Early Agriculture, Language History and the Archaeological Record in China and Southeast Asia

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For the past decade I have been researching the topic of early agriculture and the history of language families, as part of a general interest in questions of ethnogenesis and population origins/dispersals [Bellwood 1984-5; 1985; 1991; 1994; in press a,b,c]. Comparative research within several disciplines allows significant generalizations to be made which affect greatly our understanding of the prehistory of the past 10,000 years in those latitudes (temperate and tropical) where environmental factors have allowed agriculture to take place. Because of the short space allowed for this paper I can only summarise these generalizations here:

(1) Primary agricultural development has only occurred in a very few regions of the world (southwestern Asia, central New Guinea Highlands, Mesoamerica, northern Andes, perhaps central Africa) and agriculture has spread from these regions mainly by demographic growth of the agricultural populations themselves rather than by adoption of agriculture by hunter-gatherers [Bellwood 1990; 1994; and in press items]. I base this statement on surveys of the relevant archaeological and linguistic records and on the records of forager/agriculturist interaction available in the ethnographic record. Some archaeologists regard agriculture as easily diffusable to "receptive" forager [e.g. Gebauer and Price 1992:8], but I suspect such receptive foragers have mostly existed only in regions of agricultural marginality.

(2) The languages within geographically-extensive language families (such as Austronesian, Indo-European, Sino-Tibetan) carry linguistic traces of common ancestry and dispersal from a homeland region. They do not result from convergence of unlike forms. Language families can only have spread to the great extents attained by many (e.g. the ones just listed) by means *predominantly* of population colonization. They have not spread by language shift, even though processes of language shift and elite domination can be seen to have operated intensively in many localised group-to-group circumstances recorded ethnographically and historically.

(3) Language family homelands, as determined by comparative method reconstructions of family trees, proto-language vocabularies and (in some cases) lexicostatistcal calculations (the latter subject to many provisos owing to varying rates of change) indicate that many of the major agriculturist language families originated in relatively restricted areas of the earth's surface. Many such areas also happen, not coincidentally, to be areas where agriculture originated from a primary foraging baseline (e.g. southwest Asia, central and southern China., Mesoamerica). Regions of agricultural origin are regions where the geographical distributions of many different language families intersect, and also where the origin zones of many of those intersecting language families were

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located. Over time, populations have tended consistently to move out from such zones of primary agriculture through demographic growth, rather than in; their languages have moved outwards with them (obviously there are exceptions here - Turkish in Anatolia for instance, but these do not negate the general pattern at the *language family* level). Conversely, regions which are not areas of primary agricultural origin, e.g. peninsular south Asia (India and Sri Lanka), are also not the origin regions of the language families which now occupy them (Indo-Aryan and Munda did not originate in India, and neither did Dravidian if one accepts an Elamo-Dravidian macrofamily with origin somewhere northwest of India).

(4) Some of the language families which intersect in the primary agricultural regions are classified by many linguists into macrofamilies (e.g. Nostratic in southwest Asia, Austric and Austro-Tai in eastern Asia, Central Amerind in Greenberg's classification for central America). Such macrofamilies, if indeed they are "real" (as I believe some be, unless we believe that all the language families in the world have descended independently from a world-wide stage of proto-language which must have existed only about 8,000 years ago - surely an inconceivable concept), must be subject to the same historical observations as language families; that is, they originated in restricted areas and have spread outwards by means of population colonization.

