nificant value beside the easily acquired delicacies of the pakeha.

But what would be hardly worth troubling about under one set of circumstances might be extremely valuable under another; and it is quite conceivable that an article of food which would be comparatively valueless once the Maoris had become possessed of the potato, of wheat and maize, of the pumpkin and vegetable-marrow, and had the means of purchasing biscuit and flour and sugar and tobacco, would be worth cultivating at the cost of any trouble at a period when the list of garden produce was limited to the smaller varieties of the kumara and taro (taro Maori), the tasteless hue and the "greens" mentioned by the early navigators, and when the supply of vegetable food had to be eked out with the fern-root and other wild edibles of the bush. I think, therefore, that, in the absence of any evidence to the contrary, we may safely conclude that Mr. Cheeseman's theory is the correct one, and that the plant was brought by the Maoris in prehistoric times, and that most probably the introduction took place on their original immigration to the country.*

ART. XXXII.—*Notes on the Cultivated Food-plants of the Polynesians, with Special Reference to the Ti Pore* (Cordyline terminalis).

By T. F. CHEESEMAN, F.L.S.

[*Read before the Auckland Institute, 9th July, 1900.*]

I THINK the Institute is indebted to the Rev. Canon Walsh for the trouble he has taken in preparing his paper,† and in collecting evidence proving the former cultivation by the Maoris of the Ti pore, or *Cordyline terminalis*. I have no doubt whatever that he is perfectly correct in the conclusions he has arrived at—that the Ti pore was introduced by the Maoris when they first colonised New Zealand many generations ago, and to a limited extent was cultivated by them until the commencement of European settlement, but in the extreme northern portion of New Zealand only. As the subject is an interesting one, I am desirous of advancing some considerations respecting it which appear worthy of notice.

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* See *C.* sp., *ti tawhiti*, Hooker's Handbook of N.Z. Flora, p. 743 (Hector, 1865).

† See above, p. 301.

So far it has been believed that the cultivated plants of the Maoris, brought with them when their migration to New Zealand took place, were four only. First, the kumara, or sweet potato, which, up to the time of the introduction of the true potato, constituted their chief vegetable food, and is still largely grown; second, the taro, which fifty years ago was seen in every Maori cultivation of any size, but which has now fallen into almost total disuse; third, the hue, or gourd, which was grown for the double reason of providing a food somewhat similar to our pumpkin, and of preparing calabashes, or water-vessels, from the hardened rind of the fruit. Like the taro, it is now seldom cultivated. Lastly, there is the aute, or paper-mulberry, now apparently extinct, but which was abundant in Cook's time. In Polynesia the inner bark is used for the manufacture of cloth, but in New Zealand it seems to have been put to no other purpose than that of making fillets for adorning the hair of the chiefs.

These four plants have a very wide distribution. The sweet potato is now cultivated in all warm countries and many temperate ones. Its native country is unknown, but it is usually supposed to be of American origin, although on this supposition it is difficult to account for its undoubted presence in the Pacific islands and New Zealand long prior to the period of Cook's voyages, and at a still earlier date in China. The taro is considered to be truly native in India and Malaya, and possibly also in some of the Pacific islands, but it also is widely grown in most warm countries. The hue, or gourd, has been known in cultivation from time immemorial, and its native country is quite uncertain, although probably some part of tropical Asia or Africa. Although commonly grown in Polynesia, it does not seem to be truly wild there. As for the paper-mulberry, notwithstanding the fact that it is, or was, cultivated throughout Polynesia from Fiji to the Sandwich Islands, it is extremely doubtful whether it is truly native therein. Probably we shall have to look to China or Japan for its true home. From these facts it will be seen that the four plants brought by the Maoris to New Zealand are widely distributed species, cultivated for ages over a large part of the earth's surface.

The position occupied by the Polynesian races as tillers of the soil has hardly had sufficient attention given to it, although it may be doubted whether any people ignorant of the use of metals ever advanced so far as they have done. In the case of New Zealand, we are apt, at the present time, to think of Maori agriculture as being slovenly, careless, and without method. But it was not always so. Let any one read the account given by the first visitors to New Zealand—especially Cook—respecting the Maori cultivations of those days—the

care that was taken to keep them free from weeds; the labour expended in conveying gravel to hill up the kumara plantations; the trouble taken to protect them from strong winds by means of temporary screens or fences; the months employed in building houses (often highly carved and decorated) in which to store their crops; the amount of patient care and selection required in raising new varieties, for it is not generally known that more than fifty varieties of the kumara alone were cultivated—when all this is considered it cannot be denied that the Maoris were patient, careful, and expert agriculturists.

