

中央研究院 民族學研究所集刊

第十三期

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中華民國五十一年春季

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NANKANG, TAIPEI, TAIWAN

REPUBLIC OF CHINA

MAJOR PROBLEMS IN THE CULTURE HISTORY OF SOUTHEAST ASIA

KWANG-CHIH CHANG

In recent years, anthropologists have shown wide interest in the contemporary cultures of Southeast Asia, but for cultural historical synthesis they often still rely upon hypotheses that were formulated some time ago and are now largely dated. The paucity of new syntheses apparently is the result of the paucity of new field data, but it seems imperative that we make some fresh reevaluations of the old data to formulate new problems and to direct new field researches. The reevaluation could be considerably aided by new field data from prehistoric South China, which are highly suggestive of a solution for such recurrent problems as the beginning of food-production and the first appearance of irrigation techniques in Southeast Asia, problems that the archaeological materials from Southeast Asia itself have yet to shed much light upon. The purpose of the present paper is to review some of the major problems in the culture history of Southeast Asia, and to make explicit some of the directions along which their solution may eventually be found.

First in order is a definition of the area under study. In current scholarly literature, Southeast Asia usually refers to the Indo-Chinese and Malay Peninsula, Indonesia, British North Borneo, and the Philippines.⁽¹⁾ For the purpose of a discussion in its culture history, however, Southeast Asia rightfully includes South China as well as the peninsular and island areas to the south. Both in geology and geography, South China is sharply demarcated from North China by the crest of the Tsinling Mountains and the Huaiho valley (approximately the 33rd parallel) but continues on to the south. In culture history, South China was definitely a part of Southeast Asia throughout the various prehistoric and historic periods until after the Han Dynasty, when the islands and the peninsula, except for its northern fringes, first came under Indian and then under European influences. This vast cultural area was occupied during the early post-glacial periods by similar groups of mesolithic hunter-fishers, and from the introduction of agriculture through the ethnographic present has been characterized by a number of common stylistic elements in its culture history.⁽²⁾

(1) Brian Harrison, *South-east Asia*. London, MacMillan, 1954, p. ix.

(2) A.L. Kroeber, *Peoples of the Philippines*, New York, American Museum of Natural History, second and revised edition, 1928, pp. 225-230; Ling Shun-sheng, "Tung-nan-ya ku-wen-hua yen-chiu fa-fan (An introduction to the study of the ancient Southeast Asiatic culture)", *Chu-yih-yü-kuo-ts'e*, no. 44, Taipei, 1955, p. 1.

THE FOOD-GATHERING STAGE

Southeast Asia has never been seriously considered as mankind's place of origin, despite the fact that Darwin's "missing link" was first discovered in this area in the form of *Pithecanthropus erectus* in 1890-91 by Eugene Dubois. From probably Lower Pleistocene deposits in Kwangsi of southwestern China, jaws and teeth of *Gigantopithecus blacki* have been found,⁽¹⁾ but their morphology indicates anthropoid rather than hominid affiliations. The earliest human occupation of Southeast Asia can only be traced to the beginning of Middle Pleistocene or the very end of Lower Pleistocene, as it is evidenced by remains of *Meganthropus* and *Pithecanthropus* bones from Java in association with the Djetis fauna. The chronological position of the Djetis fauna is somewhat in dispute,⁽²⁾ but at any rate the currently available archaeological evidence shows conclusively that by the beginning of Middle Pleistocene (probably the Second Glacial stage in the Himalayan glacial sequence) the area of Southeast Asia had been populated by the forerunners of man. The evidence consists of both human fossils (*Pithecanthropus erectus* of Java and Mapa Man of Kwangtung) and remains of palaeolithic implements (the Patjitanian industry of Java, the Tampanian assemblage of Malaya, the Lower Anyathian of Burma, and several possibly lower palaeolithic industries dating from Middle Pleistocene in Thailand, Borneo, and South China).⁽³⁾ The mainland part of Southeast Asia and the archipelago, separated from each other at the present time by the South China Sea and Malacca Strait, formed a single land mass during each of the Glacial maxima of the Pleistocene when the Sunda Shelf was exposed, and the various remains of fossil men and palaeolithic implements from the various regions of Southeast Asia dating from the Middle Pleistocene period indicate that this whole area was probably occupied by physically and culturally related groups of population. Generally speaking, these human groups were Pithecanthropoid,⁽⁴⁾ and their stone implements were fashioned primarily in the chopper-chopping-tool tradition—consisting of crudely flaked unifacial and bifacial implements on pebbles with big secondarily retouched

(1) Pei Wen-chung and Li Yu-heng, "Discovery of a third mandible of *Gigantopithecus* in Liu-cheng, Kwangsi, South China", *Vertebrata Palasiatica*, vol. 2, no. 4, 1958, pp. 193-97.