The conclusion I draw from the above observations runs as follows. Shifts from complex foraging to agriculture in the cereal-based regions of primary agricultural origin led to rapid, and in some cases explosive, population growth. Many of these populations began immediately to colonise adjacent areas inhabited only by foragers, who in many cases were probably incorporated through intermarriage into the larger agricultural populations. After relatively short periods of time of these expansions had reached huge extent- Austronesians from Taiwan to Polynesia, Indo-Europeans from Ireland to Bangladesh, Uto-Aztecans from central Mexico to Idaho (many switching back to foraging in the marginal climates of the Great Basin), *all before any historically recorded expansions of the imperial type.* Romans, Mongols, Greeks, Aztecs and other empire builders had very little overall impact on language family distributions in the long term; for example, Indo-European is greatly more than just the Romance languages which have descended from Latin. Historical expansions of individual languages (e.g. Thai, Burmese, Malay and Chinese in eastern Asia) have, of course, been numerous, but in no case can such historical movements be seen to be responsible for the total distribution of a major family of languages.

We can also see many examples of population expansions, in the purely material-cultural sense, in the archaeological records of widespread early agricultural homogeneity. Examples include the Danubian of central Europe, Lapita and Island Southeast Asian red-slip pottery assemblages in Austronesia, Mesoamerican and Andean Early Formative cultures, and must of the Chinese early Neolithic. In many regions of the world, as time progressed forwards from periods of agricultural beginnings, so archaeological patterns became more fragmented, just as did linguistic patterns if the linked reconstruction of agricultural and language family expansion offered here is

correct. This early agricultural homogeneity in so many regions of the world archaeological record can hardly document diffusion alone, simply because diffusion alone via some kind of "interaction sphere" model, whether of languages or material cultures, though unmoving, pre-existing and diverse populations, would not lead to all the shared elements of iconography and style which make the archaeological complexes listed above so striking in their relative degrees of homogeneity. The linguistic phenomenon of interference through shift [Thomason and Kaufman 1988] is surely a concept which also applies to material culture diffusion. (What archaeology requires for the 21st century is some objective method of actually quantifying continent-wide patterns of homogeneity versus heterogeneity through both time and space).

Situations of continuous expansion by early agriculturists of the type advocated here are very hard for us to visualise today since there have been no such expansions on major scales in recorded history, apart from those set in train by European colonialism. This means that the Neolithic past is not just a simple version of the present culturally-diverse landscape in the rural parts of many developing countries. Linked population expansions probably occurred after the regional beginnings of agriculture on a similar scale to the recent colonial outpourings from Britain and Iberia. It is worth reflecting, however, that some of these early expansions were often variable in *speed* : for instance, Austronesian colonization seems to have been very rapid in eastern Indonesia and the western Pacific, but delayed into eastern Polynesia and on to the mainland of Asia (Chams, Malay). Likewise, the Indo-European colonization of India took place several millennia after movement into Europe. Speed can be read not only in the distribution of C14 dates, but also in the structures of language families. Tree-shaped structures of subgroup relationships reflect slower outward dispersal than do rake-shaped structures, since the former depend on relatively long periods of regional stasis in order to accumulate the shared innovations which produce the hierarchical tree shape. A rapid spread over a large geographical region, as seems to have occurred with Lapita colonization of the western Pacific, will yield a linguistic family tree with very little hierarchical differentiation (and any which does exist will probably reflect subsequent population readjustment; see Ross 1989 for Melanesia).

The idea presented here is that some of the population dispersals which occurred consequent upon regional developments of early agriculture were immensely greater even than many dispersals of pre-industrial societies in history. Dispersal of a biocultural population through time and space is a very significant concept for prehistory. Moore [1994] has highlighted what he terms "bifurcative" and "rhizotic" (or reticulate) models of biocultural change, the first being the model of expansion and differentiation suggested by major language family dispersals, the second being the model seen to operate normally in the recent ethnographic world, where cultures have porous boundaries and peoples of different ethnic background interact freely. Moore suggests that reticulate processes have been dominant in human prehistory, a point of view echoed by Fried [1975] in his suggestion that ethnicity is very much a product of conflict and historical state-level domination. Perhaps, however, specific

conjunctions of history and environment going back deep into the human past have given rise to massive bouts of bifurcation at rare intervals, just as in the recent cases of the European colonial dispersals. Bifurcative and reticulate processes of evolution have thus not operated evenly through time-circumstances and opportunities, in a sense, determine outcomes with an immense range of varying possibilities.

