ANCIENT CONNECTIONS BETWEEN INSULAR SE ASIA AND WEST AFRICA IN THE LIGHT OF ETHNOBOTANICAL AND OTHER EVIDENCE

[This paper has *not* been submitted for publication and is distributed to other scholars as a basis for discussion]

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Summary

Taxonomic and distributional data on the plantain (*Musa* AAB & ABB), make the conventional hypothesis of its introduction to Africa via the East Coast problematic. It is suggested that taro (*Colocasia esculenta*), water-yam (*Dioscorea alata*) and *Musa* AAB, all three cultigens of the Indo-Pacific area, were introduced directly to West Africa in ancient times. Other types of evidence, including musical instruments and elephantiasis appear to lead to the same conclusion. The implications of this for models of Bantu expansion are briefly explored.

1. Introduction.

1.1 The 'Indonesia-Africa' hypothesis.

The possibility of an Indonesian contribution to West African culture has a long history among Africanists, and has attracted its fair share of scepticism. Recent ethnobotanical work provides reasons for a fresh assessment of the evidence. The paper[1] begins with a brief history of the debate to put the argument in perspective.

Apart from a mid-nineteenth century attempt to relate Fulfulde to Malay, the first important statement of this hypothesis comes in a report by the German ethnologist, Leo Frobenius (1898). Frobenius states that African material culture, apart from the hunting gathering phase, and previous to Islamic incursions, is 'Indonesian'. His evidence for this statement is drawn from similarities between artefacts, with particular emphasis on musical instruments and carving styles. He has, as one commentator puts it, a tendency to use 'therefore' in the sense of 'and', and some of his arguments today seem tenuous in the extreme. Certainly none of the links he makes cannot equally well be explained by convergent evolution. Nonetheless, these ideas stimulated a whole generation of scholars to search for such links. Prominent among these were some distinguished ethnomusicologists, Hornbostel (192O), Sachs (1928), Kunst (1936 & 196O) and Father A. M. Jones (1964 & 1971,1972) as well as the ethnographers James Hornell (1928, 1934) and J.H. Hutton (1946). Their findings have been largely ignored by scholars in other disciplines, and I have suggested (Blench, 1982) that their musicological findings were marred by a dubious methodology, and are of little value.

In the 4O's and 5O's new types of evidence from other disciplines, considered less esoteric, began to make an impact on the debate. It had become clear that the core-populations of Madagascar at least were transoceanic in origin and studies by Dahl (1951) and Dyen (1964) showed that Malagasy could be assigned to the Maanyan group of the Austronesian language family. This suggested that the ancestors of at least some of the present-day inhabitants migrated from what is now the island of Kalimantan, at some unspecified period in the past.

At the same time taxonomic studies began to show that a number of food plants widely regarded as 'African' must have been domesticated elsewhere and imported Among the most significant are Asian rice (*Oryza sativa*), water-yam (*Dioscorea alata*), taro or 'old' cocoyam (*Colocasia esculenta*), plantains (*Musa* AAB & ABB) and bananas (*Musa* AAA). All these are apparently S. E. Asian domesticates, except for the plantain, which incorporates some Indian components in its genetic make-up. Two hypotheses have been advanced to explain this. It has been supposed that these plants were transmitted via the 'Sabaean lane', that is, Sri Lanka and South India, to South Arabia, and thence to the East African coast, or that they were carried directly across the Indian ocean by the same mariners who populated Madagascar.

With the exception of rice, all these crops seem to have been well established in West Africa by the time of the first European contacts with the coast. It has commonly been said that they diffused across the centre of the continent via the Zairean rain-forest, and indeed, Simmonds (1962;137 & 1976;213) confidently shows a thick black arrow sweeping across the centre of the continent from East to West schematically representing the diffusion of plantains and bananas. However, in a personal communication to the author, Professor Simmonds has expressed some doubts about the correctness of this model in relation to the plantains (*Musa* AAB). Throughout this paper 'plantain' is the term applied to the *Musa* subspecies containing the B genome, thus *Musa* AAB & ABB. This is essentially a West African usage, since 'plantain' in East Africa is applied to any cooking banana.

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[1]This paper was first written in 1979 and circulated as a draft. A presentation of the main argument was given at the University of Port Harcourt in 1981 and I am grateful to Kay Williamson, both for arranging that and for her comments. The paper lay neglected until 1988, when some parts were incorporated into a presentation at the British Museum conference 'The Indian Ocean in Antiquity'. I was encouraged to revise it by the paper of Edmond de Langhe at the British Institute in East Africa conference in Cambridge in June, 1994. This present version has benefited from the detailed comments of Professor de Langhe, to who I am extremely grateful.

1.2 Murdock's Hypothesis: the 'Tropical Food Kit'.

The first author to collate this evidence was Murdock (1959:222 ff.) who rightly pointed out the problem in chronology. At the period when Austronesian or Indian navigators were presumably reaching the East coast (ca. 2OOO B.P.), its only inhabitants would have been Cushite pastoralists, and Khoisan-related groups with a hunting-gathering economy. Neither of these are likely candidates for the transmission of vegetatively reproducing crops requiring elaborate agricultural skills. Murdock's answer to this was to postulate a 'Yam Belt', a corridor with its Easternmost tip in Southern Somalia, passing North of the Equatorial forest, as far as the Kru and other coastal tuber-growers in the West of West Africa. Murdock's candidates for the adoption and transmission of these cultigens were a people he calls 'Megalithic Cushites', then inhabiting the Highlands of Southern Ethiopia, and represented today by people such as the Konso. A daring hypothesis at the time, and significant in focusing attention on the role of cultigens in population-dynamics, it has had to be discarded in the light of recent work (David, 1976:258). The main difficulty is that there is no evidence that the Highland Cushites were settled anywhere near the Coast, either then or now. Recent work on Sam speakers (Somali, Rendille and Boni) suggests they were already present on the Somali coast before this period, and that their economy was either pastoral or hunting-gathering (Heine, 1982).

