MOLEGODE.

On soil more clayey than the rest of the plots the Molegode plough gave satisfactory results.

An Improvement on the village plough with a share and moleboard with a satisfactory curve is the Molegode plough, which is of very much lighter draught than the other ploughs mentioned above.

THE VILLAGE PLOUGH.

The village plough was used on clayey soil similar to that on which the Molegode plough was used. It did decidedly inferior work in comparison to the work of the others. This was quite obvious and the cultivators agreed that the work done by the other ploughs was superior to that of the village plough.

This demonstration showed that the Oliver plough was hardly suitable for work on paddy fields on account of its heavy draught. The buffalos drawing this plough quickly wearied and showed signs of fatigue.

The Meston plough is of fairly suitable draught for certain parts of the district where strong and healthy buffalos are found. Of the two ploughs Goiya and Meston the work done by them is almost the same but the Goiya plough is lighter.

It has been found that the cost of working the Goiya and Meston ploughs is exactly half the cost of working the village plough. Better work is also performed.

The plough found to be most suitable for the district is the Molegode plough. It has been found to plough one and half to two pelas of paddy field a day against one pela with the village plough.

All those assembled at the demonstration were of opinion that the Molegode plough was the most suitable of the ploughs demonstrated on for work in paddy fields with buffalos. It is possible however that improvements can yet be made on the present model.

A PRELIMINARY PAPER ON THE RIPENING OF OIL-PALM FRUITS.

Ir. H. N. BLOMMENDAHL.

In this paper is summarised the results of investigations started in 1921 at the General Experimental Station of the A.V.R.O.S. on the ripening process of the oil-palm fruits. The objects of the investigations were to ascertain (1) the rapidity of formation of the oil in the fruit, (2) the losses in oil contents due to premature picking of the bunches, (3) the effects on the oil content of over-ripening, (4) the period of retention of the maximum oil content after ripening of the fruit and the changes that arise in the quality of the oil by so keeping.

The results obtained are of the greatest importance to the Oil-Palm industry and illustrate the important part played by nature in providing in the oil-palm, unlike in the sugar-cane and other crops, an external indicator by which full maturity may be recognised.

The writer first describes the anatomy of the oil-palm fruit, and the part played by "fat" in its structure. He points out that as the ripening of the fruit takes place, a simultaneous change in colour is noticeable—from light green to purple and dark violet, at which stage fat first begins to form, and then to yellow and orange-red when the fruit reaches full maturity. He states that the first oil formed about 4½ months after fertilisation is colourless, but that this turns into the well-known yellow colour soon after, due to the formation of the colouring matter "carotin." The physiological functions of carotin in the metabolism of the plant are then discussed. The writer observes that at the moment the fruit detaches itself from the bunch, full maturity has been reached. The original hard and tough exocarp becomes much softer and the fruits either fall or remain in the bunch.

As regards the quality of the oil during ripening, the free fatty acid content is of primary importance. Unlike other ripening oil seeds where the free acid content decreases during ripening, and is reduced to a minimum at the moment of full ripeness, the writer finds that the acid content of the palm oil is more or less constant during the whole ripening process, increasing slowly in over-ripe fruits. Two methods have been adopted for determining the free fatty acids: (1) by extraction with gasoline as solvent, (2) by pressure. The figures obtained by pressing were always higher and tend to show a greater difference at higher acid content. He concludes that in general "the oil obtained from bunches 5 days after reaching full maturity does not differ very much in quality from the oil of ripe or not fully ripe bunches. The difference is about 1 per cent."

In order to study to what extent losses in fat content occurred if bunches were not collected daily, as in estate practice daily picking was considered very expensive, three oil palms were sampled daily for two years and analysed for oil content to ascertain the increase during ripening. The fat was extracted with gasoline. In the course of the experiment the following interesting observations were also made :—(1) the loss of weight in the fruit during storage may be quite considerable amounting to 25 per cent. in the fortnight, (2) the loss of weight of stored nuts was negligible. Great attention was paid to sampling. As a result of investigation it was shown that the position "centre-front" is the one where the difference in oil contents between the outer and inner fruits is at a minimum. The exocarp at the outer fruits had a somewhat less per cent. of fat than that of the inner fruits. It has however been shown by the writer "that in general, the figures obtained by the analysis of the outer fruits calculated in per cent. of the fruit weight represent fairly well the average oil content of the whole bunch."

He also showed that "the maximum oil content (judged by the quantity of oil calculated in percentages of the weight of the nut) is reached when the fruits start to loosen in the bunches"—and that the oil content increases during ripening, "all the oil being formed in a period of 24 days."

The oil contents of fruits of the same tree remains constant within certain limits—in this particular investigation from 20 to 30 per cent. of the average value. The writer however confirms the previous view held that it is very dangerous to judge a tree from its oil content only, if only a few

analytical figures are available as this characteristic is of minor importance when compared with the wider variations which exist in the weight of the fruit.

The experimenter then discusses the effect of after-ripening. He has found that with the oil palm, in contrast to other fruits, if an unripe bunch is cut and preserved for 'ripening' the oil content, if calculated on the nut, shows no apparent increase with keeping.

As regards losses in gathering the fruits over-ripe, it was observed that the greatest losses occur from the dropping of the fruits from the bunch. It was also found that 'the oil content in the *outer* fruits decreased after reaching the maximum. The same loss of oil content was also found in some cases for the inner fruits. In other cases, however, an increase of oil content was noticed, after the outer fruits had reached their maximum.' From his figures he deduces that the oil content remains constant for 3 days, after full ripeness

The writer finally investigates the problem of the most eonomical collecting period. This obviously would depend on the age of the plantation. By calculation from the figures at his disposal he arrived at the conclusion that by using a 5 days' harvesting frequency the maximum productiveness has been obtained.

SUMMARY.

The general conclusions arrived at are as follows:—

(1) The formation of oil in oil-palm fruits takes place very quickly; under the conditions found around Medan, within 24 days.

(2) Losses caused by harvesting unripe bunches cannot be compensated by ripening after plucking.

(3) There is no objection to harvesting over-ripe fruits, provided that not more than 3 days have elapsed since the fruits have reached their full maturity.

(4) The maximum oil content is reached at the moment that several outer fruits loosen naturally in the bunch.

(5) The free fatty acid content in undeveloped bunches is about the same as that of ripe bunches.

(6) After reaching full maturity the free fatty acid content slowly begins to increase, but after 3 days this increase amounts to 0·6 per cent. only.

(7) An economical harvesting—frequency for the conditions around Medan—is one of 5 days."

Abstracted by A. W. R. Joachim, Agricultural Chemist.

THE CASHEW NUT.

As the Imperial Institute said in a Bulletin of theirs, *i.e.*, of the first quarter of 1916, the cashew nut is worthy of note as one that has been attracting increasing attention in England, besides other countries of Europe and America. The export of the nut was seriously hit by the war, but the trade is now slowly but steadily reviving and its commercial possibilities are also generally recognised.