

THE NEOLITHIC TAIWAN STRAIT

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Abstract (F. Bayerl): The article summarizes the ancient Taiwan Strait environment from the Neolithic when melting ice raised the sea level and formed the Strait. Earliest cultures are Fuguodun and Dapenkeng in Fujian and Taiwan respectively, and the author sees both as ancestral Nandao. Longshan formative, tied to Han and Tibetan culture, greatly influenced southeast coastal culture ca. 3,000 BC, and Tanshishan culture replaced Fuguodun and Depengkeng, while the old Nandao persisting on west coastal Taiwan was transformed into Fenbitou culture by Longshan influences. There is discussion of pottery styles, but not of rice cultivation.

Here archaeological data on the Taiwan Strait Neolithic is summarized so that it can be a starting point for further research. This region is chosen because most of my fieldwork was in Taiwan where there are some inconsistencies in the interpretation of ancient history. In China, most archaeology is under provincial jurisdiction, but data from several provinces are needed if cultural historic ties are to be bound to the natural environment. Several factors impinge on Taiwan Strait research: complex coastal geography; diverse ancient human resources with terrestrial, freshwater and marine animals and plants; and easy sea transport promoting foreign resources exchange. As such complex conditions demand archaeological dependence on environmental science and ancient cultures gave high importance to stone- and bone-ware, we must scrutinize geographic features ⁽¹⁾ and types of stoneware ⁽²⁾ because both underlie ancient living conditions. Although geography and stoneware closely relate to production, they are unsuitable for cultural classification. Rather, pot shape and decoration define cultures, so it is important to combine cultural knowledge with resource use by ancient habitants. Such Neolithic data is abundant in Taiwan Strait.

Taiwan Strait archaeology exemplifies multidisciplinary studies in ancient history. In addition to environmental science, analysts may explore various ancient cultures from their resource standpoint by distinguishing terrestrial and marine foods, sourcing pottery clay, identifying bone from food sources, etc. This research also needs linguists, ethnologists and cultural historians from other Pacific regions, points elaborated in my *Archaeological Research on China's SE coast and the Origin of Nandao (Southern Island) language* ⁽³⁾. As some Neolithic traits persist historically, the literature may provide important data.