Another difficulty is that Murdock's categorisation of the 'Indonesian' cultigens was not sufficiently precise. There are two species of yam in Africa that have been transmitted from S. E. Asia. One is the Asian yam (*Dioscorea esculenta*), cultivated in the coastal zone in East Africa. The other the water-yam, (*Dioscorea alata*), is found discontinuously throughout the continent, but particularly in West and Central Africa. Murdock similarly uses the term 'bananas' to refer indiscriminately to two genetically distinct subspecies, the plantain (*Musa* AAB or ABB), and the sweet banana (*Musa* AA or AAA). In defence of Murdock, it must be said that the descriptive literature available to him was inadequate, and that later work by Stover & Simmonds (1987) and by Flinn & Hoyoux (1976) established the dichotomy, both botanically, and in terms of use and distribution.

It is, of course, easier to criticise than to propose alternative solutions. One scholar who attempted to come to terms with this problem was A.M. Jones (1964 & 1971) who proposed that Austronesian seafarers rounded the Cape and landed on the West African coast. His evidence for this was based largely on the tunings and distribution of certain types of xylophone, considered by him to have been introduced from Indonesia. He draws additional support from other musical instruments, mancala, sailing techniques, and brass-casting. These arguments are discussed at length in Blench (1982) but regrettably, Jones' questionable methodology means that they must by and large be discarded.

Nevertheless, the possibility persists that elements of the 'tropical food kit' (as Murdock calls it), *was* introduced directly to the West coast. The cultigens under discussion are the plantain (*Musa* AAB), taro or 'old' cocoyam (*Colocasia esculenta*) and the water-yam (*Dioscorea alata*). For reasons that have remained unclear, these crops seem to be anciently established in West Africa, unlike *Musa* AAA and Asian rice.

1.3 The 'Age-Area' hypothesis, and an evaluation of its Relevance to Botanical Evidence

The argument for this is based on the 'age- area' hypothesis, that the relative time-depth of a given cultural trait in a specific geographic area is reflected by the diversity of terms applied to it and by its own morphological variation. Related to this is the degree of cultural 'embedding', that is, the significance of a trait or artefact in ceremonial life or oral lore. In the case of plants this may be measured by the everyday uses to which parts of the plant are put, and by the elaboration of the ritual and belief surrounding the cultivation or collection of the plant.

Two reservations may be entered with respect to intraspecific variation of a cultigen. When a crop is introduced, a number of different cultivars may be introduced simultaneously. The mango, for example, was introduced into West Africa by the German colonial authorities in the first decade of this century, and a

number of different varieties were brought to the Coast at the same time. The variations between these cultivars were immediately recognised by the African people who began to encourage and protect mango trees, and the Yoruba today recognise and name a variety of cultivars. In this case, only cultural evidence will indicate the recent introduction of the mango, for as soon as oral history ceases to record its introduction as a 'new' crop, it will rapidly be assimilated into the repertoire of 'traditional' cultigens, as maize has been.

If the introduced cultigens reproduce sexually, then only a short period of indiscriminate breeding will rapidly result in a broad variety of phenotypes. The sweet potato, which flowers freely, can quickly produce a number of clones, particularly if it has been restricted to a single cultivated variety for some time. Even the edible Musaceae, herbs notionally propagated vegetatively, can rapidly produce considerable genetic diversity if a few fertile specimens are present among the introduced plants. Simmonds (1966:57) affirms that the basic process for deriving new clones of the cultivated *Musaceae* must be somatic mutation. However, the presence of the wild *Musa acuminata* AA on Pemba island off the East African coast suggests that Austronesian navigators may occasionally have carried fertile wild relatives of the edible bananas with them in their boats.

Whether this occurred in the case of the plantain is unknown, but it undoubtedly significant that the broad range of *Musa* AAB varieties are both stable and culturally recognised. This argues for ancient establishment, even if it were demonstrated that fertile *Musa* specimens were brought to Africa. Although there are a wide variety of genotypes of both cassava and maize in West Africa, the actual number of culturally recognised cultivars of each in West Africa is still very small. Therefore, when arguing from morphological variation in cultivated plants, it is crucial to take into account their capacity for producing fertile outcrosses. Moreover, the cultural context of plants should be taken into account when discussing their variation, as this may contain important indicators of their antiquity.

1.4 Evaluating the Antiquity of Crops by Linguistic Methods.

The principle most widely accepted is that formulated by Williamson (197O, 1993) in her studies of terms for useful plants in the languages of the Southern Nigeria. She argues that the antiquity of a root may be gauged by the extent to which it undergoes regular phonological transformations within a language family. Broadly speaking, terms that tend to 'jump' the boundaries of established language families are probably not part of the core vocabulary of that family. The term for 'onion', normally a loanword from Arabic through Hausa in savannah West Africa, has been borrowed by some languages of the Kwa, Benue-Congo Gur, Chadic and Adamawa families with equal facility. Even without historical testimony, this alone would mark the recent entry of the onion into the economy of West Africa. This is not sufficient to attest the introduction of the onion, however, for the cultivated cola presents a similar situation. This is because although the cola-nut is indigenous to West Africa, its stimulant properties do not seem to have been widely recognised until the seventeenth and eighteenth centuries. This period sees a considerable expansion of the trade in cultivated cola, and the Hausa name for cola, *gooro*, is loaned into a variety of languages with the introduction of the nut itself.