(2) D. A. Hooijer, "Fossil mammals and the Plio-Pleistocene boundary in Java", *Proc. Kon. Akad. Wet. te Amsterdam*, vol. 55, no. 4, 1952, p. 439; H. L. Movius, Jr., "Palaeolithic archaeology in southern and eastern Asia, Exclusive of India", *Cahiers d'Histoire Mondiale*, vol. 2, no. 2, 1955, p. 260; F. C. Howell, "The Villafranchian and human origins", *Science*, vol. 130, 1959, p. 833.

(3) H. L. Movius, Jr., "Early man and Pleistocene stratigraphy in southern and eastern Asia", *Papers, Peabody Museum*, vol. 19, 1944; "The lower Palaeolithic cultures of southern and eastern Asia", *Trans. Am. Phil. Soc.*, n.s., vol. 38, 1949; *op. cit.*, 1955; H. R. van Heekeren, *The Stone Age of Indonesia*, 'S-Gravenhage, 1957.

(4) W. E. Le Gros Clark, *The fossil evidence for human evolution*. The University of Chicago Press, 1955, pp. 81-112.

flaking surfaces.⁽¹⁾ The facts that identifiable hunting implements are lacking from these Middle Pleistocene Lower Palaeolithic assemblages and that faunal remains have been found but rarely in association with the palaeolithic industries seem to suggest that the Middle Pleistocene inhabitants of Southeast Asia were primarily food-collectors with a generalized subsistence pattern. Technological assemblages similar to the Southeast Asiatic Lower Palaeolithic industries have been discovered from the Middle Pleistocene deposits in North China (e.g., Choukoutienian) and India (e.g., Soan), and from the Lower and Middle Pleistocene deposits of Eastern and Southern Africa (e.g., the so-called "Kafuan", Oldowan, and Pre-Chelles-Acheul), and may represent the persistent occurrence in this part of the Old World of a Pebble Tool substratum which was, in Africa, the basis out of which the Abbeville-Acheulian development subsequently was derived. It is significant to note that for Southeast Asia as a whole, neither Abbeville-Acheulian hand-axes nor the Levalloisian flakes that characterize many Middle Pleistocene stone industries of Africa and Europe are significantly represented in the lower palaeolithic assemblages. This may indicate that man with a pebble tradition of culture came to Southeast and Eastern Asia from Africa before the great Hand-axe-Levalloisian development took place, although it is also possible to formulate other interpretations to account for the facts, such as those taking into account the nature of raw materials or the tropical environment of Southeast Asian habitat which might have favored the persistence of the older traditions.⁽²⁾ The basic explanation, however, must necessarily lie in historical factors, for the wide and transitive distribution of the various technological traditions in the various parts of the Old World cannot be explained by either petrological or ecological factors alone. Furthermore, available archaeological evidence appears to indicate that hand-axes, though insignificantly represented numerically, were used along the southern fringes of the Southeast Asia area—such as Malaya, Java, the Philippines, and as far north as Japan.⁽³⁾ It is therefore possible that

- (1) H. L. Movius, Jr., *op. cit.*, 1949, 1955; H. L. Movius, Jr. (guest editor), "Special Palaeolithic Issue", *Asian Perspectives*, vol. 2, no. 2, 1958. For an alternative terminology, see B. B. Lal, "Palaeoliths from the Beas and Banganga valleys, Panjab", *Ancient India*, vol. 12, 1956, pp. 65-67.
- (2) Augustus J. Sordinas, *The functional character of crude tools in the tropics*, Report for Anthropology 111, Harvard University, 1960, ms. Ralph Linton, in *Tree of Culture* (1955, New York, Knopf, p. 474), attempts to explain the distribution of different Lower Palaeolithic industrial traditions in India in ecological terms, but fails to make his point because he cites the industrial distribution incorrectly.
- (3) Hand-axes are thus seemingly confined to the island arc along the southern and eastern fringes of Asia; see: Ann Sieveking, "The palaeolithic industry of Kota Tampan, Perak, Northwestern Malaya", *Asian Perspectives*, vol. 2, no. 2, 1958, pp. 91-102; H. L. Movius, Jr., *op. cit.*, 1949; G. H. R. von Koenigswald, "Preliminary report on a newly-discovered Stone Age culture from northern Luzon, Philippine Islands", *Asian Perspectives*, vol. 2, no. 2, 1958, pp. 69-70; H. Otley Beyer, "Philippine and East Asian archaeology, and its relation to the origin of the Pacific Islands population", *National Research Council of the Philippines Bulletin*, no. 29, 1948, p. 11; Robert B. Fox, *The Philippines in pre-historic times*, The Unesco National Commission of the Philippines, 1959, p. 12; Harumi Bifu and C. S. Chard, "Pre-ceramic cultures in Japan", *American Anthropologist*, vol. 62, 1960, p. 820. For the occurrence of hand-axes in the interior of the Eastern Asiatic mainland, see: K. C. Chang, "New light on early man in China", *Asian Perspectives*, vol. 2, no. 2, 1958, p. 50; D. C. Graham, "Implements of prehistoric man in the West China Union University Museum of Archaeology", *Journal of the West China Border Research Society*, vol. 7, pp. 47-56, 1935.

