

THE CHIEFS KEEP THEIR POWER IN W. SAMOA

From GLEN WRIGHT, in Apia

For the second time in 10 years Western Samoa's Parliament has voted against universal suffrage. After only one day of debate on March 27, the vote was 37 to 6.

Motion to change the electoral law was introduced by the national assembly's youngest member, Letele Taneolevao Siaosi. His proposal was that only Matais (chiefs) be candidates for the assembly, but that the vote be given to all citizens more than 21 years old.

Thus some 8,500 chiefs continue to speak for more than 30,000 adult Western Samoans in matters of government.

The only time universal suffrage has ever been exercised was in 1962 when every adult voted in the independence plebiscite, at the insistence of its sponsor, the United Nations

Speaking against Siaosi's motion, MP Fatialofa said that people over 21 who were not chiefs would cause trouble if given the vote.

Scornful

"They would sway the majority, and that is not the right thing to do," he declared.

Prime Minister Fiaame Mata'afa, who supported universal suffrage in the constitutional conventions of 1954 and 1960, argued that in voting for independence and the Constitution in 1962 the people approved restricting political power to the chiefs

Members of Parliament were just as unanimously adamant that tradition and custom be the principle of Western Samoa's Government, pointing with scorn to the wars, riots, revolutions, insurrections and civil uprisings in countries whose governments are based on the legal process.

They argued that the Matai system is as democratic as possible, because Matais are chosen, often from a field of candidates, by unanimous vote of their aigas (extended families).

According to the Constitution the Matais in turn choose 45 of their number every three years as members of Parliament, the Head of State appoints one of them Prime Minister, who selects a cabinet of eight. When

present Head of State Malietoa Tanumafili dies, his successors will be chosen every five years by Parliament, which also has power to remove him or them

The debate was lackadaisical and characterised by such reasoning as: "People over 21 will agree, and say, 'the right to vote is not for me',"—MP Polataivao.

But the six dissenting MP's, the Press, and a host of youth leaders vigorously oppose this view. Their opinions shaped by exposure to libertarian ideas expounded by school teachers, Press and radio, they chafe under the rigid authoritarianism of the Matai system.

Customarily every morning the chief calls his tribe together and issues the day's orders; not only who is to do what, but how it is to be done. All production and earnings must be given to him. He takes what he wants and distributes the rest according to a traditional pecking order.

He reserves to himself the right to make all decisions, large and small. He has his choice of the women, too.

Social order

In return, he is obligated to maintain social order and provide for the physical needs of his tribe.

However, thanks to foreign institutions, recent generations have become much better educated than most of their rulers. Therefore, they argue, they are better equipped to make some decisions, and can make significant contributions to others.

High on the young commoners' grievance list is the Matai's self-assumed prerogative of taking first choice of the women, both in and out of marriage. This runs counter to the Christian sex code to which all subscribe by virtue of church membership, and to their own design for living.

Although few Samoans abide by Christian ethics, they do make a

Caledonian will try again

New Caledonian aviator Henri Martinet, 62, was back in Paris in April after having abandoned, at least temporarily, his flight from Paris to Noumea and back by a single engined Caudron-Renault.

But only a serious accident stopped his flight, in the Celebes, after six weeks of flying from France. His plane crashed on March 24 when there were only a few more stops to get him to the Pacific.

Martinet, well-known in South Pacific aviation, was making an anniversary flight 30 years after having made the first historic flight from New Caledonia to France. He left Paris with his wife, France, 52, on February 9, but his wife was not in the two-seater when it crashed. She gave up her seat in Singapore to a French reporter and was in Noumea when he crashed.

Martinet says he will make another attempt.

vital distinction between free-will and coercion and accuse their chiefs of hypocrisy on this score.

Another cause for dissatisfaction has been election malpractices by the Matais. They have created and forced their tribes to approve scores of new Matais, some only ten years old. Such chiefs do not have the traditional attributes of control of customary lands or performance of government functions but were created solely so that their votes could be manipulated in parliamentary elections.

The government has made it illegal to confer a title on anyone less than 21, but the creation of great numbers of titles for electoral purposes is still possible.

"Rear-guard action"

In an editorial, the *Samoa Times* stated: "The whole debate had the distinct atmosphere of a rear-guard action. . . . If the opposition is to become no more enlightened than this, it will eventually find itself cutting out the Electoral Act altogether or limiting the amount of education to be given to the growing generation, as more and more young people who form 60 per cent. of the population demand their say in the planning of the future."

BANK BELIEVES NEW HEBRIDES HAS A FUTURE

News that the British-based Australia and New Zealand Bank Ltd. will open a branch at Vila, administrative capital of the New Hebrides Condominium by December this year, means that this bank has faith in the condominium's economic potential.

It can also be taken as a sign that the ANZ Bank believes Hebrides trade with Australia is going to snowball in the future.

The bank sent a top administrative officer to the Hebrides last year, who submitted a detailed report on the condominium's economic future. The report emphasised that while Australia supplied 46 per cent. of the Hebrides' imports, it took a mere three per cent. of its exports.