For the Niger Delta Williamson postulates three levels of antiquity for useful plants. The most ancient layer are the West African domesticates, the Guinea-yam (*Dioscorea rotundata*), and the oil-palm (*Elaeis guineensis*). The hypothetical reconstructions derived from the terms applied to these suggest that they have transformed phonologically according to the historical divisions within language-families. Assuming there has been no significant semantic shift, then if a term may be reconstructed for a proto-language it is reasonable to assume that the item corresponding to the root was present at that period.

By contrast, the recent 'American complex' of plants brought across the Atlantic by the Portuguese and other early traders on the coast have a pattern of freely crossing the boundaries of language-families (see also, Blench, in press,b). Words for cassava, groundnuts, and maize are found both in Ịjọ and the nearby but distantly-related Ogoni languages, and the vernacular terms appear to 'jump' these boundaries. Plantain and taro, however, exhibit a curious intermediate status, for they cross language boundaries to a limited extent,

but seem to have been present before a number of the internal sub-groupings of the present language-families were established. Williamson suggests that they were brought to the Delta by the Ogoni peoples, speakers of a Cross-River language, who entered the Eastern Delta >15OO B.P. This suggests considerable antiquity in West Africa, without these cultigens forming part of the original 'stock' of indigenous cultivated plants.

2. The Indo-Pacific Cultigens

2.1 The *Musaceae*

The evolution of the *Musaceae* has been reviewed by Simmonds (1962, 1966, 1976), Stover & Simmonds (1987) and Champion (1976). The Musaceae divide into two major series, the Australimusa and the Eumusa; only the Eumusa have spread to Africa. The terminology is very inconsistent in the literature and 'plantain' are not consistently distinguished. Essentially, this discussion will use the term 'banana' for the sweeter AA and AAA genomes and 'plantain' for the hybrids, AB, AAB and other more complex types.

2.1.1 East Africa

The Musaceae of East Africa have been comparatively well studied, for example by Shepherd (1967). Throughout East Africa, the Musaceae are largely AA or AAA, with the smaller, sweet diploids confined to the coastal region and the AAA types in the upland areas. In Uganda, for example, nearly all the principal cooking and beer bananas are AAA triploids. The diversity of clones suggests that the AA and AAA types have undergone significant mutation on the continent. Hybrid triploids (AAB and ABB) are known, especially on the coast and Stover and Simmonds (1987:161) say;

> "..and hybrid triploid types (AAB and ABB) predominate. The latter, the hybrid types, (as judged by the present distribution, diversity and native names), appear to be spreading inland from the coast and may thus represent a relatively recent addition to the bananas of East Africa."

Swennen and de Langhe (p.c.) report that ‘one banana cultivar of the EA-AAA group seems to have been present in West Africa since several centuries’. This was presumably brought in the early period of the Portuguese trade, although the route by which it reached this area is unknown.

2.1.2 Central Africa

2.1.2.1 Triploid Plantains

An important investigation by Walker (1931) in Gabon lists the names of twenty-seven plantain cultivars for each of the eight principal languages, as well as numerous cvs. with more restricted distributions. The plantain is highly embedded in traditional life, and Walker gives pages of material on the varied uses of parts of the plant, as well as ritual restrictions governing its cultivation.

The centre for which the greatest diversity is recorded is Yangambe in S.W. Zaire. De Langhe (1961) records the names of fifty-six cultivars recognised by the Olombo people, and classifies these according to standard taxonomic criteria. Further eastward Musa AAB declines dramatically in importance (although the reason may be partly ecological). Although there are some restricted areas of the East coast where the hybrid triploids AAB and ABB are widespread (Simmonds,1966:118) these seem to be recent introductions from India, as is the 'Bluggoe' plantain (ABB) now a staple in some areas of Uganda.

2.1.2.2 Diploids

Gabon is also the centre of a island of diploid AA clones. These are sterile and have clearly been introduced. nonetheless, they seem to have been present from the period of the earliest European contact. Walker (1931) regards them as recent, (though pre-Portuguese), introductions, and only a few cvs. have been recorded.

2.1.3 West Africa

Research in West Africa appears to have made negative progress, since Stover and Simmonds (1987:167) regarded it as an area so poorly known that they were unable to include it in their annotated list of clones by countries. Virtually all cooking bananas are of the AAB group (Tezenas du Montcel et al, 1983). The AA and AAA clones are known only as small, sweet bananas that can be eaten without further preparation. Although these were certainly present in West Africa in pre-Portuguese times their status points to an introduction recent compared with the large farinaceous plantain eaten as a staple that must be cooked before consumption. This variation may also measured by the disproportionate numbers of cultivars of the two sub-species locally available. In the Niger Delta, the Kolokuma cultivate ten varieties of plantain and only five of banana (Timitimi, 197O).

2.1.3.1 Triploid Plantains

Most botanical work in West Africa has tended to show that plantains are predominantly the hybrid triploids, AAB. An investigation of the Musaceae of Sierra Leone (Bakshi, 1963) showed that they were all of the AAB group. Gill (1971) lists seventeen plantain cvs. for Ghana, while work by Lassoudière (1973) in Ivory Coast suggests that the plantain is the second most important staple after the Guinea yam, so a similar variety can be expected there. Ndubizu (1981) classified all Southern Nigerian plantains as genetically AAB and divided them into three principal groups and twelve sub-groups and within these sub-groups further varieties are recognised. A report by de Vos (1978?) discusses a collection a plantain cvs. that includes thirty from Eastern Nigeria and forty from Western Cameroun. Tezenas du Montcel (1979) gives an overview of AAB plantains in Cameroon and their local names. Most recently, a comprehensive survey of the Musa AAB varieties of West Africa has enumerated more than one hundred distinct types (de Langhe, in press). De Langhe concludes that this cannot be satisfactorily explained except by the conclusion that ‘plantain reached Central Africa in very remote times’.