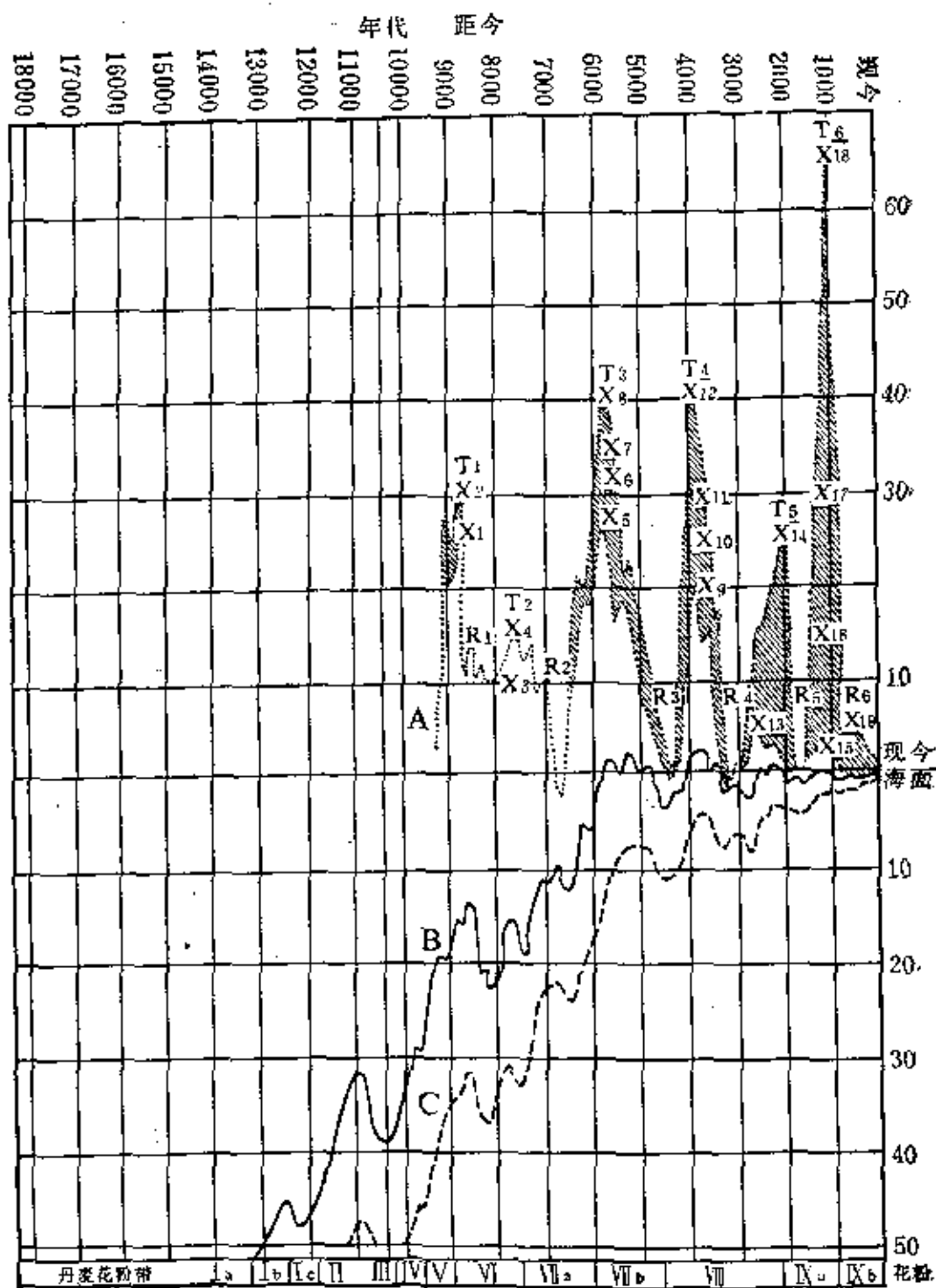
Despite abundant cultural data, a complicated subject and foreseeable important results, Taiwan archaeology remains formative, a delay created by the 40-year political situation. Alternately, Chinese archaeology always centered on the Yellow Basin and neglected frontiers like the Taiwan Strait, a neglect making future research here limitless.

A. Ancient Environment of the Taiwan Strait

The Taiwan Strait, almost 100 m deep, narrows to 130 km between Taiwan and Fujian⁽⁴⁾. The Penghu Islands or Pescadores are 45 km from Taiwan (Dongshi Village, Tainan County) and 140 km from Fujian (Weitao, south of Quanzhou)⁽⁵⁾. Pleistocene glaciations lowered sea level 140m in the East China Sea 15,000 years ago, forming a land bridge between Taiwan and the mainland ⁽⁶⁾, with Palaeolithic artifacts on both sides ⁽⁷⁾.

In the initial Holocene 10,000 years ago, melting ice raised the East China Sea 100m, quickly forming the Taiwan Strait⁽⁸⁾. Historically, Fujian-Taiwan travellers relied on boats, taking at least 2 days to travel from Xiamen on the mainland to Tainan. Kangxi 24th year *Annals of Taiwan Prefecture* (1685) said, "besides 11 *geng* (interval of about 2 hours each in night watch) from Taiwan to Beijing, there are 7410 *li* (Imperial mile) of land travel"⁽⁹⁾. The 11 *geng* required at least 20 hours of boat travel from Tainan to Quanzhou or Xiamen, but even more time is needed due to stopovers and delays. Yonghe Yu 's *Journey on the Small Sea* details his voyage from Xiamen to Tainan in Kangxi 36th year (1697), starting from Dadan Island near Xiamen harbour early on the 21st day of second lunar month in Spring, stopping in Penghu at noon on 22nd, resuming at 23rd midnight and arriving Tainan 24th evening – a journey of 3 days⁽¹⁰⁾. As Early Qing Dynasty sailboats were inefficient, Yonghe mentions the "the wind died at midway when people returning to Fujian from Tainan, the boat not moving an inch in 7 of 10 days for the whole trip". As ancestral Nandao speakers sailed to Polynesia more than 2000 years ago, their boats must have been more efficient than Early Qing Dynasty Han boats⁽¹¹⁾. Nonetheless, there should be no problem because the Strait is narrow irrespective of Holocene sea level.