Gauging its own experience in the nearby Solomons since 1966 (the bank opened a branch in Honiara in October of that year), the bank report said sawn timber exports (particularly from the French Erromanga project) and meat sales (particularly from Santo) could go to Australia in a big way in the 1970's.

Tourism also was seen as a bright point. The bank, which is in the travel business itself, can see tourism picking up in the Hebrides, especially with "circle Pacific" tours.

Both the bank and one of the condominium's biggest traders, Burns Philp (New Hebrides) Ltd. say they "feel sure" they can co-operate in their varied business operations. Neither would disclose if any arrangements had been made.

BP's, already agents for the Australian Commonwealth Savings Bank in Vila, feels it can work with both banks without interests conflicting. But it's unlikely BP will let ANZ office space in its new Vila headquarters—the building is already full.

The ANZ overall view was that the condominium's potential is, as yet, not fully exploited. The bank obviously wants a hand in future developments. Its former Honiara manager, Mr. Alan Barker, was in Vila in April checking possible sites for an office.

ANZ will compete in Vila with the French Banque de L'Indochine and the Commonwealth Bank.

NEW | NOUVEAU PASSPORT | PASSEPORT

New Hebrideans, who are under two flags, at last have something that looks like their own passport in place of certificates of identity. It is a handsome document covered in dark blue, with gold lettering. Pages are in pale blue, and from cover to cover the contents are scrupulously played down the centre, English on one side, French on the other. However, the cover says not simply **PASSPORT** but "Travel document for use as **PASSPORT**".



News of the third bank closely followed announcements from the French and British Residencies that two condominium-owned abattoirs, with refrigerated storage space, would be built, subject to feasibility studies, at Santo and Vila.

As Santo has a deepwater wharf (Vila is in the process of building one) and it is exporting more meat than Vila, its abattoir will be built first, possibly by January, 1972. Vila will get its abattoir in 1973.

So far, steamed and non-steamed canned meats from Santo have been doing well in New Caledonia; only better quality exports would find their way to Australia.

AND AMONG THE IRRATIONAL AIRLINES . . .

A top-level eight-man team of British and French aviation experts took a look at aviation facilities and possible developments in the New Hebrides in April.

The team was, among many other things, interested in whether Bauerfield, on the main island of Efate, could be upgraded for jet services or whether another airstrip should be built on that island. Bauerfield was upgraded more than a year ago but it is still not suitable for jets.

New Hebrides aviation facilities are, in fact, very poor and the condominium is not likely to get any decent air services until real money is spent.

Airstrips are marginal—most were built by the late Paul Burton and planter Bob Paul when they got New

Hebrides Airways off the ground against difficult odds a number of years ago—and it is impossible for an internal air service to operate profitably until airstrips and other facilities are improved.

Both French and British aviation interests have been putting pressure on recently, which is one reason for the aviation experts' visit. The French are, anyway, interested in reviewing their entire South Pacific air services.

Hebridair, the French internal airline, has nothing able to fly at all at the moment. Its Dornier needs replacing or rebuilding.

New Hebrides Airways was making do in April with an Aztec under charter while a new modified and overhauled Drover 3B was being flown from Australia to replace its only other aircraft, a Drover damaged recently. The Hebrides internal, rationalised air "fleet" was thus neither rationalised nor a fleet.

New Hebrides Airways, which already has Qantas and BOAC capital in it, now also has Burns Philp money. In April there was a share transfer which resulted in the Islands trading firm getting a 15 per cent. holding. Qantas and BOAC control the company with 51 per cent. of the shares, and other shareholders besides BP are Mr. and Mrs. Bob Paul, the widow of Paul Burton, and some New Hebrideans. Bob Paul is chairman.

Other pending aviation changes in the South Pacific reported in April were a decision by the Republic of

table in the cemetery to remain the customary two days.

A detailed sketch of a proposed monument for Kwajalein was sent to the US command. Unfortunately it was far too elaborate and the Americans said that they could not build it, explaining that the cemetery was, after all, small and out of the way and that few people would ever get to see it.

The Americans also pointed out that it might be many years before the present security restrictions were relaxed enough for any members of the association to see the marker in place. However, the possibility of a smaller memorial of some kind still existed, and the organisation was promised consideration of a revised design.

A permanent monument has still not been agreed upon. However, in the autumn of 1967, two members of the association visited the Islands, their purpose being to place small, temporary "grave posts" in the appropriate places.

Permission to visit Kwajalein or Eniwetok Atolls was not granted, but the representatives toured Nauru and Ocean Island, Makin and Tarawa, and Jaluit, Mili and Maloelap in the Marshalls, all scenes either of battles or of regular, debilitating bombardment, isolation and eventual starvation.

"Grave posts"

Two of the "grave posts" were sent to Kwajalein and placed in the cemeteries there and on Roi-Namur.

They are simple markers inscribed with Japanese characters which say (according to the best available translation), "In memory of Japanese soldiers killed on the Marshall and Gilbert Islands."