The furthest eastern extent of the ancient cultivation of the AAB plantain as a staple appears to be in Western Uganda (Mukasa, 197O:142), where the Gonja and Manjaya Musaceae are islands of AAB, surrounded by the more common AAA types. The other examples of the B genome in Uganda, Musaceae of the AB, ABB, and ABBB are both rare and apparently recent, according to Mukasa. Compared with West African usage, some of the earlier literature is confusing in terminology. For example, an article by Masefield (1944), entitled 'Some recent observations on the plantain crop in Buganda' is largely a discussion of Musa AAA, the banana.

Flinn and Hoyoux (1976) synthesised this disparate material in the map accompanying a review article, showing quite clearly the virtual absence of the AAB plantain from the whole East African coastal strip, and Madagascar. Stuhlmann (191O) had previously observed the importance of the sweet banana in this area, and it is apparent that the distributions of the two dovetail across the continent.

This evidence seems to support the coastal strip from the mouth of the river Zaire to the Bight of Bonny as the original centre for the dispersal of the plantains (*Musa* AAB) in Africa. N.W. Simmonds now sees a case for this view despite his earlier published views to the contrary (Simmonds, p.c.).

2.1.3.2 Tetraploid Plantains

Tetraploid plantains are very much less common than triploids. One of the most well-known is ABBB, cultivated in Southeast Asia and apparently originating in that region (Stover and Simmonds, 1987). The other tetraploids, AABB and AAAB, all seem to come from the New Guinea/ Solomon Islands region. These have apparently also been recorded in West Africa.

2.1.4 Linguistic Evidence

The linguistic evidence for the origin of the Musaceae in Africa is hard to interpret. A study by Blakney (1963) attempts to list and group the vernacular terms applied to Musa spp. across the continent. Blakney found that the two principal word-stems #-*ko* and #-*to* were widespread across the continent, and this was later confirmed for Bantu languages by Guthrie (1967-1971). Unfortunately, the data that Blakney used failed to consistently distinguish between plantain and banana, and as he seems to have been unaware of their very different distributions, he failed to match any of his widespread roots with either of the subspecies.

Walker (1931) referred to names for the Musaceae in Gabon, showing that the generic term for plantain in all the languages studied contains the #-*ko* root, normally in the form #*kondo*, shown to be widespread in Bantu. The root #-*to*, in the form #*toto* is applied to bananas. It seems at least possible that these terms are used broadly across the continent to make the distinction between the banana and the plantain.

Blakney concluded from the broad dispersal of the root #-*ko* must indicate that it formed part of the core vocabulary of the Niger-Congo language phylum. This is an extremely problematic assumption for two reasons; -primarily, if this were the case, then the Musaceae would have to be more than ten thousand years old in West Africa (*not* four thousand as Blakney states). This is highly unlikely on the basis of present botanical evidence.

More recently, Rossel (1989) has studied the vernacular terminology of plantain and banana in Nigeria. A clear problem is that the words for Musa have been formed from existing terms applied to the indigenous *Ensete* sp. (usually #-*kom*- or similar in Nigeria).

2.1.5 Summary

There are three groups of Musaceae in West Africa whose origin has not been satisfactorily explained. These are;

a) the AA bananas in Gabon
b) the AAB plantains throughout West Africa
c) the tetraploids AABB and AAAB in the Bight of Benin region

b) and c) have little or no significance in East Africa. The AA bananas predominate along the East African coast but are hardly known in the interior.

2.2 The Water-Yam, *Dioscorea alata*.

Ethnobotanical material on the water-yam is rarer, presumably because of its reduced commercial significance in Africa. Less research is thereby generated, so that the lists of cvs. and distributional data available for the plantain do not exist. Water-yams are cultivated sporadically throughout East Africa and Ethiopia, as well as on Madagascar, and throughout West Africa. Their exact distribution is unknown because of the tendency of non-specialist observers to confuse them with other species of yam. Work by Chevalier (1936:522 ff.) earlier in the century on the *Dioscorea* led him to conclude that the water-yam was

long-established in West Africa, although he offers no hypothesis about the route of its introduction. He observes that under certain circumstances it gives higher yields than *D. cayenensis*, the indigenous West African cultivated yam, and notes that some of the peoples on the edges of the forest, such as the Ivoirian Baulé, are experts in its cultivation. The botany and evolution of the water-yam have been reviewed by Martin (1976) although he is able to contribute no new information on its history or distribution in Africa.

The areas where *D. alata* is cultivated in Central Africa remain poorly known. Vocabularies of many languages in Central Africa give merely 'yam' as gloss, without mention of the species. This is in part a reflection of the difficulty of identifying the particular species grown, but that ignorance in turn reflects a lack of up-to date texts. Both Burkill (1951) and Coursey (1967:17) maintained that the water-yam was introduced by the Portuguese to West Africa, but their evidence for this, as Miège (1952:148) pointed out, was based on the out-dated distributional and botanical data in Prain & Burkill (1939). This map marks the absence of the water-yam from many areas of central Africa, in particular parts of Gabon and Cameroun, where in fact it is a significant staple. As Coursey was unprepared to admit the possibility of a separate introduction on the West coast, the Portuguese were a convenient solution.

The assumption of a Portuguese introduction, however, does not lie well with the linguistic data, or the variety of cvs. found in the Bight of Bonny area. *D. alata* is almost always sterile, or else produces only male inflorescences (Chevalier, 1936:522, Martin, 1976:1O). As Martin observes 'It is difficult to escape the conclusion that existing varieties are very old and perhaps have diverged from their progenitor varieties by somatic mutation.' This long-term process militates against the improvement of the water-yam by modern crop-breeding techniques, but does suggest that the remarkable diversity of clones on the West African coast must imply considerable antiquity.