cultural influences from the Hand-axe-Levalloisian centers in Africa and southwestern Asia might have been diffused subsequently into our area along a coastal route, but we certainly need many more archaeological materials from the interior to confirm the latter area's negative aspect.

During the Upper Pleistocene period, several major changes took place in Southeast Asia concerning both man's physical characteristics and his cultural equipment. In physique, both Solo Man of Java and Ch'ang-yang Man of central China show characteristic features of the neanderthaloids⁽¹⁾; whether they were the direct descendants of *Pithecanthropus* in this same area or whether they were affiliated with the neanderthaloids elsewhere in the Old World, are questions beyond the scope of the present discussion. *Homo sapiens* appeared, in a later phase of the Upper Pleistocene, in Southwest China (Tzu-yang Man and Liu-chiang Man) and in Java (Wadjak Man). Franz Weidenreich⁽²⁾ contends that Wadjak Man was probably ancestral to modern Australians, and Woo Ju-kang has shown that Liu-chiang Man and Tzu-yang Man exhibit both Mongoloid and Oceanic Negroid characteristics.⁽³⁾ Coupled with the fossil man discoveries in other parts of the Far East, these findings appear to indicate that the modern races of Southeast Asia had not yet been formed during Upper Pleistocene, but that their differentiation may have initiated toward the end of that period.⁽⁴⁾

In culture, the available archaeological data seem to suggest that during the Upper Pleistocene period there may again have been more than a single cultural tradition in Southeast Asia, and at least two regional phases seem to be discernable. One, represented in archaeological evidence solely by the Upper Anyathian of Upper Burma, appears to be a continuation of the older chopper-chopping-tool tradition of technology and of the generalized food-gathering subsistence into the Upper Pleistocene.⁽⁵⁾ The other, typified by the Ngandong industry of Java, the Tjabenge assemblage of Celebes, and the flake industry of Niah Cave in Borneo, also contained a significant amount of chopper-chopping-tool persistents, but these industries are in

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- (1) F. Weidenreich, "Morphology of Solo Man", *Anth. Papers, Am. Mus. Nat. Hist.*, vol. 43, 1951; Chia Lan-po, "Notes on the human and some other mammalian remains from Chang-yang, Hupei", *Vertebrata Palasiatica*, vol. 1, no. 3, 1957, pp. 247-57.
 - (2) F. Weidenreich, *Apes, Giants, and Man*, The University of Chicago Press 1946, p. 30. Cf. E. A. Hooton, *Up from the Ape*, MacMillan, New York, 1949, pp. 352-53.
 - (3) Pei Wen-chung and Woo Ju-kang, *Tze-yang Man*, 1957; Woo Ju-kang, "Human fossil found in Liukiang, Kwangsi, China", *Vertebrata Palasiatica*, vol. 3, no. 3, 1959.
 - (4) Cf. J. B. Birdsell, "The problem of the early peopling of the Americas as viewed from Asia", *Papers on the Physical Anthropology of the American Indian* (W.S. Laughlin ed.), The Viking Fund, New York, 1951; C. S. Coon, S. M. Garn, and J. B. Birdsell, *Races*, Charles C. Thomas, Springfield, Illinois, 1950, pp. 65-75.
 - (5) H. L. Movius, Jr., "The stone age of Burma", *Trans. Am. Phil. Soc.*, n. s., vol. 32, 1943.

addition characterized by a considerable percentage of flake and blade artifacts in the assemblages.⁽¹⁾ Stone and bone points have been found from the Ngandong beds of Java, and stone points from the Tjabenge industry of Celebes. In association with the Ngandong industry is a large number of bones of bison and water-buffalo, and with the Tjabenge, skeletons of pygmy elephants and stegodons. The association of rhinoceri and elephants with the flake artifacts at Niah is also suggested. One may infer that during the Upper Palaeolithic epoch the Southeastern Asiatic food-gatherers had differentiated into no less than two regional facies—interior food-collectors and lowland big-game hunters, somewhat analogous to the situation of western North America at the same period of time. This inference, to be sure, has yet to be better substantiated by future archaeological data, particularly data from the vast territory of South China, where the palaeolithic cultures are next to unknown. The origin of the flake and blade traditions in this part of the Old World is also an open question. Blade and flake industries have been found from deposits of corresponding temporal horizons in North China and India, and these are both possible sources of origin for the flake and the blade industries of Southeast Asia.⁽²⁾