Kwajalein has remained an American military base since its capture and the Americans who died taking the island are commemorated by several monuments. The island chapel was the first memorial, and contains two memorial plaques.

There is also a large monument to the US dead, and two of the atoll's airfields, Bucholz Field on Kwajalein, and Dyess Field, on Roi-Namur, are dedicated to individual heroism in the battles for the two islands.

Oddly, the only individual grave on Kwajalein is a very small one. The headstone on it reads, "Tinker. Japanese canine survivor, Kwajalein invasion, 1944. . . Befriended by members of the US Armed Forces. Born approx. 1943—Died 15 Jan., 1962."

THE KITE-FISHERS OF THE SANTA CRUZ ISLANDS

By DON MARSH

It was while I was steering the concrete yacht *Adventure* through the Santa Cruz Islands, in the British Solomon Islands Protectorate, that I noticed what appeared to be a piccanniny flying a square-shaped kite from his dug-out canoe. Of course, it's not such a strange sight to see a kite fluttering in the breeze anywhere in the world, but one does not expect to see the manipulator conducting the sport from the seat of a canoe.

As I drew closer to the small island of Te Motu, I could see that the boy was actually paddling his canoe along while trailing the kite. It seemed a rather odd way to fly a kite just for the fun of it.

I would have taken no more notice except that I saw him haul in a fish which was hooked to the tail of the kite. So that was it—kite-fishing. Although I had heard that this most ancient form of fishing was still carried out among the remotest tropical islands in the world (where Japanese tin-openers and tinned fish have not arrived), I did not expect to see it in its natural setting.

Made of leaf

Any tourist or traveller has to pay to get subject matter for his camera these days—posing, dancing, tattooing, cooking, hunting; and it's all so unnatural when posed: even nose ornaments are only worn for the benefit of foreigners, and are not normally seen.

In New Zealand, some anglers use a kite to take out the line if they wish to fish further from the shore than they can cast the sinker; and the kite they use is quite an ordinary diamond-shaped one, but the kind used in the Solomons is a small square one made of dried leaf and slivers of bamboo.

There is certainly some skill needed to handle a dry-leaf kite, which seems to come naturally to the primitive man of the Santa Cruz Islands.

The fisherman has to choose a suitable sea surface and wind force, and paddle at sufficient speed to keep the kite just hovering over the water so that the tail, weighted with hook and bait, is just bobbing along the surface.

The usual clam or prawn bait is used on the hook; with no sinker attached because the bait has only to skim the water. .

Most kite-fishermen now use steel hooks (in preference to bone or

wood) and flesh bait, but I passed close enough to see that this one was using the old traditional cobweb ball: the web ball acting as hook and lure.

However, cobweb will not "hook" any kind of fish (although it will lure all the surface fish). It will only hook a species whose top set of pronged teeth fit tightly into the lower set. When such a fish snaps at the web ball, both sets of teeth are jammed together by the threads of web. And the teeth remained jammed because fish have very little opening power in their jaws (That applies to crocodiles too, incidentally. It is quite safe to hold them by the snout, as any crocodile hunter will tell you.)

The same web bait can be used over and over again. The best of webs are provided by those huge spiders who spin their snares in the lime bushes: some threads are as thick as cotton and quite strong; and give one quite a scare if walked into unawares.

Quite a scare

As soon as the proposed airfield is built on Ndeni to receive jumbo jets, the Santa Cruz Islands will be just as plagued by tourists as anywhere else. All primitive ways of life, such as kite-fishing and flying-fox hunts, which tourists will come thousands of miles to see, will soon be no more; for tourism sees to it that customs are turned into mere imitations of former ways.

The very first batch of tourists, almost strangled to death by the sheer weight of their cameras, will be the lucky ones: there will still be plenty of genuine Islands life to focus on—and no broken glass on the beaches.

So far, Santa Cruz has been left alone by the commercial world: an oasis in the competitive sphere. But how long is kite-fishing to be with us before it, too, disappears, and the Melanesian loses his identity?

People

● Mr. N. H. Fisher, a geologist for the New Guinea Administration in the 1930's, has recently been promoted from assistant director to director of the geological branch of Australia's Bureau of Mineral Resources, Canberra. His new job carries a salary of \$11,500. In 1935 Mr. Fisher visited Bougainville and made a detailed report on three small gold mines at Kupei, Moroni and Panguna. Panguna is today the site of the island's massive copper deposits.

● The Gilbert and Ellice Islands Commissioner of Labour, Mr. Murphy, was due in the New Hebrides, the Solomons and Fiji in April and May to find out whether he could get more Gilbertese to work in the Hebrides and the Solomons. He was to discuss industrial training matters in Fiji. He was to travel to the Hebrides on the GEIC's passenger vessel *Ninikoria*. Mr. Henry Schutz of the GEIC's biggest private firm, Schutz and Wilder, was to accompany him to the Hebrides on recruiting business.