The water-yam has a long dormancy period (Martin,1976), a feature that makes it an ideal plant to transport on long ocean voyages, as it avoids the necessity of keep a plant alive while en route. This must have been an important factor in its choice as a major staple in Oceania, although not decisive, as the transportation of the *Musa* species show. Timitimi (197O) shows that the Kolokuma recognise eighteen cvs. of *D. alata* while Raponda-Walker & Sillans (1961:15O) list three major subgroups and numerous other varieties grown in Gabon. Comparing this with other tubers introduced by the Portuguese such as the fertile and easily bred sweet potato which has developed only two or three cvs. since the seventeenth century such a shallow time-depth seems unlikely. Again, the water-yam seems to become increasingly less important further Eastward, displaying the same pattern as the plantain. Tothill (1948:364) in a survey of agriculture in the Sudan, observed that *D. alata* was increasingly cultivated in Equatoria as an anti-famine crop, but that this was a recent development. Widely grown throughout the Equatorial rain-forest, it seems unknown on the East African coast, although, it was evidently once important on Madagascar. No widespread root has yet been found that is systematically applied to it, although the Proto-Bantu #-*kua* that Guthrie (1970:309) reconstructed for 'yam' may in general apply to water-yam, although in West Africa, for example in Jukunoid, the root #-*ku* is used for the ordinary Guinea yam.

2.3 Taro -the 'old' cocoyam -*Colocasia esculenta* syn. *Colocasia antiquorum*.

The botany and agriculture of *Colocasia* spp. has been reviewed by Plucknett et al. (197O) and its evolution in Plucknett (1976). As wild *Colocasia* is found both in India and the Malay peninsula, taro may have been domesticated in either area. The investigation of the cocoyam is made more difficult by its confused taxonomic status. In older texts, two types of *Colocasia* were distinguished, *C. esculenta* and *C. antiquorum*, and these seem to have corresponded to two types of cocoyam, one producing a large single tuber, the other producing a cluster of smaller corms. A study in India showed that a large number of varieties with different chromosome counts can co-exist in cultivation. Cultivated taro is normally sterile and clonal varieties are thought to arise through somatic mutation, although fertile seed has occasionally been reported.

An investigation by Yen and Wheeler (1968) of the chromosome numbers of *Colocasia* in the Indo-Malesian area shows that there are two distinct types. The first, 2n=28, is found throughout Southeast Asia and in Polynesia, while the second, 2n=42, seems to have a more disjunct distribution, is cultivated in India, the Philippines and New Zealand. A systematic investigation of the chromosome numbers of the West African taros would obviously have important implications for historical models of cultigen spread, but no such study has presently been undertaken.

Taro seems to be of an importance similar to the water-yam in the Bight of Bonny area. A paper by Knipscheer and Wilson (198O) maps the cultivation of cocoyams in S. E. Nigeria, and shows that in some areas their importance is that of a co-staple. Lyanga (198O) states that the cocoyam is the second most important staple in Southern Cameroun. To a certain extent accounts of the cocoyam are bedevilled by a failure to distinguish *Colocasia* from another edible aroid, tannia, or the 'new' cocoyam (*Xanthosoma mafaffa,* previously *X. sagittifolia*) brought to the West African coast from the West Indies in 1843. However, an account quoted by Mauny (1953) shows that taro was well established in Senegambia by 15OO, too early for Portuguese navigators to have been instrumental in its diffusion. In the monumental dictionary of Duala by Ittmann (1976) it is apparent that *Colocasia* is deeply embedded culturally in the coastal areas of Cameroun. The Duala recognise fourteen cultivated varieties, and also have a complex specialised vocabulary for denoting the various parts of the plant. Ardener (1956:46) claims that taro was the 'original cocoyam of the Kpe-speaking peoples of the Cameroun coast'. Raponda-Walker & Sillans (1961) show that the 'old' cocoyam is of great importance in Gabon, with as many as fifteen varieties recognised in some areas.

Plucknett (1976) and subsequently Watson (1983) have suggested that the cocoyam spread down the Nile valley and thence to West Africa. the basis of this appears to be the presence in West Africa of roots such as '*koko*' which are held to derive from the Arabic *qulqas*. Williamson (1993) has recently analysed the linguistic data on cocoyams in the languages of Southern Nigeria. She concludes that all the evidence points to the ancient establishment of cocoyams in the region and in particular that the Arabic *qulqas* is unlikely to be the source of the widespread root *koko* in West-Central Africa. Blench (in press) has recently analysed the evidence for the diffusion of cocoyams in North-Eastern Nigeria and concludes that there is no linguistic or ethnographic support for the idea that they were introduced by the Arabs.

2.4 The Anomalous Distribution of the Indo-Pacific Cultigens.

Vernacular classifications by no means always correspond to taxonomic distinctions, and it would be useful to have the same sorts of cross-check that are available for plantains. However, enough has been said to suggest that Murdock's 'tropical food kit', specified here as the plantain (Musa AAB), the old cocoyam and the water-yam, show every sign of ancient establishment on the coast of West-Central Africa. The hybrid triploid plantains (AAB and ABB), are apparently recent introductions in East Africa, whereas cocoyams and wateryams are either absent or of minor importance. This suggests that the conventional account of their diffusion across the continent from East to West is inadequate. De Langhe (in press) has pointed to a similar view, at least in relation to plantains.

Various hypotheses have been advanced to explain the presence of the Indo-Pacific cultigens in West Africa, by having them traded or diffuse from areas where they are no longer in use. Section Three considers some of these arguments, and proposes an alternative model.

3. Hypotheses to Explain the African Distribution of Indo-Pacific Cultigens.

3.1 Dispersion through the Nile Valley.

The most common argument for the presence of the 'tropical food kit' in West Africa is to have these cultigens diffuse from the Nile valley. Dalziel (1937:468) suggests this for the plantain, and Burkill

(1938:95) and Plucknett (1976:11) for the cocoyam. The claim in Plucknett et al. (197O:413) that taro was brought by 'Megalithic peoples' to the Eastern Mediterranean is unsupported speculation.