As far as is known, the termination of the Pleistocene period in Southeast Asia did not involve major and decisive changes either in climate or in fauna. While glaciations and inter-glaciations mark the climatic fluctuations in the temperate zones of the northern hemisphere and in the high mountains of sub-tropical and tropical South China, the lowlands of Southeast Asia probably experienced no major climatic changes other than the progression and retrogression of sea-water levels and the relative amount of rainfall. Studies of faunal remains from Southwest China and from the Niah Cave of Borneo have led Pei Wen-chung and Lord Medway to conclude, separately, that the present natural environment of Southwest China and Borneo has been in existence for more than a single geological period, and that the termination of Pleistocene did not leave any remarkable impressions in these regions.⁽³⁾

No matter whether these conclusions can or cannot be generalized for the entire area of Southeast Asia, or at least a large part of it, the fact remains that both of the Upper Palaeolithic traditions of Southeast Asia continued into the post-Pleistocene period. In mainland Southeast Asia and in scattered places in the archipelago region, the Upper Palaeolithic food-collectors persisted into the Recent period, and their industrial remains are known as the Hoabinhian and its related phases. The Hoabin-

(1) van Heekeren, *The Stone Age of Indonesia*, 1957, pp. 37-54; Tom Harrison, "New archaeological and ethnological results from Niah Caves, Sarawak", *Man*, vol. 59, 1959, pp. 1-8.

(2) Cf. Movius, *op. cit.*, 1955, p. 538.

(3) Pei Wen-chung, "The living environment of the Chinese primitive men", *Vertebrata Palasiatica*, vol. 4, 1960, p. 41; Lord Medway, "Food bone in Niah Cave Excavation", *Sarawak Museum Journal*, vol. 8, 1958, p. 630.

hian artifacts are characterized by crudely chipped pebble tools, essentially a persistent expression of the palaeolithic chopper-chopping-tools, and their subsistence patterns were probably characterized by the hunting of small game and gathering of molluscs.⁽¹⁾ In the islands, the Recent period industries, as known in Java, Sumatra, Borneo, the Lesser Sundas, and the Philippines, are characterized by flakes and blades which are better made, more refined, and smaller in size than the Upper Palaeolithic flakes and blades, but are essentially the continuation of the same industrial traditions.⁽²⁾ Big land mammals did not become extinct in all places, though smaller land mammals were the main object of the chase. Human skeletons found in association with these Recent period industries show, however, that by this time a distinctly Oceanic Negroid population has been formed in this area and that the entire Southeast Asia region was probably occupied by peoples having physical features similar to the modern inhabitants of Melanesia and part of Australia.⁽³⁾

BEGINNING OF AGRICULTURE

Did agriculture originate in Southeast Asia? Culture historians are agreed that the neolithic revolution emerged independently in more than a single nuclear area in the world, and that the Near East and Nuclear America were two of these areas where the crucial transition in subsistence modes from food-gathering to food-producing has been well-documented. There are certainly other areas where such events could have happened independently, and one such area long and much favored by ethnologists is the tropical region of Southeast Asia. Ralph Linton states:⁽⁴⁾

A second and quite independent center of plant and animal domestication occurred in Southeastern Asia. The dividing line between this and the Southwestern Asia area of domestication apparently ran north and south through Central India and was directly related to differences in ecology. The climate of the Ganges Valley and of much of Southern India resembles that of the coastal regions of Southeastern Asia from Burma to Indochina and of the large Indonesian islands. Its outstanding features are heavy seasonal rainfall and constant heat. Most of this territory was covered with dense jungle in ancient times. Seed bearing grasses, which require plenty of sun and light, were scarce here, but the jungle

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- (1) Madeleine Colani, "La civilisation Hoabinhienne Extrême-Orientale", *Bull. Soc. Pre. Franc.*, vol. 36, 1939, pp. 170-74.
 - (2) Van Heekeren, *The Stone Age of Indonesia*, 1957, pp. 86-106.
 - (3) P. V. von Stein Callenfels, "De immigratie van de Papoea-Melanesoiden", *Mensch en Maatschappij*, vol. 9, 1933, p. 339; "The Melanesoid civilisations of Eastern Asia", *Bulletin of the Raffles Museum*, vol. 1, 1936, pp. 41-51. See also: H. D. Collings, "Notes on a recent paper: 'The Melanesoid civilisations of Eastern Asia'", *Bull. Raffles Museum*, vol. 1, 1938, pp. 122-123; D. A. Hooijer, "Fossil evidence of Australmelanesian migration in Malaysia", *Southwestern Journal of Anthropology*, vol. 6, 1950, pp. 416-22.
 - (4) Ralph Linton, *op. cit.*, 1955, pp. 95-96.

provided numerous wild roots and fruits upon which the ancient food-gathering economy of the region depended heavily. Throughout much of this region mountains run down fairly close to the coast and changes in altitude produce marked changes in environment. It seems highly probable that this led to the domestication of different crops in the lowlands and in the highlands.