● Mr. Ned Avary, a retired PanAm jet pilot, is living on Lord Howe Island with his younger son, Dean. "Captain" Ned, who likes Howe's climate and its school, recently made a trip to Noumea on Captain Emile Savoie's *Jacques Del Mar II*, via Norfolk Island. On Howe he has rented a large house for an "indefinite stay".

● Mr. Les Hambleton, a retired jeweller who had spent 10 years building a 28 ft ketch in a barn near Vancouver, British Columbia, farewelled his wife and children in Vancouver in April to sail around the world singlehanded in the ketch.

● Lee Graham, who as a 16-year-old set out from San Pedro, California, in a 24 ft fibreglass sloop *Dove* to sail around the world singlehanded, is nearly home. (He was expected in Barbados, West Indies, in late March, and had to sail through Panama to San Pedro). And the singlehander is now married. Lee married his wife, Pat, late last year when he arrived in Durban, South Africa, and Pat has since been following his sailing stops by air or ship.

● Bob Trumbull has been *The New York Times'* correspondent in the South Pacific these past four months, and during this time he has travelled to several Island territories (among them, the Gilbert and Ellice Islands, Fiji and Western Samoa). He will be back in Fiji soon and plans to make a trip to Rabi Island. Covering the 25th anniversary of the Battle of Tarawa late last year, Bob went to Ocean Island and he's now anxious to follow up the Banaban story. As a war correspondent, Bob covered the Tarawa battle over 25 years ago. Today he's based in Sydney.

● Mr. Bill Carney, Australia's Trade Commissioner for the Pacific Islands, put in a week on Tarawa, capital of the Gilbert and Ellice Islands, in April. A real goer, Bill has done a tremendous lot in the last couple of years to promote Australian trade and goodwill in the Islands. The other Australian Trade Commissioner for the Pacific Islands, Mrs. F. B. Wilson, has recently put in three weeks in New Guinea, visiting Madang and Kieta. She expects to visit New Caledonia later this year.

● Captain A. J. D. McArthur, a ships' master in the Solomons and New Guinea Islands from 1932 to 1936 and in recent years master of the Conzinc Riotinto exploration ship *Craestar*, suffered a stroke in April. He retired in January and became a partner in a land agents' firm, Surfers Accommodation Centre, at Broadbeach, Queensland. Captain McArthur's wife, "Babs", died late last year. His brother-in-law, Bob Lundie, is head of a Sydney customs agency.

● An apprentice draftsman, Ducky Nippon, who works for the Department of Public Works in Papua-New Guinea has been selected as the Apprentice of the Year. Ducky comes from Kunakunai Village in the Kokopo Sub-District of East New Britain.

● Mr. Alan Tiffany, formerly head of the School of Engineering at Ipswich Civic College, England, is due to arrive in Fiji with his wife and children in May, to take up a new appointment as principal of the Derrick Technical Institute in Suva.

● Mr. John Simpson, China Navigation's training officer with the Gilbert and Ellice Islands *Teraka* seamen's training scheme, recently arranged for 15 trainee seamen to fly to Hong Kong from Tarawa to

take up jobs in his company's ships. To avoid a long and expensive air trip via Fiji and Australia, John chartered Fiji Airways' 748 aircraft to fly the Islanders to Majuro, Marshalls, and from there they picked up Air Micronesia northwards.

● Reverend G. C. Harris, president of the Free Wesleyan Church of Tonga and the kingdom's Royal Chaplain since 1963, will retire to Australia in June. He will leave following the church's annual conference at the end of May. No successor has been named.

● Mr. Ossie Todd, Steamships Trading Co. Ltd.'s resident director for Australia, recently bumped into an old New Guinea drinking mate in Sydney. The mate: Monty Stobo, currently a director of Burns Philp (NG) Ltd. and shipping manager for BP's parent group. Both have many years behind them in NG working for their rival groups, but they are now based in Sydney.

● Martin Burnet, of Bedfordshire, England, is now working with the Volunteer Service Organisation on three causeways on Onotoa Atoll Gilbert and Ellice Islands, with another VSO, Dick Morris. They are working against time to get the causeways completed. The pair used a raft made of 25-year-old oil drums to move the atoll's only tractor from islet to islet.

● Two former New Guinea gold-fields identities found themselves with unexpected spells in Sydney hospitals in April. Mr. Tom Yeomans was in St. Luke's Private suffering from a slight stroke, and Mrs. Lillian Barclay Millar was in Mona Vale Hospital recovering from an operation. Mr. Yeomans' attack came just as he was preparing for a trip to New Guinea.

(More People, p. 139)

● **Opposite: Miss Virginia Blake, professional dancer from Tahiti, visited Sydney recently after having been in Los Angeles where she was a guest of the American television show "Hollywood Palace". Miss Blake, who was in the film "Mutiny on the Bounty," is pictured here in Sydney's Centennial Park. The duck is one of the locals, and apparently with an eye for beauty. Photo: Bruce Adams.**





The Practical Planter

GETTING STARCH OUT OF SWEET POTATOES

The sweet potato (*Ipomoea batatas*) has a starch content of between eight and 29 per cent. There are hundreds of varieties: those of average starch content are more suitable as a food, while varieties of average to high starch content are good for starch production.