Having made these general points I now wish to focus on some questions which arise in connection with the Chinese Neolithic, Chinese-region language history, and the impact of developments in early Chinese-region agriculture on the populations and regions of Southeast Asia and into the Pacific. I wish to present a hypothesis that the Chinese early Neolithic commenced a phase of bifurcative cultural and biological dispersal of tremendous significance in world prehistory.

The Chinese Neolithic was a fairly wondrous phenomenon. Between perhaps 8500 and 7000 years ago, Neolithic cultures had spread over much of central and southern China, particularly in the riverine and coastal areas, to as far south as Guangdong and probably Vietnam. These cultures are characterised by a polythetic but relatively homogeneous pattern of painted, cord-marked or incised pottery with a similar range of shapes, stone adzes and reaping knives, spindle whorls, bones of domestic pigs and chickens, and evidence for sedentary and often quite large villages with heavy investment in agricultural production. Despite clear relationships between early Chinese Neolithic assemblages, however, a unitary source cannot easily be demonstrated. The Huanghe basin cultures are different in certain basic stylistic respects from those of the Yangzi and southern China, and it is the former which are presumably in the direct line of development of the Chinese-speaking peoples of history, as opposed to the many ethnic minorities of southern China who presumably stem from the southern Neolithic cultures. But interaction is there from the start, as seen not only in similarities in artefact styles but also in the presence of rice in a number of Huanghe-region sites from pre-Yangshao times onwards [Wu Yaoli 1994]. Could all of this suggest that there was a zone, focused on the basins of the middle and lower Huanghe and Yangzi rivers, from which early agriculture and the ancestral populations and languages behind most of the modern ethnolinguistic groups of East and Southeast Asia have expanded outwards, initially by processes mainly bifurcative rather than reticulate in nature?

This question is of course hard to answer because we have seemingly no antecedents within China for the Chinese Neolithic; the well-developed cultures present by about 8000 years age already had pottery and domestic animals, a circumstance which, on a comparative basis, suggests that they were by no means the earliest stages in the transition. In southwestern Asia, a region for which we have very much better data for the transition to agriculture than China, complex foraging societies, already living in settlements of quite large size, developed cereal cultivation about 10,500 years ago during environmental situations of fluctuating climate and food supply at the end of the last glaciation. Several millennia of increasing hunter-gatherer cultural complexity preceded the shift to agriculture, and two millennia succeeded it before we

see clear signs of the invention of pottery or animal husbandry. The shift overall was quite a long and complex process, although there does seem to have been a threshold which when crossed led to rapid and irreversible locking into agriculture with unprecedented population growth during the PPNA and early PPNB of the Levant. The agricultural heartlands in China have not yet produced detailed evidence of this type.

Could this suggest that agriculture was introduced into the Yellow and Yangzi valleys from some other region? Or is the evidence for a shift/transition right there in central China but simply undiscovered by archaeologist? Or, was the transition so rapid that it is almost invisible archaeologically? I am not in a position to answer such questions with certainty. All I wish to do in this paper is to raise and to bring up observations made in another recent paper [Bellwood in press c] derived from a comparison between the Southwest Asian, Chinese and New Guinea Highland regions of early agriculture. These observations provide theoretical support for the view that East and Southeast Asian agriculture was a primary development in the Huanghe-Yangzi region, especially for rice, the crop upon which forms the following discussion is focused (space is lacking for a consideration of the millets).