During the Holocene period, the major Taiwan Strait Neolithic environmental changes were mainly the rise and fall of sea level and vegetation changes. Geologist Caoqi Lin⁽¹²⁾ said soon after the Holocene began, there was a major "sea invasion or inundation, sea level quickly surpassed the current one. That was the "Beishi Inundation Period". Since then to present, there have been 6 "sea-invasions and 6 sea-withdrawals" During withdrawal, the sea level at the Strait is equivalent to present. During the invasion, the level is 20-60 meters higher than now⁽¹³⁾. Therefore, the six sea invasions during the Holocene period, creating inland water inundations, forced living areas from the coast 20-60 meter higher inland. The 6 sea inundations also marked the height of the rise of living areas from sea level, they were (years ago): Beishi (~ 9000), Longgang (~ 8500-7000), Tainan (~ 6500-5000), Dahu (~ 4000-3500), Guoshengpu (~ 2700-2600), Zhanghua (~ 1500-1100) and Bin (~ 1100). Tainan 2 (~ 4500-3000 BC) and Dahu (~ 2000-1500 BC). These are crucial periods in cultural history; they greatly influenced human habitation and food source (to be discussed). Repeated in- and out-flow on Taiwan's west coast shows geologically on Fujian's coast⁽¹⁴⁾. "Besides expected different sampling in various places, in- and out-flow on both sides of Taiwan Strait coasts are synchronous"⁽¹⁵⁾, a conclusion affecting Fujian's Neolithic distribution. Tanshishan, Fujian's earliest site, is on the north bank of the lower Min River and more than 20 km from its current delta. As Tanshishan fossil shells are all maritime, "the coastline at that time...was possibly close"⁽¹⁶⁾. Radiocarbon dates suggest mid- and lower Tanshishan culture existed at 1055-1140 BC⁽¹⁷⁾ and pre-2500 BC, overlapping the Dahu period of 2000-1500 BC.



图一 台湾海峡全新世海面升降图

Fig. 1. High and low ocean levels of Neolithic Taiwan Strait

Zhongtien Songxiong began his research in Taiwan in 1964 on alternating Holocene vegetation as determined by plant analysis ⁽¹⁸⁾. His Sun-Moon Lake sediment analysis suggested “central Taiwan temperature dropped $>7^{\circ}\text{C}$ below present ca. 35,000 years ago, resulting in most plants being fir, chestnut-leaved oak, elm, Taiwan walnut, willow, etc. Air temperature rose gradually, with vegetation changing to subtropical and warmth-loving white gourd, scented apple, chestnut, Eastern water chestnut, etc. ca. 10,000 years ago. Air temperature rose 2.5°C above present ca. 5,500 years ago, then fell to the current level ca. 3,000 years ago”⁽¹⁹⁾. The high temperature period revealed by vegetation changes shows that around 3,500 years ago matches “Tainan inundation period”, while Zhongtien's suggestion is supported by Holocene spore analysis ⁽²⁰⁾. Based on the above, it appears both shores of Taiwan Strait have high water levels at 5000-1500 BC, with humid warm air and rich marine resources, most people being on coastal terraces, but with plenty of resources in inland forests and valleys.

B. Fuguodun and Dapenkeng cultures

Taiwan's Palaeolithic sites reveal human occupation of the Strait since the Pleistocene, which was basic to Holocene Neolithic growth.