Sweet potatoes which give a large yield, have a light coloured flesh and high starch content are most desired for starch manufacture. Except for methods used to remove the colour from the starch, the process is said to be quite simple and similar to that for other root starches.

Indeed, the Japanese have been producing low-grade starch from sweet potatoes for many years for purposes where colour is not so important. It is understood that production in Japan is from a large number of small factories, and the quality of the starch varies considerably.

Success in Japan

According to a report on Japanese cottage and small-scale industries, sweet potato starch production is run on well organised lines and its success is due to abundant cheap electric power, the ability of small enterprises mostly catering for the domestic market to adapt themselves quickly to changes in fashion, a plentiful supply of cheap labour, the close personal relationships of employees and co-operative relations with larger enterprises. The by-products of sweet potatoes are also used, e.g. the pulp and vines are used for cattle feed.

In Japan, the tubers are processed during the three months from October to December. The process is alkaline throughout, and the yield is from 20-26 per cent. (average 23 per cent.). The starch is stored as wet starch in concrete tanks.

In the US, experimental work on sweet potato starch production was begun during the last part of the nineteenth century. The first sweet

potato starch factory was set up in Louisiana in 1928 by the La Fourche Starch Refining Company. Owing to various factors, including competition with white potato starch, operations were not successful.

The Department of Agriculture pursued studies on sweet potato starch and in 1934 initial trials were started at a factory in Laurel, Mississippi. The plant could not be run economically and had to be abandoned. Then in 1944 the United States Sugar Company authorised the erection of a large plant in Clewiston, Florida, but that also failed. The reasons for the failure of the industry in each case were attributed to the following factors:

- Low yields of crop per acre.
- The use of unsuitable varieties for starch production.
- Storage difficulties.
- Seasonal production.
- Competition from other cheaper starches.
- Quality variation and poor colour of the starch.
- High production costs.

In view of that experience with sweet potatoes for starch production, the American view was that any future production of starch from sweet potato should be in small units, e.g., 10 tons per day and should be considered only where the raw material could be obtained cheaply, and all the by-products should also be made use of as in Japan. Apart from the proximity of the supply of raw material other factors reported to be important in considering the location of a sweet potato starch factory were:

- Abundant good water supply, free from algae and iron salts.

Exports of Fiji dalo double

New Zealand eaters of Fiji-grown dalo have doubled their appetite. Exports of the starchy vegetable increased from under 10,000 cases in 1967 to over 20,000 in 1968—all but 1,000 cases going to New Zealand.

The 1,000 cases went to North America, where there is also an increase in dalo eaters.

Kadavu's dalo production for sale in 1968 was 85 tons, compared with 40 tons in 1967, most of it being produced in Nabukelevu Tikina.

Plantings now in the ground indicate that Kadavu may be able to double production this year.

- Good transport facilities.
- Facilities for the disposal of effluents.
- Cheap labour.
- A good market for the final starch product.

It was also recommended that full use should be made of the crop by having the factory associated with a cannery which could use any tubers that were unsuitable for starch production.

American system

A system of producing starch from sweet potatoes, developed in Mississippi, worked like this:

Sweet potatoes were thoroughly washed, crushed in a hammer mill and with a clear saturated solution of calcium hydroxide to flocculate certain impurities and dissolve the pigment present which would otherwise have discoloured the starch. The mass was passed over a series of electrical shaker screens to remove the liberated starch granules.

The screened slurry was re-ground and washed with calcium hydroxide solution. It was then re-sieved giving a suspension with a pH of 8.6 to 9.2, which was the optimum range for all the tabling operations.

The starch milk was again sieved to remove fibres, etc., and its spe-

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cific gravity adjusted to about 5°Be before being pumped into the tables. The tables sloped 1/32-in. per foot and were made of concrete, 19 in. wide by 110 ft long. The starch deposited on the tables was re-tabled with fresh water and the deposit from this was flushed from the tables to give a slurry with specific gravity in the range of 10-15°Be and re-screened.

To obtain a good coloured product the starch from the second tabling was bleached for two hours with slight excess of sodium hypochlorite at a pH value just above 8.3. The residual chlorine was eliminated by the addition of sulphur dioxide and a final adjustment of the pH value was made.

The liquor was then centrifuged at 1,200 r.p.m. in a basket type of centrifuge. The resultant starch still contained about 35 per cent. moisture and further drying in a batch vacuum drier (4 ft in diameter and 20 ft long) was necessary to reduce the moisture content to 12 per cent. The dried sweet potato starch was then pulverised and screened over bolting silk to give the final product.