And, putting on one side the disturbing effects due to the intrusion of Europeans, the same statement can be made about Polynesia generally. On the first arrival of European navigators there was every evidence of a long-continued cultivation of the soil, not, of course, in the same shape that was visible in New Zealand, for in a tropical climate the growth of vegetation is so rapid and the necessity for shading the soil so great that many cultivations, when seen from a distance, present more or less the appearance of a jungle, and an abandoned plantation reverts to the forest in a year or two. But as regards the extent to which the inhabitants were dependent on vegetable food, the number of different plants cultivated, the care given to their plantations, the assiduity with which new varieties were raised and propagated, the evidence is even more complete than in New Zealand.

For the purposes of this paper I will briefly allude to the chief plants cultivated for food in tropical Polynesia, passing by the four which have been conveyed to New Zealand, reference to which has already been made. In order of merit the banana will rank first, no doubt. Of late years several varieties have been introduced by Europeans; but at the time of Cook's first voyage Dr. Solander enumerated no less than twenty-three varieties as being in cultivation in Tahiti. Dr. Seemann, in the "Flora Vitiensis," gives the names of nineteen known in Fiji; and during a recent visit to Rarotonga I obtained a list of eighteen which were grown on that island before the arrival of Europeans. These numbers will give an idea of the extent to which the banana was cultivated before any foreign demand arose for the fruit. Yet, notwithstanding its great abundance, it is doubtful if the true banana is indigenous in any part of the Pacific. The evidence, such as it is, seems to point to its gradual introduction, ages ago and step by step, from tropical Asia or Malaya. I have been careful to say "true banana," because there are species of plantains, or cooking-bananas, such as *Musa felix*, which are undoubtedly indigenous in Polynesia. But these are not cultivated to any great extent, although the fruit is regularly

collected from the immense groves which they often form in the mountain valleys.

Next to the banana comes the bread-fruit, which has a very similar history. In Tahiti Solander obtained evidence proving that twenty-one distinct kinds were in cultivation differing greatly from one another in the cutting of the leaves and shape and size of the fruit. Yet Tahitian legends expressly allude to its introduction from abroad. So also in Rarotonga, where it is said to have been introduced partly from Tahiti and partly from Samoa. In Fiji Seemann saw thirteen varieties in cultivation, but was unable to satisfy himself that it was indigenous. In all probability it has been brought from the Malay Archipelago in a similar way to the banana.

Taking the cocoanut palm next, we have a species which is now plentiful on all tropical shores, and whose native country is quite uncertain. In Polynesia, however, it has so much the appearance of a true native that it appears best to so consider it. Judging from the numerous legends relating to it, its cultivation must be nearly as old as the Polynesian race itself.

I have mentioned the taro among the New Zealand cultivated plants, but one or two allied species are also largely grown in Polynesia, especially the gigantic kape (*Alocasia macrorhiza*). How far either it or the true taro is indigenous in the Pacific islands it is almost impossible to say, from the readiness with which they establish themselves in swampy places or on the banks of streams, in a very short time presenting all the appearance of true natives. Both are often cultivated in artificial ponds or swamps, frequently of large size, and fed by runlets of water conducted from the nearest stream. The construction of these ponds must have involved a very large amount of labour, considering the imperfect tools employed.

Five or six species of yams are grown in Polynesia, in some of the islands to a very large extent. In Fiji their cultivation was of so much importance that the months received special names from the class of work that had to be done at those particular times in the yam plantations. Some of the species are doubtless indigenous, but others are almost certainly introduced, probably from tropical Asia or Malaya.