A study of food and cultigens in Egyptian civilisation that considers material up to the fifth century A.D. (Darby et al., 1977) makes it clear that none of these plants were recorded by this date. Water-yam was unknown although the *Musaceae* seem only to have spread there in the later Islamic period. The term *Colocasia*, however, **was** used in the Graeco-Roman period to refer to a quite different plant, a usage that may have misled earlier scholars. The Arabic term *qolqas* recorded in later sources was transferred to *Colocasia* and travelled unchanged across the desert to become the *kolokas* recorded among the Shuwa Arabs.

Chronologically, the responsibility is then shifted to the Arabs. This is even more unlikely on a number of grounds. Primarily, it makes the introduction too late, historically and more important, there is an absence of motivation. Why should Arab traders carry across a dry desert cultigens that can only flourish in a humid zone far outside their normal orbit. An intensive investigation of West African food-plants referred to in medieval Arabic sources (Lewicki, 1974) reveals no mention of these crops while, in comparison with known introductions, such as the onion, the behaviour of vernacular terms is totally aberrant. The hypothesis of transmission from North Africa can be safely discarded.

3.2 Introduction and Disappearance in the East African area.

An alternative explanation for the distribution of Indo-Pacific cultigens is to suppose that they *were* originally introduced on the East coast but have since been displaced. To account for their marginal presence there today, two arguments have been advanced. Either they were once widely cultivated, and were later dropped in favour of other crops, or else they were traded across to West Africa directly, and never became established on the East coast. This section deals with the first hypothesis, while section 3.3 discusses the trade-route argument.

There are two objections to the idea that Indo-Pacific cultigens were established on the East coast at an early date, the main one being that there is no evidence for any sort of agriculture on the coast at this period. The cultivation of root-crops and vegetatively reproduced herbs such as the Musaceae requires their borrowers to be part of a fairly sophisticated agricultural tradition. The sweet banana, *Musa* AAA, could become established in Ethiopia by the sixth century, because of its ancient tradition of agriculture, but no comparable traditions existed on the coast. Yet the plantains, *Musa* AAB, are conspicuous by their absence in Ethiopia.

In relation to this, the absence of *Musa* AAB in the Eastern African area is problematic precisely because of the highly evolved cultivation of AAA throughout this area. Given that cultivation techniques, yields and even cooking abilities are much the same for both plantain and banana, why should the plantain have been so conclusively eliminated? To take a comparable example, the new and the old cocoyams require very similar cultivation techniques, although *Xanthosoma* yields slightly better under most conditions. Yet *Colocasia* shows no sign of disappearing.

Both on historical grounds, and in the light of botanical evidence concerning traditional cultigens in Eastern Africa, to assume the displacement of a complete set of humid-zone cultigens in this way is labouring the hypothesis.

3.3 Introduction via Trade Routes through Southern Sudan

Could the Indo-Pacific cultigens have been carried to West Africa across the Southern Sudan by traders? Murray Last has argued that the extent of Coptic trade along this route has been underestimated, and it may well be that the use of the domestic camel contributed to an expansion of the trade in spices and easily transported concentrated sale-goods such as cloth and henna. However, the argument also has a

chronological problem, since the identity of traders who would be carrying humid-zone cultigens over such distances remains to be established. Even if this were the case, their point of arrival would then presumably be the area of Lake Chad. Yet plantain and water-yam are unknown in this area, whereas taro was clearly introduced by the Arabs at a much later date. It is the inadequacy of these arguments that has suggested another hypothesis, set out below, that has at least the merit of meeting most of the objections raised above.

3.4 The possibility of direct introduction

3.4.1 Long-distance Navigators: the model of the Lapita People.

An alternative hypothesis is that the 'tropical food kit' was brought directly to West Africa by long-distance navigators at some unknown past period. Such navigators would have to round the Cape and land on the shores of the Bight of Benin. The obvious candidates for such travellers would be the Pacific mariners who carried these same plants eastward to the remoter parts of the Pacific across comparably large distances. To account for a concurrence of *Musa* AAB, taro and water-yam we must locate their homeland somewhere in the area of the present-day Philippines, Kalimantan or Sulawesi. Musa AAB has an important secondary dispersal centre in the area of the present-day Philippines (Simmonds, 1962:12), although it may have originally incorporated the 'B' genome from somewhere on the Indian subcontinent. *Musa* AAB is rare in Polynesia, Micronesia and Melanesia compared with the banana (*Musa* AA or AAA) and the Pacific banana (*Musa troglodytarum*) (Barrau 1958,1961), although taro and water-yam are more widespread. Navigators who would then be able to carry cultigens such long distances must be a people with a highly evolved sailing technology, accustomed to moving rapidly over long stretches of open water.

De Langhe (p.c.) points out that the present-day climatic conditions around the Cape create problems for the transport of Musa planting materials. Under normal circumstances, the cold weather would kill the buds after no more than 2-3 days. So such a solution would have to assume that the navigators were in possession of quite sophisticated plant preservation systems, or that climatic conditions were somewhat different.

A model[2] for such a mobile population would be the so-called 'Lapita' people. Bellwood (1978:244) says - 'the Lapita culture is the record of a number of highly mobile groups of sea-borne colonists and explorers, who expanded very rapidly through Melanesia in the mid-late second millennium B.C.' Their most characteristic artefacts are tempered ceramics, and these have been found over a broad expanse of the Pacific in contexts that have been dated from 1500 B.C. to 0 A.D (Spriggs, forthcoming). The possible trade aspects of this dispersal do not detract from the adventurousness and implied navigational skills of this early Austronesian group. On both linguistic and typological grounds, Bellwood (1978:225) identifies the original homeland of the Lapita people as 'North-Eastern Indonesia or in the Philippines'[3].