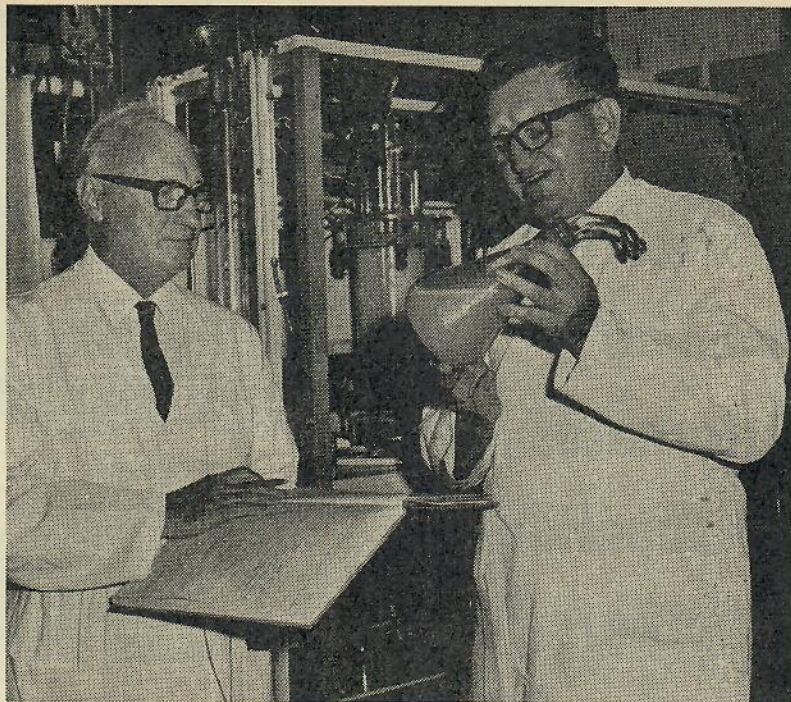
The wet process was alkaline throughout. Clear water was introduced at the shaker screens and throughout the whole process the pH was maintained within the range 8.6 to 9.2. Speed of operation was essential because the process was prone to bacteriological troubles.

The starch produced by this process was said to be valuable for warp sizing and gave good clear colours and soft handle when used for finished cotton goods. It was also found to be suitable for paper making and for the manufacture of adhesives and dextrin.

To prepare sun-dried chips from sweet potatoes, the tubers are washed well then sliced and scraped with a knife to remove the skin. They are then cut into chips of about 1/4 in. thickness, spread over a clean cloth or on a clean cement floor and dried in the sun. When freshly cut, the slices are white in colour and change to a creamy yellow after two hours of drying.

After about eight hours of drying, the slices generally become dull white in colour and crumble easily on pressing. Drying is usually complete in about 10 to 12 hours.

Sweet potato flour is formed by pounding the sun-dried chips in an iron or stone mortar followed by sieving. The flour thus prepared is a creamy white colour.—*Information from the British Government's Tropical Products Institute.*



Professor G. Roper (right), of the University of New South Wales, has been working for six years with Professor F. J. Moss (left), also of the university, developing a simple process for producing edible protein from grass and crop waste. They are pictured here in the university's biotechnology laboratory.

Edible protein from grass

A process for producing edible protein from grass and crop waste has been developed by scientists at the University of New South Wales, Sydney. It has been hailed as a significant step towards the solution of the world's food problems.

Similar processes have been developed in other parts of the world, including Britain and the USSR. It is claimed that the Australian process is proving three times as efficient as any other.

Scientists at the University of NSW aim further to perfect the process so that it can be used by families, or by co-operatives in villages by 1969.

Working for six years

Professor G. H. Roper, associate professor of biological engineering at the University of NSW, says that the process "could lead to man being able to adequately feed himself in the future without the danger of protein shortage".

Professor Roper has been working for six years on this project with Professor F. J. Moss, associate professor of biological technology at

the university. Professor Moss is a former physician who became so interested in the protein deficiency problem that he set up a private laboratory to work on it 20 years ago.

So far the Australian research team has been able to produce protein suitable for human consumption from such sources as grass, sawdust, sugar cane fibres, crop stubble and coconut flesh. With the new process, 35 lb of edible protein can be produced from 100 lb of grass.

A process employed in British experiments at the Rothamstead Agricultural Research Centre is able to produce only 12 lb of edible protein from 100 lb of grass.

Professor Roper says that as far as he knows, the Russians have not progressed as far as Australians in respect of protein production for human consumption. However, they have said they will be producing 1.3

million tons of protein, synthesised from waste, for use as stock feed in 1970.

The artificial protein produced at the University of NSW is powdery. Protein produced from sugar cane has a sweet taste like molasses. When lucerne is used, the product has a pleasant salty flavour. The protein produced by this Australian method is of extremely high quality, generally of comparable value to egg.

Of special significance is the relative simplicity of the Australian method, which can be used anywhere, particularly in underdeveloped areas.

"Breakthrough"

Professor J. R. A. McMillan, national president of the Australian Freedom from Hunger Campaign, has hailed the work of Professors Moss and Roper as the beginning of "a phenomenal breakthrough in meeting the world's protein shortage".