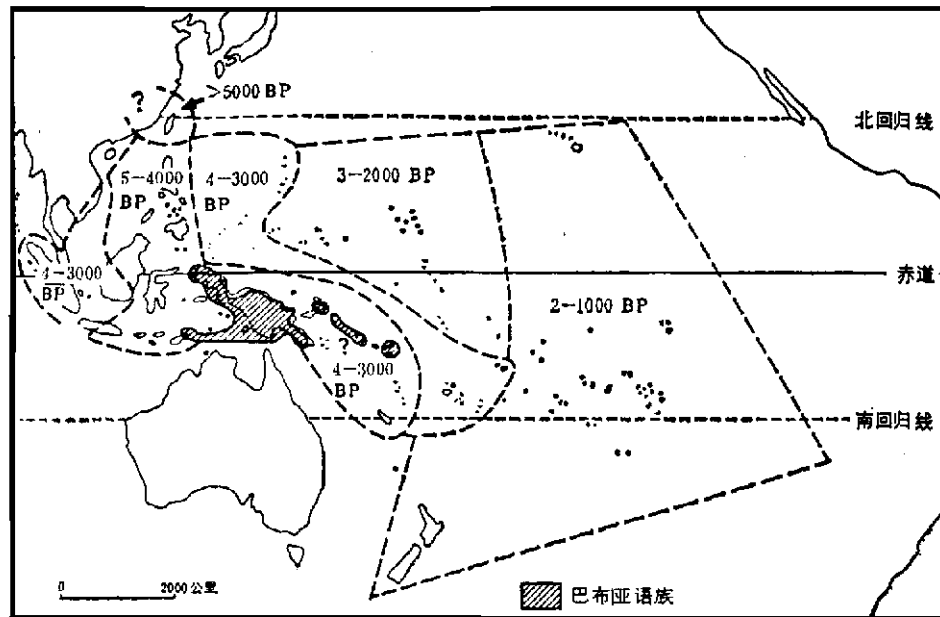
Pottery and possibly agriculture may represent the earliest Taiwan Strait Neolithic cultures of Fuguodun and Dapenkeng in Fujian and Taiwan, respectively. Both existed at 5,000-2,500 BC, synchronous with inundation and high Holocene temperature. Their distribution and contents are detailed in *Archaeological Research on China's SE coast and the Origin of Nandao language*⁽²¹⁾, with 5 main sites on the Fujian coast, namely from north to south, Minhou's Beisaxitou, Pingtan Island (including Aodong's Nancuochang and Nanlong's Kequtou), Jinmen's Fuguodun, Caoan's Chenjiao and Haifeng's Xisakeng. More sites on the east coast include the aforementioned Taipei's Dapenkeng, Tainan's Liujiacun and Kaohsiung's Fengbitou⁽²²⁾ (Fig. 2).



Fig. 2. Neolithic site distribution on Taiwan Strait (1)

The Fuguodun and Dapenkeng coastal cultures had sea and land resources involving agriculture, hunting, fishing and collecting shellfish. People hunted and fished and harvested tubers ⁽²³⁾, while prominent cultural traits are reflected in their pottery decorations, e.g. the various cord-marked decorations on Dapenkeng pots implying the prominent position of fibre-made rope or cord in the culture and broken stone shafts for extracting fibers from bark ⁽²⁴⁾. In any culture, familiarity with and the know-how to use plants does not prove agriculture like incipient cultivation, but they are foremost requirements in establishing agriculture. Japan's Jomon culture is a good example. The importance of shells in Fuguodun culture is seen in the prominent use of various shell imprints in pot decorations, mainly clams (*Anadara granosa* and

Anadara ehrembergi). As cord-marking is also on Fuguodun pots, with shell pattern on Dapenkeng pots, I think both are regional variants of the same culture, the emphasis on plant or shell varying from one to the other. But we cannot use only pot decoration and ignore modern technology to elucidate past agricultural, hunting and fishing data.



图三 南岛语族聚落扩张图

Fig. 3. Expansion and settlement of Nandao language

Fuguodun and Dapenkeng research is not only significant to marine archaeologists, but also to those studying Pacific culture and ethnography. *Archaeological Research on China's SE coast and the Origin of Nandao language* said many Oceanian archaeologists believe ancestral Nandao came from China's southeast coast⁽²⁵⁾, a view strongly supported by Taiwan ethnographic and archaeological data. Besides the Han majority, Taiwan has more than 300,000 Nandao (Austronesian), also known as Malayo-Polynesian aborigines. Its widespread Nandao clans led linguists to believe its origin was there⁽²⁶⁾. Taiwan's Neolithic, history and modern ethnography is notably continuous; i.e. the earliest Neolithic Dapenkeng culture may be ancestral Nandao. If Fuguodun represents Dapenkeng on the Strait's west coast, we can assume Nandao language origin was on the Fujian and Guangdong coasts, matching archaeological expectation (Fig. 3). In addition, many linguistic similarities exist between Neolithic culture and Nandao⁽²⁷⁾.