Linton goes on to enumerate yam, taro, banana, breadfruit, and paper mulberry as having originated in the tropical lowlands of Southeast Asia, where they were associated with a coastal and riverine culture. Yams and certain varieties of rice he lists as crops first raised by the hill peoples of the same region.⁽¹⁾ Such hypotheses as Linton's have been made on the basis of the botanical distribution of plant and animal species in this area, and according to their distribution among some of the primitive peoples of the ethnographic present in Southeast Asia and in the Pacific regions whose cultures in general may reflect conditions during the early neolithic periods.

There are two different perspectives pertaining to the problem of agricultural origins in Southeast Asia: one regarding the beginning in this area of the abstract idea and actual knowledge of the cultivation of plants, and the other concerning the first domestication of certain plant species that grew wild here. These two aspects of the same problem are surely related, but are neither one and the same nor mutually determined. It is highly probable that the Southeast Asian tropics served as a new potential ground for carrying out successful experiments in domesticating new plant species growing wild in the natural habitat of the area, but this probability does not naturally lead to the conclusion that Southeast Asia was at the same time an original birth-place of agriculture where the idea and knowledge of plant cultivation came into being independent of external stimuli. To determine whether agriculture as a complex of ideas and techniques began in Southeast Asia independent of other agricultural centers, it is necessary to examine the stage in Southeast Asian culture history as established by archaeological evidence when agriculture was practised in a neolithic village context.

Archaeological investigations in Southeast Asia have been spotty. South China is beginning to be explored archaeologically, Indo-China and Malaya both have a considerable amount of field material, but the rest of the area remains little known. We cannot say that the stage of culture history in every region of Southeast Asia immediately after the mesolithic cultures is clearly understood. We can only say that all available data at our disposal point in the distinct direction of a cultural stage that can best be characterized as sub-neolithic. Excavated sites in Kwangtung,⁽²⁾

(1) Ralph Linton, *op. cit.*, 1955, pp. 96-102.

(2) Mo Chih, "The stone implements unearthed at Hsi-chiao-shan, Nan-hai county, Kwangtung", *Archaeological Journal*, vol. of 1959, no. 4.

the Bacson district of Tonkin,⁽¹⁾ and Sarawak of Borneo⁽²⁾ all show that essentially mesolithic cultures persisted into the period when pottery and polished stone implements appeared in archaeological deposits. Ceramics and polished stone implements which occur in such nuclear areas as the Near East and North China in neolithic village context appeared in Southeast Asia at sites whose total assemblages indicate continuing mesolithic cultures—in fauna, cultural debris, and stone inventory—where either agriculture is not evidenced, as for instance at the site of Somrong Sen in Cambodia,⁽³⁾ or in their total cultural contexts the occurrence of agriculture appears extremely unlikely, as for instance at the site of Hang-Rao Cave in Annam.⁽⁴⁾ A number of explanations may possibly account for such cultural associations, but the simplest, most straightforward, and most probable one is that the mesolithic cultures persisted in Southeast Asia for a lengthy duration of time, during which some neolithic technology—ceramics and polished stone tools—was introduced as a result of cultural contacts with other neolithic cultures which had *both* neolithic technology *and* agriculture.

Is it possible that neolithic technology emerged in Southeast Asia among the mesolithic hunter-fishers quite independently and prior to agriculture, and therefore that the appearance in this region first of neolithic technology and then of agriculture

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- (1) See, for instance, Madeleine Colani's observation at the Sao-Dong cave in the Hoabinh district of Tonkin:

"La division en périodes [with *proto-neoliths* appearing in the later periods] peut-être critiquée; dans ces dépôts très meubles où l'on ne voit pour ainsi dire aucune stratification, rien n'indique ces divisions. Elles sont basées sur des observations en quelque sorte morphologique: outillage excessivement grossier à une profondeur de 2 mètres, moins fruste et plus varié au voisinage de 1 mètre; de 70 à 80 centimètres jusqu'à la surface, les perfectionnements sont plus grands". ("L'Age de la pierre dans la province de Hoabinh", *Mem. Serv. Géol. d'Indochine*, vol. 14, fasc. 1, 1927, Hanoi, p. 18.)