Almost any plant can be used, even the plant debris left behind after a crop has been harvested.

Explaining the Australian process, Professor Roper said: "The protein is produced in several stages. Using grass, the plant material is crushed and the plant juices extracted.

"This juice is set aside and the plant fibres are then treated with sulphuric acid. The sugary solution in the fibre residue is added to the plant juices, together with selected bacteria or yeasts to feed on the sugars present and produce protein in their own bodies.

"We have found that we can use about 20 different micro-organisms to do the job of producing protein," he said.

The protein produced is analysed for its amino acid content, the vital constituent of proteins, and if necessary the raw protein is supplemented with amino acids to improve its quality. To obtain the protein, the solution is spun off in a centrifuge.

● Proposals are now being considered for transport projects including new and improved roads, Bridges, wharves and airstrips for the 1969/70 Papua-New Guinea Rural Development Programme. The programme provides funds to each P-NG district for expenditure on approved projects. Priorities are put forward by the District Co-ordinating Committees in consultation with the Local Government Councils, District Advisory Councils and other community representatives.

WORKBOAT MAINTENANCE



The right tools for the job

Workboat maintenance obviously cannot be carried out without the proper tools. This month our marine engine specialist lists some of the tools which should be found in the workshop of a practical planter.

The first and most obvious requirement is a set of hand tools, e.g. spanners, combined open-end and ring types to cover the range on the boat engine. It's also a good idea to have a set of spanners in SAE from $\frac{1}{2}$ in. to $\frac{3}{4}$ in. to suit tractor or car. Other essential hand tools are screwdrivers, heavy and light, pliers, tin snips, small pin punches, large and small hammers and a 1 in. flat chisel and $\frac{1}{2}$ in. or $\frac{3}{4}$ in. cross cut chisel.

A good stout breast drill or a small hand drill are important on a plantation. If, however, you have electric power on hand, it would be a better idea to get hold of an electric drill and with a bench attachment. An electrical drill is useful in a number of ways, e.g. with a wire brush rust can be removed from machinery, etc. and propeller blades can be cleaned with an emery or sanding disc. The drill can also be used as a grinder.

Welding

A blowlamp should be kept for soldering, etc. and it is now possible to get a small gas welding outfit. A small assortment of dies or die nuts are very useful. For plumbing and pipe repairs keep a pair of Stilson wrenches and several pipe size die nuts—i.e., $\frac{1}{2}$ in., $\frac{3}{4}$ in. and 1 in. Gas. (BSP).

It is now possible to get a small power driven hacksaw which can be very useful for cutting shafts, bars, bolts, chain, pipes, tubing and wood. A useful small saw bench, complete with a wide range of operation equipment is now on the market at a reasonable price.

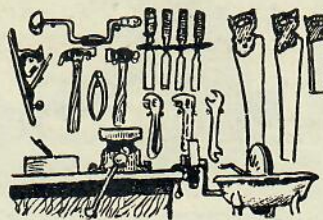
The use of a Black Hawk type hydraulic jack is worth considering as it can be used as a permanent press unit quite apart from its normal use. This sort of jack is portable, labour-saving and reasonably priced.

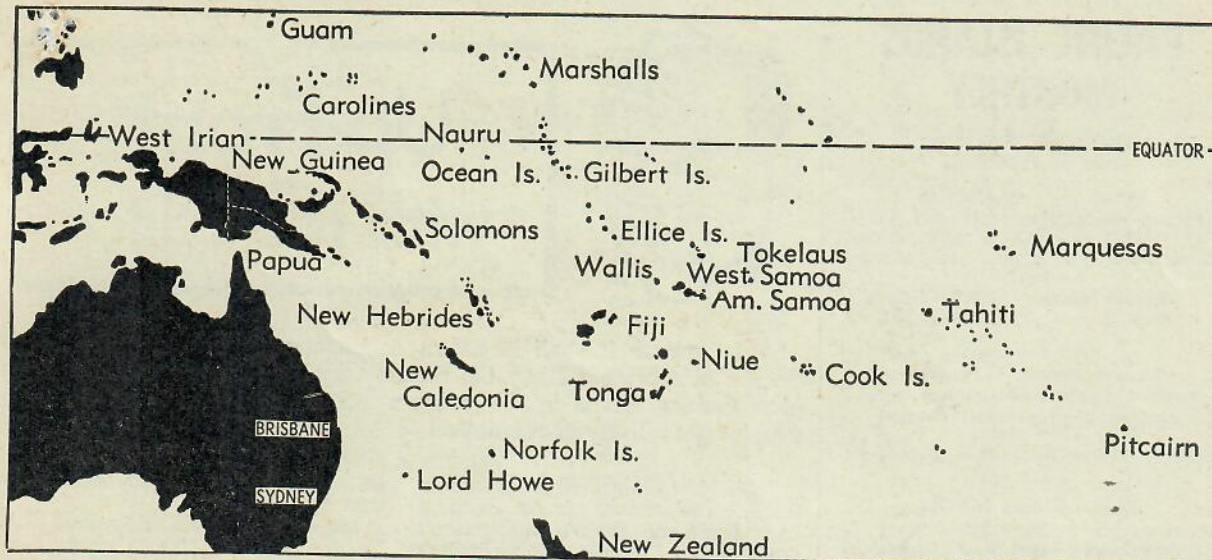
Testing equipment for engine fuel systems is not vitally necessary, as there has been an increase in fuel injection service stations in the Islands. Unless you were very remotely stationed, you would require only a small nozzle cleaning kit. A small test gauge is obtainable for injectors.