I. The Environmental Background to Early Agriculture

As in Southwest Asia, the climatic amelioration at the end of the Pleistocene in eastern Asia involved a rise of temperature, approaching present levels by 13,000 BP, and also the development of a much stronger summer monsoon. As also in Southwest Asia, there is growing evidence that this overall climatic amelioration was temporarily revered in China by a Younger Dryas cold interval after 11,000 years ago. Given fairly strong claims that this climatic retraction was the major stress factor leading to the development of agriculture in southwest Asia [Moore and Hillman 1992], by causing adverse fluctuations in wild plant food availability, we need to consider the possibility that a similar situation of climatic stress was the major causal factor behind early Chinese-region agriculture. Any temporary shortening of the summer growing season on the northern edges of both wild rice and millet distributions could have been quite significant for populations targeting them as food sources.

Because of this factor, it is clearly important that the oldest evidence for domesticated rice in China actually comes from the Yangzi basin, a region which was presumably on or very close to the northern edge of the early Holocene range of wild rice. Plant cultivation, presumably not coincidentally, seems also to have begun on the edges of wild progenitor ranges in Southwest Asia and the New Guinea Highlands. In these areas planting perhaps began around the edges of seasonally-inundated patches of soil, especially at times when water levels were falling rapidly after a rainfall period. It is apparent from the locations of early rice-growing sites that rice began its cultivated life as a wet-field crop rather than a swiddened crop. Dry-land swiddening in China and Southeast Asia may be regarded as a secondary development undertaken when good swampy or riverine terrain was already fully occupied.

II. The Importance of Reaping Knives

The morphological and genetic changes promoted by domestication in rice, especially the loss of the shattering habit when ripe, were probably stimulated by the same kinds of harvesting and management activities which led to the related changes in wheat and barley in Southwest Asia [Oka 1988; Chang 1989; Thompson 1992]. Such activities might have included the use of a sickle/reaping knife [Wilke *et al.* 1972]. Selection of non-shattering stock for planting, and winter storage of seed leading to reduced selection pressures for tough protective glumes. According to Oak [1988: 101], some of the morphological changes could have taken place rapidly, as in Southwest Asia [cf. Hillman and Davies 1990 for wheat]. The use of reaping knives could thus be a very significant indicator of the region where selection of domesticated characteristics in rice and millets first began. The oldest Neolithic sites in the Huanghe basin have reaping knives or sickles of stone, shell and even pottery However, the oldest layers in the rice-growing sites of the Yangzi region, for instance at Pengtoushan and Hemudu, do not appear to have stone reaping knives [Yan 1991:120-1] and they are also absent in the oldest Neolithic sites in the Penghu Islands and Taiwan [Tsang 1992]. One might conclude from this that the Huanghe basin was the first locus of agriculture in China, but a problem here is that absence of reaping knives in stone does not necessarily mean a total absence of the tool type; bamboo might have been used instead. While it is still uncertain where the practice of cereal reaping, as opposed to simple uprooting or beating, first developed in China, the question is obviously an important one for determining where crop plants first began to develop domesticated characteristics.

III. The Consequences of Early Agriculture in China

The consequences of the shift to agriculture in China were massive indeed, if we examine both archaeological and linguistic sources of evidence. The biological evidence relating to a dispersal of Asian-derived populations through Southeast Asia and into Oceania is also of major importance, albeit outside the range of this paper.

Commencing first with the archaeology, I refer to Chang's rather interesting discussion of the growth of the "Chinese Interaction Sphere" [1986: Chapter 5]. In this discussion Chang accepts the putatively "early" dates for pottery from some southern Chinese cases, although these have no support from dated village sites older than 5000 BC and I favour omitting them from further consideration until better data are presented. If they are omitted, then we have three phases, following Chang:

(1) 7th millennium BC - a cluster of related sites in the Huanghe basin [Peiligang, Cishan: Shih 1993], plus the newly-discovered Pengtoushan rice-growing complex in the middle Yangzi [Yan 1993]. From published data it is not clear to me whether we have here one primary development of agriculture with two minor sub-foci, or two independent development. As noted above, the presence of rice in some early Huanghe sites makes total independence of agriculture in the two zones look very unlikely.