- (2) Tom Harrison, *op. cit.*, 1959, p. 5. The following statements are of special interest:

"There is virtually no overlap between the square tools—with a rich related ceramic and other artifact activity—in the subsurface layers, and the well defined underlying land in which no tools have flattened faces, but characteristically they are round in median cross-section. Moreover, the round tools have not been found connected with the many extended burials of men with pronouncedly shovel-shaped incisors of 'Mongoloid type', who continue on from later Neolithic. Skeletal material associated with the earlier 'round-axe neolithic', is still somewhat ambiguous; but body structure is distinctly slighter, possibly 'Negrito'.

Although no overlapping upward with the later neolithic, they [the round-axe neolithic] do merge downwards into and intermingle with the less securely defined mesoliths. We now have a fine series of transitional pieces, including three big round axes found together, almost polished at the cutting edge, partially edge-ground in adjacent parts, and heavily flaked off in crude manner towards the butt. The material used for these tools varies.....But in only one 'round axe' is the stone the same as that used for any of the later, quadrangular tools".

- (3) Eugene C. Worman, Jr., "Somrong Sen and the Reconstruction of Prehistory in Indo-China", *Southwestern Journal of Anthropology*, vol. 5, 1949, pp. 320-321.
- (4) H. Mansuy and J. Fromaget, "Stations néolithiques de Hang-Rao et de Khé-Tong", *Bull. du Service Géol. de l'Indochine*, vol. 13, fasc. 3, 1924, p. 6.

does not have to be explained in terms of cultural contacts? It is certainly possible—but not at all probable. Aside from the consideration that neolithic technology appeared here in a persisting hunting-fishing assemblage, which makes it appear intrusive rather than spontaneous, it is improbable because both polished stones and pottery—and more specifically the corded form which was the first pottery that appeared in Southeast Asia—were, along with agriculture and other characteristic features of neolithic cultures, *integral* parts of the neolithic culture in the area immediately to the north of Southeast Asia, and because overwhelming evidence of agriculture appeared in Southeast Asia during a subsequent stage of its culture history along with an entirely new horizon of culture which was definitely intrusive from the Huangho Basin of North China. Therefore, as far as Southeast Asia is concerned, we confront two sets of separate problems: the origin of neolithic technology in the sub-neolithic horizon of this area, and the origin of agriculture. The available archaeological evidence indicates that both of these origins can be found in North China during various stages of that area's culture history. After the introduction of agriculture into Southeast Asia, new experiments were probably carried out with locally indigenous plants and a rich variety of new food crops began to be cultivated.

The evidence pointing to such conclusions is scanty, but its meaning is unequivocal. In North China, we know that before the stage of neolithic farming cultures—known widely in the western part of North China as the Yangshao Culture, and characterized archaeologically by painted pottery vessels—there was probably a ceramic horizon marked by pottery with cord and other textile impressions. In the Yangshao and the subsequent Lungshanoid, Shang, and Chou cultural stages, the corded-pottery had never ceased to be a prominent ceramic tradition. In these North China contexts, cord-marked pottery and polished stone axes occurred as integral parts of a full-fledged neolithic complex, including settled village life, the cultivation of food and fabric crops, and the domestication of animals.⁽¹⁾ In the Yangshao Stage, the southern boundaries of the Huangho Neolithic lay along the northern and eastern slopes of the Tsinling Mountains, but cord-marked pottery, partially polished stone axes, and totally ground axes have been found continuing from the Tsinling slopes southward into the Greater Chinese Southwest and most of Southeast Asia south of China.⁽²⁾ Moreover, in these regions—the Chinese Southwest and Southeast Asia south of China—these neolithic technological elements also occurred in a hunting-fishing cultural context in strata stratigraphically lower than fully neolithic complexes.

(1) K. C. Chang, "Dating the neolithic culture of North China", *Bull. Inst. Hist. Philol., Acad. Sin.*, vol. 30, 1959, p. 279.

(2) K. C. Chang, "Chinese prehistory in Pacific perspective: Some hypotheses and problems", *Harvard Jour. Asiat. Stud.*, vol. 22, 1959, p. 133; "A working hypothesis for the early cultural history of South China", *Bull. Inst. Ethn., Acad. Sin.* 7, 1959, p. 86.

The continuous geographical distribution of these neolithic technological elements tends to render improbable the possibility of independent inventions of these traits separately in North China and Southeast Asia, and the contextual associations favor North China as being the source and Southeast Asia as the recipient of these technological innovations. This hypothesis on the North China origins of neolithic technology in Southeast Asia has still to be confirmed or modified by a precise chronology for both North China neolithic and Southeast Asian sub-neolithic, which is completely lacking at the present. All things considered, however, I think that currently available information makes the hypothesis itself appear quite plausible.