Electrical maintenance equipment is not very expensive and it is worthwhile getting hold of a volt meter and ammeter to check charge rate and battery voltage. It is possible to get a small testing box (with leads, etc., included) at a low cost.

A good hydrometer is useful but if you can afford it, a battery "prod-meter" is better for telling the condition of a battery. A pair of portable leads of HD cable with alligator clips are a good workshop time saver.

This is a list of the basic tools for the planter who carries out his own maintenance. For further details of the equipment mentioned please write to the editor of the Practical Planter section.





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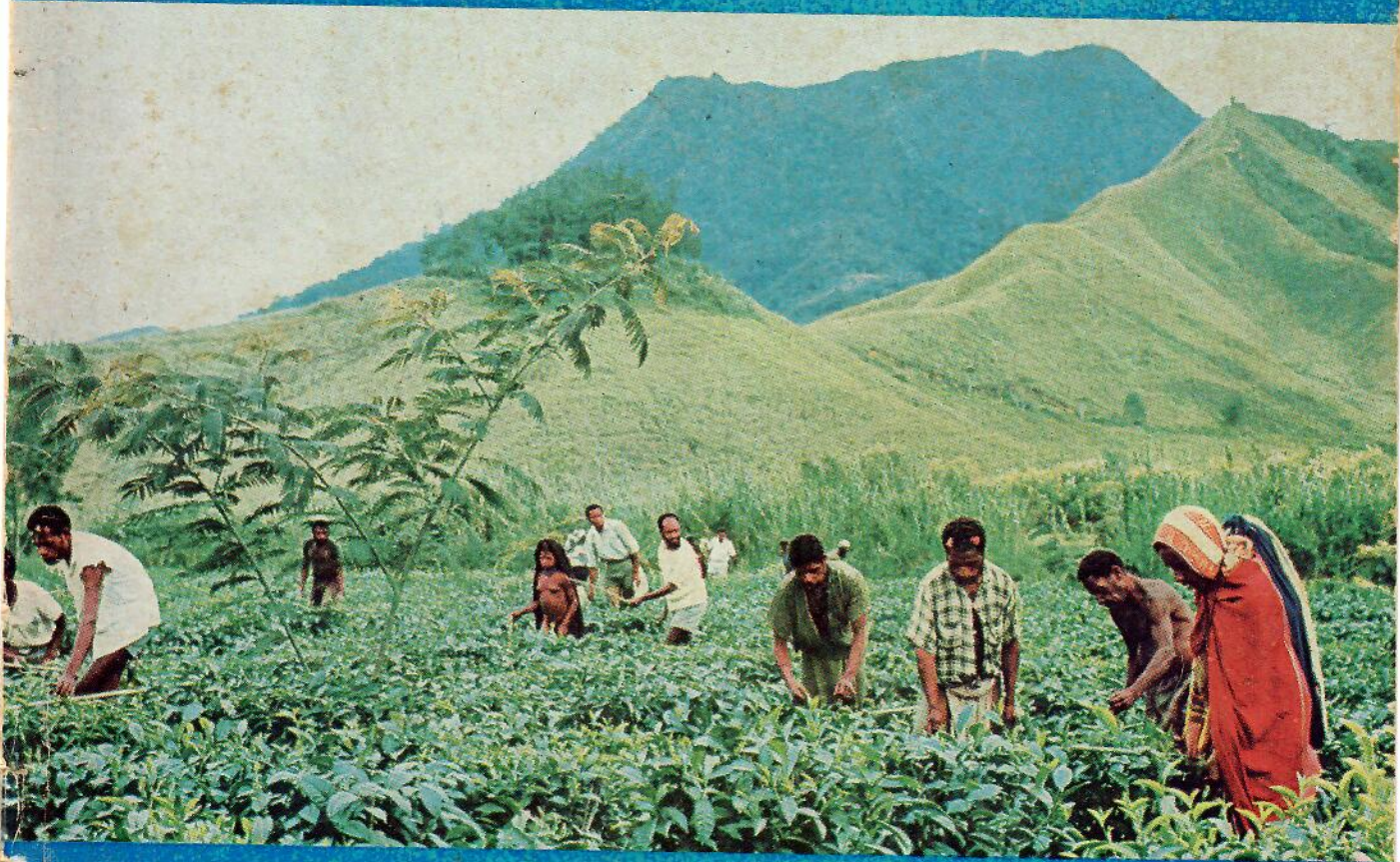
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