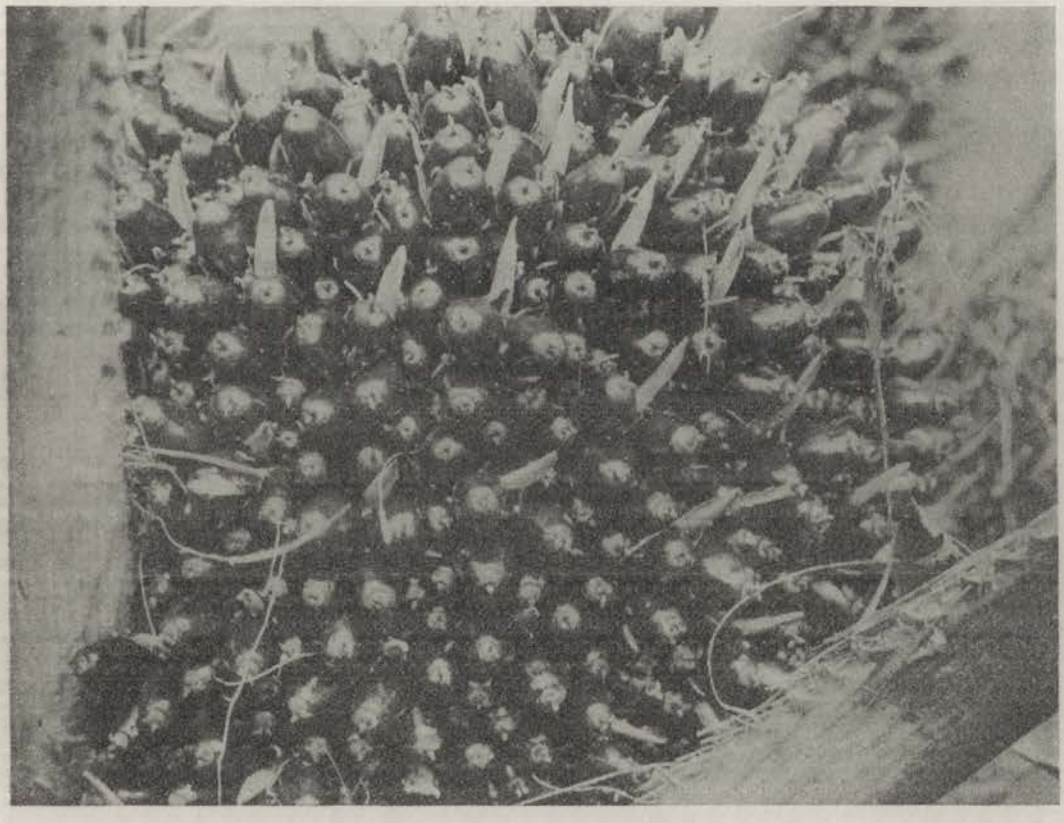
The Oil Palm Industry in West New Britain

Since 1966 work has gone ahead steadily on the oil palm project near Cape Hoskins in West New Britain. Last year the first results of five years' hard work were seen—fruit bunches were harvested and taken to the factory for processing, and the extracted oil was exported. The prospects for this new industry are most encouraging, but it must be noted at the outset that only a big oil palm project can operate efficiently and economically. You cannot make a profit out of a small oil palm plantation.

DASF is constantly looking for new crops which may prove better sources of income than our present sources and for crops that can be grown where no useful crop has grown before.

One crop that invited further investigation was the West African oil palm. Compared with coconuts, the oil palm nuts are very small —roughly the size of betelnuts—but they contain a very high proportion of oil. The fruits grow on the palm in big bunches; so big that a man can conveniently carry only one at a time. The fruit bunches growing on the palms at Kimbe now weigh 20 to 30 lb but as the trees get bigger, the fruit bunches will get bigger too, until they reach an average weight of 50 to 60 lb.

Because of their large size and weight, transport of fruit bunches presents problems where the use of trucks is not practicable. In Malaya workers tie the bunches onto a pole carried across the shoulder. In Africa a man may be seen balancing two or three bunches on his head; in Papua New Guinea they either carry them by hand or use a wheelbarrow.



(Photo: D.I.E.S)

Plate I.—A fruit bunch on a palm. Each individual nut is about the size of a betel nut.

(Photo: D.I.E.S.)

Plate II.—Seedling palms ready for planting out, are taken from the company's nursery to the smallholder blocks.

The best feature of these palms is that for one acre of land they produce three times as much oil as coconuts palms. Another advantage is the early maturity of the palms. After 3½ years from nursery planting, the first fruit bunches are ready for harvesting. This compares well with a time of 4 to 5 years for coconuts.

There are, of course, disadvantages too, the chief one being that the oil must be extracted from the fruit within 24 hours of the bunch being picked and preferably within 12 hours. After 24 hours the oil starts to go rancid. For the same reason it is essential that the palms are examined once a week and all ripe bunches are picked. If the fruit gets overripe the oil goes rancid before the bunch is picked. Naturally the factory will not accept overripe fruit bunches, as the rancid oil would spoil the rest of the oil.

Highly specialized equipment is needed for the extraction process and because this equipment is expensive, it must be used all the time to get an economic return from the expenditure. This means that there must be a big supply of fruit bunches to keep the extraction unit working full-time. This requires 2,000 hectares (5,000 acres) of oil palm with road access to the factory. It is therefore not an economic proposition to have a small isolated oil palm plantation.