(2) c. 5000 BC - the Yangshao, Dawenkou, Daxi, Majiabin and Hemudu cultures, plus assemblages distributed down the southern coast of China to Fujian and

Guangdong [Chang 1992; Tsang 1992; and see Meacham 1984-5 for some possible dates of this order for painted pottery assemblages from Hong Kong and Macau]. Chang states that these assemblages are still "distinctive and individual" [1986:237], but I believe, have seen much of the material in Chinese museums, that the assemblages from coastal regions south of the Yangzi, including Taiwan, are all fairly closely related in terms of ceramic detail (e.g. red slip, cord marking, perforated pedestals, general shape repertoire etc, not to mention the very broad range of non-ceramic material culture from atone adzes to the widespread presence of rice). The situation seems to me be similar to that of the earlier phase, with slightly separate but overlapping style zones in the Huanghe basin and the sub-Yangzi regions.[1]

(3) In the third phase, starting 4000 BC, Chang now recognises a very high degree of regional integration, but still with northern (Huanghe basin) and southern ("Lungshanoid") divisions. Chang believes this grew together because of a "process of linkage", and that "regional cultures reached out to touch each other physically, interacted culturally, and show tangible and growing evidence of sustained and significant interaction" [1986:237]. Chang's words of course suggest that he believes a homogeneous cultural entity [his "Chinese or proto-Chinese sphere of interaction": 1986:242] developed by convergence from relatively unlike ancestral cultural form. While I must respect Chang's views on this, my own viewpoint is that the interaction sphere was there from the beginning of the Neolithic; it did not converge, but simply continued to track relationships between people and cultures who shared one, possibly two, foci of common origin at the beginnings of expansive millet and rice agriculture. The problem may be that the truly oldest Neolithic cultures of China are still too fugitive for the degree of early homogeneity to be recognized. Many on the coast, for instance, might have fallen victim to rising postglacial sea levels.

At this point I can only add that for many years I have held strongly the view that a dispersal, via human colonization, of Neolithic material culture and agricultural systems took place from the general region of Sub-Yangzi China through much of Southeast Asia, eastern India, and Oceania beyond the region of independent early agriculture in New Guinea and western Melanesia. There are still no reported dates, either archaeological or palynological, for arguable agricultural activities anywhere in Southeast Asia older than about 3000 BC. The same applies to the Indian sub-continent outside the Harappan sphere of influence in the northwest.

This brings me back to the archaeological and linguistic discussion at the beginning of this paper. In brief, the general area of East Asia between the Huanghe river, Yunnan and northern Vietnam can be stated on firm linguistic grounds to have contained the homeland for the Tai-Kadai, Miao-Yao (also known as Hmong-Mien) and the vast Austronesian language families, and on slightly less firm grounds the homeland regions for the Austroasiatic and Sino-Tibetan families [Bellwood 1994]. As already noted, areas of

primary agricultural origin elsewhere in the world tend to be regions of deep phylogenetic diversity within and between language families. A such they be given recognition as regions of common major language family origin. In general, populations have remained stable within or have flowed outwards from these regions.

Within East and Southeast Asia, the location of Proto-Austronesian in Taiwan has long been accepted by a majority of linguists [Blust 1984-5; 1992; Sirk 1987; Pawley and Ross 1993]. A southern Chinese origin also applies to Tai-Kadai [Benedict 1975; Chamberlain 1990]. An early propinquity of ancestral Tai-Kadai and Austronesian is supported by phylogenetic claims inherent in Benedict's Austro-Tai hypothesis [Benedict 1975], or, should these prove incorrect, by an allied claim for early borrowing between the two phyla by Thurgood [1994]. For Austroasiatic, any prospect of demonstrating an origin in China is now hindered by the expansion of Chinese, but early Austroasiatic placename traces as far north as the Yangzi [Norman and Mei 1976], together with claims for an Austroasiatic-Austronesian genetic relationship [the Austric hypothesis; for a recent statement in support see Blust in press], suggest that the Austroasiatic languages spread from a homeland adjacent to those for Austronesian and Tai-Kadai. For Sino-Tibetan, homeland estimates by linguists tend to fall in the western part of the range [e.g. Matisoff 1991 favours a source in the upper basins of the Yellow, Yangzi, Mekong], but in my view any determination of a source region for Sino-Tibetan must face the problem of linguistic diversity caused by the expansion of Chinese within the past 2500 years. A source for Sino-Tibetan close to the presumed Chinese archaeological homeland, squarely in the Huanghe basin early agricultural zone, would make excellent sense and would help to explain why, during the Conference on Asian Mainland/Austronesian Connections held in 1993 in Honolulu, so many varied link, some genetic, some due to ancient borrowing, were claimed all the language families of eastern Asia [see *Oceanic Linguistics* for December 1994].

