious roots.

(International Review of Agricultural Intelligence of Plant diseases Vol. X. No. 3). K. R.

News and Notes.

The March issue of the Agricultural Journal of India is a very interesting number. Mr. T. S. Venkataraman, Acting Government Sugarcane Expert and a member of our Union in his article on packing seed sugarcanes for export gives very useful hints in an always neglected, none-the-less important branch of work in an experimental cane growing station.

Mr. Main, Deputy Director of agriculture, Sindh, writes his impressions on the tractor trials held in Loncoln in September 1919. He says upwards of forty different makes were exhibited, most of which were demonstrated on land. The trials took place in some twenty six fields and extended over three days during which time some five hundred acres of stubble and lea were ploughed up. The object of the trial was to help the farmer in the selection of the tractor and not to convince him of its utility. As regards power, the machines varied from 20 to 40 horse power, majority were below 30 horse power, the fuel used was mostly petrol. The lightest weighed about 1¼ ton and the heaviest 5 tons. Prices ranged from £ 280 to £ 650. The plough associated was the two to three furrow self lift type costing from £ 40 to £ 60. In most cases when ploughing, only one attendant was required. Mr. Main expects that the tractor wauld remove the greatest impediment to improved methods in India, which lies in the weak condition of cattle.