Supposing that the persistent mesolithic hunter-fisher-collectors of Southeast Asia, possibly Negroid in racial affiliation, adopted neolithic technology from their Northern Chinese contemporaries, we confront still another problem which defies solution at the present time: Were basic ideas of food-cultivation as well as technical knowledge of nonindigenous plants and animals also introduced among these people? In this connection one must constantly bear in mind the fact that in tropical forests of Southeast Asia where the recipient mesolithic peoples dwelt there were plenty of potentially domesticable food-plants, many of which have since been domesticated, particularly root and fruit plants. In being exposed to external influence of neolithic technology these peoples must have been exposed to the knowledge of food-production at the same time, but the incipient cultivation of tropical crops is difficult to establish archaeologically. Archaeological assemblages belonging to this "sub-neolithic" phase of Southeast Asiatic culture history, to be sure, indicate plainly a predominantly hunting-fishing-collecting subsistence. There is, nevertheless, still the possibility that agriculture was introduced to some extent among the Negroid inhabitants who may have begun to experiment on certain root and fruit plants and some of whom at least had become "incipient cultivators." Solutions of these problems in the future will certainly depend upon more problem-oriented and scientifically conducted excavations.

Whatever crops and how much agriculture will prove to have appeared among the persisting Negroid hunter-fisher-collectors in Southeast Asia, we know for a fact that both cereal crops and full-time farming life were brought into Southeast Asia by Mongoloid immigrants from North China. This conclusion has been jointly established by physical anthropological, ethnological, and archaeological evidence.

Skeletal materials uncovered from the cemetery sites in North China of the Yangshao stage show that by the neolithic period the inhabitants of North China were Mongoloid in physical characteristics.⁽¹⁾ Studies of skeletons and skulls of the

(1) D. Black, "On the human skeletal remains from Yangshao Ts'un in comparison with recent North China skeletal materials", *Palaeontologia Sinica*, ser. D, vol. 1, fasc. 3, 1925; "A study of Kansu and Honan Aëneolithic skulls and specimens from later Kansu prehistoric sites in comparison with North China and other recent crania", *Palaeontologia Sinica*, ser. D, vol. 6, fasc. 1, 1928; Y. Yen, C. Z. Liu, and Y. M. Gu, "Report on the skeletal remains from the neolithic site at Bao Ji, Shensi", *Vertebrata Palasiatica* vol. 4, no. 2, pp. 103-111, 1960; Y. Yen, "A preliminary study of human skulls unearthed from Ch'ichia culture burials in Kansu", *Archaeological Journal*, vol. 9, 1955, pp. 193-97.

Pao-chi cemetery of the Yangshao Neolithic further indicate that the North China inhabitants during that period exhibited many distinctive features that are widely found among the so-called Southern or Oceanic Mongoloids.⁽¹⁾ Physical anthropologists have long suspected that the explosive expansion of the Mongoloid race throughout Eastern Asia during relatively recent periods was an event intimately related to the diffusion of agriculture.⁽²⁾ Recent findings of neolithic sites in South China begin to bear this out in demonstrating that Mongoloid skeletons in South China appeared on the top of a mesolithic-Negroid substratum in simultaneous association with (a) evidence of cereal agriculture, and (b) a distinctive style of culture that has been described as the Lungshanoid and is apparently derivative from the Lungshanoid stage of North China neolithic, a stage when the population pressure and increased subsistence potentials brought about an explosive expansion of village farmers toward the east and the south.⁽³⁾ In the Pacific Seaboard of Eastern and South China, these Lungshanoid remains were found in contexts that can best be described as "site-intrusive units" and certainly point to the immigration of whole peoples and assemblages.⁽⁴⁾ In the Southwest and in Southeast Asia south of China, Lungshanoid elements appeared in clusters or individually, indicating that the replacement was gradual and that it involved a certain amount of intermixture with the native population and the recipient culture.⁽⁵⁾ It was a replacement nevertheless, because physical anthropological evidence shows that the neolithic remains in these areas were associated primarily and predominantly with Mongoloid skeletons, and that skeletal remains of the Negroid race rapidly diminished in the archaeological deposits.⁽⁶⁾ Ethnographic evidence shows that Negroid and Negritoid peoples still persisted in certain pocket and marginal locales in Southeast Asia, but Oceanic Mongoloid peoples unquestionably predominate.⁽⁷⁾

(1) Y. Yen, C. Z. Liu, and Y. M. Gu, *op. cit.*, 1960.

(2) J. Birdsell, *op. cit.*, 1951, p. 2; F. Barth, "The southern Mongoloid migration", *Man*, vol. 52, 1952, p. 508.