[2]The word ‘model’ is used intentionally, as various readers have pointed out to me that there is good evidence for extensive navigation by non-Austronesian populations in this region prior to the later phase of the Austronesian expansion.

[3]Although Spriggs (op. cit.) notes that the first attestation of the distinctive pottery is in the Bismarcks.

3.4.2 Winds and Currents in the Indian Ocean

A significant objection to a westward voyage of the Lapita people is that archaeological research has turned up no traces of their presence in western Indonesia. In this regard, it is perhaps worth remarking that for a navigator crossing the Indian ocean two separate currents can be used. The northern Equatorial current starts from the Moluccas straits, between Sumatra and mainland S. E. Asia, passes the Southern tip of India and South Arabia to reach the Somali coast and presumably the ancestors of the Malagasy used it to reach East Africa. However, a Southern current, running roughly along the line of 3Oº South, comes down through the Timor strait at the Western end of New Guinea and curves directly into the open ocean. Navigators using such a current would by-pass the Southern Indonesian islands and cross the Indian ocean arriving at the Northern tip of Madagascar.

The significance of this route emerges from an ethnobotanical investigation of Groote Eylandt, off the Northern coast of Australia (Levitt, 1981). *Colocasia* is found as an adventive and this is thought to be the result of prehistoric (recent estimates put these landings between 8-500 BP) visits by the 'Macassar' traders, who scoured this area for the sea-cucumber, traded all through S.E. Asia as a delicacy (MacKnight, 1976). 'Macassar' traders came from the Celebes and the Southern Philippines, and were no more than traditional traders, plugging into the expanded trade networks of Iron Age Insular S.E. Asia. If these traders were able to reach North Australia on a regular basis, presumably via the route outlined above, it suggests that their predecessors, from the same area, and with comparable nautical technology could surely achieve the same.

Once on the East African coast, strong currents would follow them down the Mozambique channel virtually as far as the Cape. From there it would be possible to reach West Africa, provided the Namibian surf can be circumnavigated. A seaman, Villiers (1957), investigating this possibility, concluded that such a voyage was possible, although to return that way would be more difficult. However, our hypothesis does not require our mariners to return -in fact it would be more appropriate if they stayed to colonise the area where they eventually landed. In view of the humid zone cultigens they may well have been carrying, they would most likely continue up the coast of West-Central Africa until they reached an area suitable for the propagation of these cultigens. The first well-watered coastal area on this Northwards voyage would indeed be the mouth of the Zaire.

What might the motive be for such an enormous undertaking? The hypothesis of traders makes more sense than colonists at this point, since individuals looking for land would surely have alighted on Madagascar and settled there. If mariners were willing to undertake long-distance speculative voyages, then they would presumably be seeking trading partners. Madagascar would have been uninhabited at this period, while the East coast would offer only pastoralists and hunter-gatherer groups. Such a long voyage undoubtedly seems unlikely, but then so does the settlement of Easter island, or the Viking landings on the North American coast.

3.4.3 The Material Traces of Austronesian Voyagers

3.4.3.1 Archaeological Material

Part of the problem in making a convincing case for such an epic voyage is that it is difficult to see what material traces its perpetrators would leave, apart from the disputed cultigens discussed above. The characteristic 'temper' of pottery would rapidly disappear because of the non-availability of the correct type of sand. The shell fish- hooks and armlets characteristic of large areas of the Pacific would cease to be made, for want of appropriate materials. In this connection it is worth noting that Ịjọ traditions recall that when the ancestors of the present population moved into the Delta, they originally did not have fish-hooks, and that these were later 'invented', being made initially from vegetable materials (Richard Freeman, p.c.). Therefore, only if archaeologists are fortunate enough to uncover one of the original beach-camps containing the original artefacts brought by the voyagers, would proof positive of this type be forthcoming.

3.4.3.2 Sound-producers and Musical Instruments showing links with the Austronesian region

There are, nevertheless, some items in the material culture of this area that would seem to constitute supporting evidence. Two sound- producers connected with plantains have distributions suggesting an origin in this zone. The first is a noise-maker made from a plantain leaf-stem. A series of incisions are made on the surface of the stem, creating a number of 'tongues' in a line parallel to the long axis of the stem. When stroked longitudinally by hand the tongues slap against the stem producing a series of sharp concussions. Reports of this instrument come from Liberia, Ivory Coast, Southern Nigeria, Congo-Brazzaville and Zaire. A survey of vernacular names for the instrument in the Niger Delta shows that it is invariably associated with the plantain, although in theory, it can equally well be made from a banana leaf-stem. This sound-producer is only otherwise reported from the Malay peninsula (Laurence Picken, unpublished field notes).

The second is the plantain-stem xylophone, the distribution of which maps against the plantain. The wooden bars of the xylophone are laid transversely across fresh *Musa* stems. No analogous instrument is reported from Indonesia, suggesting that the instrument evolved subsequent to the introduction of the plantain. This xylophone is today found in areas where the banana is the staple, but the map suggests very strongly that West Central Africa is its original nucleus of distribution.

A structural feature of musical instruments found throughout the area of the Bight of Bonny is a method of fixing drum-heads with wedges. The head is lapped, and a series of parallel fibres pass down to a subsidiary ring encircling the barrel of the drum. A series of triangular wedges are inserted between this ring and the wall of the drum. Hammering in the wedges tightens the tension of the drum-head. Drums fixed in this way are found in Nigeria, Cameroun, Gabon, Equatorial Guinea and the Congo Republic. This mode of head-fixing is otherwise only reported from the Indonesian islands (see Kaudern, 1927:141 for Sulawesi).