After a careful study of the economics of the industry the Administration and the firm of Harrisons & Crosfield (which has had considerable experience with oil palm in other countries) agreed to set up a palm oil industry on a suitably large area of land that was available in West New Britain. A company was established called the New Britain Palm Oil Development Ltd. This is a joint venture which is owned equally by the Administration of Papua New Guinea and Harrisons & Crosfield (Australia & New Zealand) Ltd. The new company was initially granted a lease of 2,200 hectares (5,500 acres) and this area was later doubled in size. This is known as Mosa Planta-

tion. At the same time other land close by was made available to smallholders. Each smallholder is allocated a block of at least 6 hectares (15 acres) of first-class arable land of which he is expected to plant at least 8 acres to oil palm. The fruit from the smallholders' blocks and Mosa Plantation is processed in a large central processing factory. New plantings are still being made and eventually it is anticipated that some 4,000 hectares (10,000 acres) will be planted by the company and 5,000 hectares (12,500 acres) by 1,560 smallholders.

People living in nearby villages have also shown interest in oil palm and they have planted a total of about 200 hectares.

To finance these smallholder projects, the International Development Association has made two large loans—$1,337,000 in 1967 and $1,920,000 in 1970. The rest of the money needed was provided by the Administration.

Each smallholder gets a total loan of $1,800 (spread over three years) and his first repayments start when he starts harvesting. His repayments vary according to his total income and, on average, his loan is repaid four years after the first harvest. After this, with hard work and good management, he can anticipate an income of $1,500 to $1,800 per year.

The oil palms which were established first (nursery planting in August, 1967, field planting in August, 1968) matured even earlier than the agronomists anticipated. They based their estimates on Malayan experience, but the volcanic soil was so fertile and the climate so favourable for growth that the palms commenced flowering some 6 months earlier than anticipated. In July, 1971 the factory was opened and the supply of fruit bunches has been steadily increasing ever since. The yields of fruit from the palms have exceeded the estimates made five years ago.

In botanist's language, the oil palm fruit is a drupe. It consists of a thin epicarp, an oily mesocarp, a hard stony endocarp (shell) and a

(Photo: D.I.E.S.)

Plate III.—A smallholder starts planting his palms.

large endosperm (kernel) with one to three small embryos (*Figure* 1). The shell, kernel and embryo together form the nut or seed. Both the mesocarp and kernel contain oil.

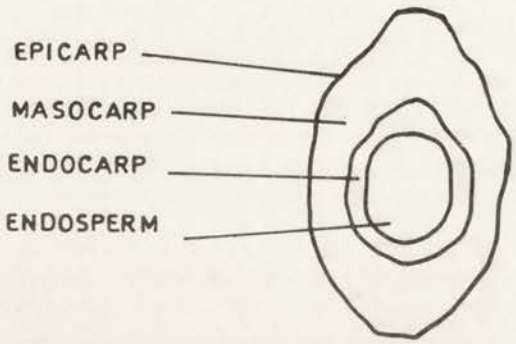


Figure 1.—An Oil Palm fruit cut lengthwise

The factory extracts palm oil from the mesocarp by pressing the fruit in large hydraulic presses that develop a pressure of about 3 tons per sq. in. After pressing, the shell and kernal are separated from the residue; the shell is cracked and the kernel recovered. Finally the kernels are sorted and bagged for export. All that remains—the stalks of the fruit bunch, the crushed mesocarp, the shells of the nuts—are all used for fuel. Nothing is wasted.

The extracted oil is pumped into tanks and taken by tractor or truck to the "tank farm" at Kimbe. The tank farm looks like a petrol company's bulk storage installation. At present there are only two tanks, but the number of tanks will grow as the supply of oil grows. Each tank is about 30 ft. high and holds over 100,000 gal. of oil. The oil is stored in these tanks until a ship arrives to take it overseas. While it is in the tank the oil solidifies so that it has to be heated to melt it. Once melted it is pumped from the tank on land directly into the tanks on the ship through a pipeline of about 9 in. diameter.

Social Development

The whole oil palm project consists of a nucleus estate surrounded by many smallholders in a big land resettlement scheme. This is by far the largest land resettlement scheme in the country and is being watched with interest by those concerned with social development. In the design of the settlement there has been an attempt to encourage integration of people from many different parts of the country. Six to ten (but no more) families from a particular district or language group are settled on adjoining properties. In the overall choice of settlers, allocations have been made with a view to a balanced selection from the different geographical areas of Papua New Guinea. There have been minor social frictions but on the whole a sound community spirit appears to be developing in the settlements.

Since for these people the old village organization has been lost, a new setup has been devised. There is a Hoskins Local Government Council and a Settlers' Representative Committee has been formed. The agricultural extension work is carried out through this Committee.

Each subdivision of the project has its own co-operative store, and these are providing the people's day-to-day needs quite adequately, and making a profit too which is returned to the people.

Schools are well equipped and adequate. Every child of school age attends school. There are aid posts and Infant Welfare clinics in the subdivisions and a big hospital at Kimbe. Churches are active and so are sports clubs, with soccer being the main interest.

Research Work

The oil palm has only recently been introduced as a commercial crop in Papua New Guinea and there is still a lot to be learnt about it. Accordingly a research programme has been established at Dami Research Station close to Mosa Plantation. Here work is carried out to study the effect of tree spacing on yield, the use of chemicals for weed control, methods of assisted pollination and the effects of castration of palms for a period before they are allowed to start bearing. Particular attention has been paid to the economics of fertilizer applications, supported by chemical analysis of oil palm leaves which provide a guide to fertilizer needs.

Future Prospects

The rise of the oil palm industry has been watched with great interest by those concerned with agriculture, social development and economic expansion in Papua New Guinea. The project has proved successful in all these aspects and the prospects for both the company and the smallholders are very hopeful. The results now being obtained show that the optimism of the early planners was fully justified.