(3) K. C. Chang, *op. cit.* (*A working hypothesis*.....) 1959, p. 94.

(4) For the definition of the term "site-unit intrusion", see G. R. Willey (*et al.*), "An archaeological classification of culture contact situations", *Mem. Soc. Am. Arch.*, no. 11, 1956, p. 7. Irving Rouse, in a more recent study ("The inference of migrations from anthropological evidence", *Migrations in New World Culture History*, University of Arizona, 1958, p. 64), has listed five criteria according to which a migration, he says, can be demonstrated. The Lungshanoid migration into South China meets these five conditions without exception.

(5) See Pearson's discussion on Southeast Asia neolithic pottery in this issue. Compare: W. G. Solheim, II, "The Kulanay pottery complex in the Philippines", *Artibus Asiae*, vol. 20, no. 4, 1957, p. 288.

(6) R. Verneau, "Les crânes humaines du gisement préhistorique de Pho-binh-gia (Tonkin)", *L'Anthropologie*, vol. 20, 1909, pp. 545-59; P. Huard and E. Saurin, "Etat actuel de la craniologie indo-chinoise", *Bull. Serv. Géol. l'Indochine*, vol. 25, fasc. 1, 1938.

(7) Fay-cooper Cole, *The Peoples of Malaysia*, New York, Nostrand, 1945, pp. 324-37; J. P. Kleiweg de Zwaan, "The anthropology of the Indian archipelago and its problems", *Science in the Netherlands East Indies*, Amsterdam, 1929, pp. 192-208.

North China neolithic evidence indicates that the first Mongoloid farmers planted several varieties of food-crops, but millet was without question the leading staple.⁽¹⁾ When the Lungshanoid farmers migrated southward into Southeast Asia, millet was evidently brought with them. Ethnographers are agreed that millet was the oldest cereal crop planted in Southeast Asia; it is still cultivated by a number of ethnic groups, mostly of the interior, mountainous areas.⁽²⁾ In the new, tropical environment, however, the Lungshanoid cultures inevitably underwent adaptive changes, some of which were drastic. Archaeological evidence from all over Southeast Asia indicates the prevalence of mound and pile dwellings, which were apparently environmentally oriented culture complexes.⁽³⁾ Husks of rice have been found widely in a number of sites in North and South China which can be dated to the proto-Lungshan Complex, or the transitional stage from the Yangshao to the Lungshanoid.⁽⁴⁾ Wild rice still grows in the monsoon areas of southern and eastern Asia, and it is highly probable that it was one of the new plants that the Lungshanoid farmers successfully cultivated in the new, tropical habitat.⁽⁵⁾ With mature farming knowledge and techniques, the Lungshanoid farmers must also have been successful in cultivating certain other plants in Southeast Asia, particularly root and fruit crops. If the subneolithic Negroid population already had such knowledge, this knowledge may have been passed along among the new immigrants who may have added even more of the indigenous food plants to the existing inventory. In any case, aside from root and fruit crops, which are at present archaeologically unsubstantiable, the process of the first cultivation of cereal crops in Southeast Asia now appears to have been established.

Before direct evidence pertaining to prehistoric agriculture in many parts of Southeast Asia comes to light, archaeologists may find useful the studies of remains of stone implements, pottery, and other artifacts that might have been left by farmers in those areas, and which provide valuable information on the cultural context of the prehistoric farmers and on the historical relationships between them

(1) K. C. Chang, *op. cit.* (*Chinese prehistory*.....), 1959, p. 106.

(2) Tadao Kano, "Various cereals cultivated in Indonesia, especially on the chronology of rice and millet culture", *Studies in the Ethnology and Prehistory of Southeast Asia*, vol. 1, 1946, Tokyo.

(3) Y. H. Tai, "Kan-lan: a study of the primitive habitation in Southwestern China", *Inst. Southwestern Soc. and Econ., Lingnan University, Memoirs*, ser. A, no. 3, 1948, Canton; Y. Y. Li, "On the platform-house found among some Pingpu tribes in Formosa", *Bull. Inst. Ethn., Acad. Sin.*, no. 3, 1957.

(4) K. C. Chang, *op. cit.* (*Chinese prehistory*....), 1959; *op. cit.* (A working hypothesis....), 1959.

(5) Cf. Joseph Spencer, "The migration of rice from mainland southeast Asia into Indonesia", *Abstracts of Symposium Papers, Tenth Pacific Science Congress, Honolulu, Hawaii*, 1961, p. 139. It may be significant to note that the appearance of cultivated rice in North China in the proto-Lungshan stage coincides with the expansion of Northern Chinese farmers into sub-tropical South China.