Archaeologically, the expansions of Austronesian speakers through mainland and island Southeast Asia respectively can be followed, insofar as the archaeological record is able to illuminate such processes, in terms already indicated by me in a number of publications [Bellwood 1984-5, 1991, 1992: in press c; see also Higham 1994 for some ideas on Austroasiatic]. These observations are not repeated here since my purpose is only to raise questions relevant for Chinese prehistory. Most importantly, does the Chinese archaeological record suggest a single origin zone for both millet and rice agriculture in the Huanghe-Yangzi region and do Chinese early Neolithic cultures suggest a commonality of origin? This is not to suggest that population expansion from central China need have been continuous, regular in tempo and always centrifugal, but an underlying foundation of early Neolithic major population dispersal may lie firmly in place beneath the reticulate pattering of subsequent prehistory and ethnography.

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Note

(1) In the recent literature there are many hints that some of the earliest Neolithic cultures of southern China relate quite closely to contemporaries in the Yangzi basin (e.g. Au Ka-fat 1993 on a middle Yangzi source for the oldest painted pottery in coastal Guangdong; Chen Xingcan 1994 for possible links between Xiantouling and the Daxi culture of the middle Yangzi). Because these reports are brief, and often with limited chronological data. I am unable to evaluate them in detail. But the possibilities which they suggest are extremely interesting.

中國及東南亞地區的早期農業、語言歷史和考古記錄

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【摘要】

不論從考古學或語言學的角度來看，人口的發源與流播與農業發展和語系分佈有莫大關連。世界上稱得上爲農業發源地的地區不多，而農耕文化往往是隨著人口的增長和擴散向外傳播，多於由別種經濟型態中途轉變過來。以中國史前時期爲例，農耕文化在9000多年前在黃河及長江流域發展起來後，導致人口迅速增長及向四周擴散。由於從同一語系分化出來的不同語言有很多共通點，只要加以細心研究，不難追溯得一些主要語系的分化和發展過程，從而得知人口與語言的散播軌蹟。研究結果是往往會發現農業的發祥地與主要語系的發祥地互相吻合。然而，由於有關最早期農業和語言發展的資料相當零碎，且甚多存疑的地方，致考古記錄每有矛盾之處。本文作者就考古觀察所得，提出了與此相關的多個問題，包括農耕文化是否由外地傳入，抑或發祥自中原，而考古學家尚未發現實證而矣，又或過渡期太迅速，根本無蹟可尋。作者又從自然環境、農耕工具等角度找出長江中下游最主要的稻作文化發源地之一的可能性。此外，本文又探討中原與華南地區新石器時代最早期文化的相類程度。

自新石器時代早期開始，中原及華南地區的人口便不斷增長及向外擴散，稻作耕種和語言系統在往後幾千年亦隨之流播到其他地區，包括東南亞大陸及群島等地。文化的演變可循分枝式及綜橫交錯式的軌蹟前進，視乎歷史及其他自然環境因素而以不同強弱程度共存。據研究所得，中華地區的新石器時代是文化和語言作分枝式演變的重要年代。這點對於研究源於中國的文化擴散十分有價值。