3.4.4 Physical traces in Present-day Populations.

3.4.4.1 The Distribution of Elephantiasis.

A further piece of contributory evidence comes from a medical source- elephantiasis. A seminal article by Laurence (1968) demonstrates that this disease had its origin in the islands of S. E. Asia. He says 'this infection is placed in the area of evolution of the Malay-Polynesian-Malagasy [Austronesian] language-group and it is conceivable that the disease was introduced to Africa by movements of people belonging to the same linguistic group'. A relevant feature of this disease is that it in order to spread it must be associated with the movement of a number of infected individuals. Now, although elephantiasis is very prevalent on the East African coast, no continuous zone of infection connects that occurrence to West Africa (cf. the map in Jones,1972 where the zones of infection are marked).

For this reason, Laurence (1968:47) came independently to the conclusion that elephantiasis was brought directly to West Africa by a migrant population. In terms of the chronology, a remarkable confirmation comes from the presence of representations of sufferers from elephantiasis among the Nok figurines (Willett, 1967:61 ff. Fig.7 and Plate 4O). The Nok terracottas have been found in a broad area of central Nigeria and are currently dated at >25OO B.P. (Shaw, 1981:159). This is a date altogether too early to be accounted for by supposing diffusion from the East coast, even assuming that a 'corridor' along which the disease was transmitted can be suggested.

Under normal circumstances, we should expect a more marked physiognomic relict in the populations of the Bight of Bonny area. However, this is also a zone where sickle-cell anaemia is extremely prevalent. Selection pressure encourages what would normally be an extremely debilitating gene, because of the resistance that it gives to malaria, a disease often fatal before the introduction of the quinines. The presence of Orthodox Jews in the Ethiopian Highlands, the Falasha, who are somatically indistinguishable from their neighbours is difficult to account for, unless we suppose a mechanism like this at work. When immigrants

marry into a resident African population, selection pressure in favour of offspring carrying the sickle-cell gene that promotes resistance to malaria will be extremely strong, and thus the 'African' genes will be favoured against those of the outsider. If Austronesians did land and then intermarried, within a few generations all phenotypic traces of their physical characters would be lost. However, recent techniques of permitting the tracking of genetic markers may make it possible to test this hypothesis.

4. The implications for African Prehistory and Suggestions for further Research.

4.1 Indo-Pacific food-crops and the Bantu expansion.

Whether the Austronesian hypothesis is accepted or not, the anomalous distribution of these humid-zone cultigens may have important consequences for our interpretation of African prehistory. Greenberg (1966) originally proposed the idea that the Bantu homeland was to be located in the Cameroun highlands. Despite some controversy, this idea was revindicated by Heine (1973) and Bouquiaux et al. (198O) and the date generally advanced for this is >3OOO B.P. The evidence for this has recently been reviewed in Blench (1992, in press,d). Archaeological evidence remains meagre, but nothing has been found to directly falsify this hypothesis.

Recent work on the Adamawa-Ubangian languages (Bouquiaux and Thomas, 198O) has shown that in the millennium preceding the Bantu expansion, the Ubangian-speaking peoples moved eastwards from Adamawa as far as the Western Sudan. The staples of these peoples, to judge by rather inadequate accounts, were the now rare tubers *Solenostemon rotundifolius*, *Plectranthus esculentus* and the aerial yam, *Dioscorea bulbifera*, and the three-leaved yam, *Dioscorea dumetorum*. None of these are particularly high-yielding, and the *Dioscoraceae* in particular need considerable processing before they are sufficiently non-toxic to be edible. This may account for the rapid growth in importance of cassava in these areas compared with West Africa, where the guinea yam is a significant alternative source of carbohydrate.

There is some evidence to suggest that this tuber repertoire was the original 'stock' of the proto-Bantu (Blench, in press,d). Chevalier (1952) discusses the use of the aerial yam, *D. Bulbifera* and some other *Dioscoraceae* among the Equatorial Bantu, and Ardener (1956:46) suggested that, for the Kpe (a group of coastal Bantu in Southern Cameroun), *Dioscorea dumetorum* was the original crop, and that it was displaced at some later unspecified period by the plantain and the water-yam. A similar impression may be gained from Ittman (1976) who lists a number of cultivated varieties of the three-leaved yam for the Duala.

Probably the appearance of three high-yielding staples that could be grown successfully in the tropical rain-forest permitted the second, and most dramatic phase of Bantu expansion. Moving South and East, presumably along the waterways they seem to have rapidly colonised the equatorial forest. The smelting of iron which began in West Africa at this period as iron-working in the Jos Plateau is dated to ca. 25OO B.P. (Shaw, op.cit.). The conjunction of these crops and at least some iron tools to make easier the clearing of the forest may have been the combination of factors that permitted the colonisation of half the continent in such a relatively short period of time.

4.2 Suggestions for further work.

In order to test this hypothesis, the most significant area of research is undoubtedly archaeology. Ideally, a site in Gabon or Congo Republic might yield recognisably Austronesian ceramics, but this seems unlikely in practice, even assuming the practical difficulties of excavation in these areas were overcome. However, the relatively sudden appearance of a radically new set of cultigens, should show up in the record of settlement patterns. A specific effect of vegetatively reproducing crops of this type is that they flourish best with irrigation. This permits a high yield per hectare and in turn allows for greater settlement densities, i.e. larger villages.

Further botanical work should concentrate on mapping more precisely the extent of the various crops, and producing annotated lists of local cultivars, recognised by farmers, with the taxonomic correlates of these. Specific genetic comparisons may be able to establish more precisely the exact area of origin of the Austronesian cultigens in Africa.

This paper presents a model for discussion. The long-distance hypothesis is here proposed for lack of any valid alternatives. The apparently unlikely collocation of items of material culture that seem to relate West Africa to Austronesia may be merely an artefact of the present inadequate state of our knowledge, and if this paper can stimulate some research in these areas it will have achieved its object.

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