Passing several cultivated plants of minor importance, we will now take into consideration the one which Mr. Walsh has brought under your notice—the *Cordyline terminalis*, or the Ti pore of the Maoris. This is undoubtedly a true native of Polynesia, stretching from the Kermadec Islands in the south to the Sandwich Islands in the north, and in an east-and-west direction ranging from Tahiti to Fiji. It also extends to North Australia, and through the Solomon Islands, New

Guinea, and the Malay Archipelago as far north as India and Malacca. It is largely planted in most of the Pacific islands, mainly for the sake of the huge tuberous root, which often weighs from 10 lb. to 15 lb. This is usually wrapped up in leaves and baked on hot stones, and is often mixed with the root of the kape, or gigantic taro. It cooks slowly, and in Rarotonga I was told that the baking of a good-sized parcel often extends over a whole day. It has a sweetish, sugary taste, which has been compared to that of stick-liquorice. In the Sandwich Islands the roots were bruised and mixed with water and then fermented, forming an intoxicating drink, but this practice does not seem to have been known in the southern Pacific. The introduction of European foods and customs has largely interfered with the use of the Ti pore, but in the olden days it constituted a very appreciable portion of the diet of a Polynesian. It is therefore in every way probable that its introduction would be attempted when the Maoris colonised New Zealand.

So far as botanical inquiry has been made into the origin of the common food-plants of Polynesia, it certainly seems to point to the belief that most of them are introductions from abroad, coming in the majority of cases from the direction of the Malay Archipelago or eastern tropical Asia. And it appears to me that this view is in harmony with the traditional history and legends of the Polynesian race, although my limited knowledge of these causes me to make the statement with some little hesitation. The actual introduction of the plants must have taken place at some far remote period, in order to give time not only for their spread through most parts of the Pacific, but also to allow of the gradual selection of so many different local varieties, in itself a proof of long-continued cultivation. The question as to how they entered Polynesia—whether they simply passed step by step from one tribe to another along the chain of islands connecting Malaya with the southern Pacific, or whether they were brought by the Polynesians themselves on their gradual advance southwards—is a matter which cannot be dealt with here.

Before going further I wish to make another point perfectly clear, which is this: that the Polynesians were not only great cultivators, but that they regularly carried cultivated plants from one part of the Pacific to another. Of course, this statement follows naturally on the assumption that the cultivated plants are not indigenous, and it is also supported by many traditions. But it must also be true if we assume that the cultivated plants are natives of Polynesia. For, even on this hypothesis, we cannot state with any reasonable degree of probability that all the food-

plants are natives of every one of the hundreds of islands on which they are cultivated from Fiji to Hawaii. Such a statement would not be supported by any of the known facts of botanical distribution. Under any tenable theory, there must have been numerous stations where some of them did not exist, and which were stocked by human agency.

During recent years the traditional history of the various parts of Polynesia has been closely scrutinised and compared. Of course, many points are still doubtful, and many questions of interest may never be solved; but sufficient has been established to warrant the statement that at one time the Polynesians regularly navigated the Pacific, between the Sandwich Islands in the north and New Zealand in the south. And, so far as the latter country is concerned, there is every reason for believing that for some centuries there was no infrequent communication between it and the central Pacific. Not only did Polynesians reach New Zealand, but they returned, bringing back with them a knowledge of the country and its productions. From such voyages the Polynesians learned the existence of the much-prized greenstone, and of the moa, so easily hunted and yielding such tempting food. And when it was at length resolved to colonise this country there can be no doubt that the "Arawa," "Tainui," and the other well-known canoes of Maori history which constituted the fleet carrying the immigrants, were steered by people who knew well what direction to take and what the duration of the voyage would probably be. It may be good painters' license to represent the Maoris arriving in New Zealand as a famished crew that had lost their way on the Pacific and were at death's door, as is the case in a well-known painting now exhibited in this city, but it may be doubted whether this was the usual result of these voyages.

As it can be considered as proved that the Polynesians, in colonising the various islands of the Pacific, stocked them with their special cultivated plants, or, at any rate, with those that were not actually indigenous, so when they came to attempt the greater task of peopling New Zealand there can be little doubt the same practice would be followed. We know that they succeeded in establishing the kumara, the taro, the hue, and the aute. Mr. Walsh has shown that in all probability they also brought the Ti pore. We are acquainted with their successes; of their failures we know nothing with certainty. But we can well imagine the attempts that they would make to acclimatise the banana, the bread-fruit, and possibly the cocoanut, and the disappointment they would feel in failing to establish the three staple food-plants of the Pacific.