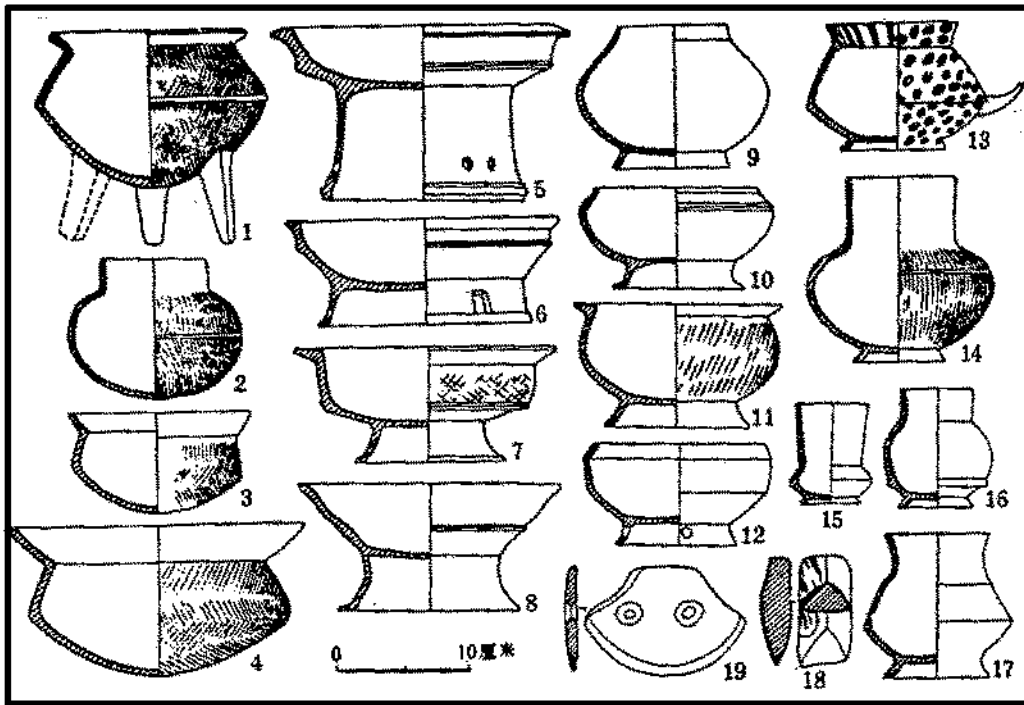
If Fuguodun and Dapenkeng cultures are ancestral Nandao, Taiwan Strait archaeology may bridge mainland and oceanic cultures. Now that no trace remains, despite 2000 years of historical records from the southeast coast, where did the mainland Nandao language disappear?

C. West coast Taiwan Strait Tanshishan culture

Tanshishan on the 20m terrace of the lower Min River 22 km west of Fuzhou City has been excavated 7 times since 1954 and is Fujian's most important Neolithic site ⁽²⁸⁾. Its single culture comprises 3 main levels. The top or Bronze Age has pottery with geometric patterns, while the Neolithic middle and lower levels are typical Tanshishan culture. Several nearby related minor sites are on the side of Minhou's Ronganzhuang, Beisaxitou, Fuqin's Dongzhang, etc. ⁽²⁹⁾ The 6th excavation report on Tanshishan cultural traits lists the following descriptions of pottery, their shapes and decorations (Fig. 4):

Middle level Tanshishan traits (Fig. 4): most red pots contain ash and sand, followed by hand-made fine-grained ashy *ding*, *fu*, bowl, cup, curled legged decanter and *dou*, etc., with wheel-decorated mouths. Decoration resembles bottom level pots, where most pots are red and fine-grained, followed by gray earthenware. All are hand-made with cord-marked, paddled or concave-dotted polished surface engraved with mounds and circles, plus coloured paintings on round-bottomed *fu* (cauldrons) with tapered abdomens, curled legged decanter and *Yin dou* (small pots), etc. From this, I conclude: (1) Tanshishan and earlier Fuguodun pottery differ greatly; while (2) Tanshishan and Longshan formative pottery is similar.

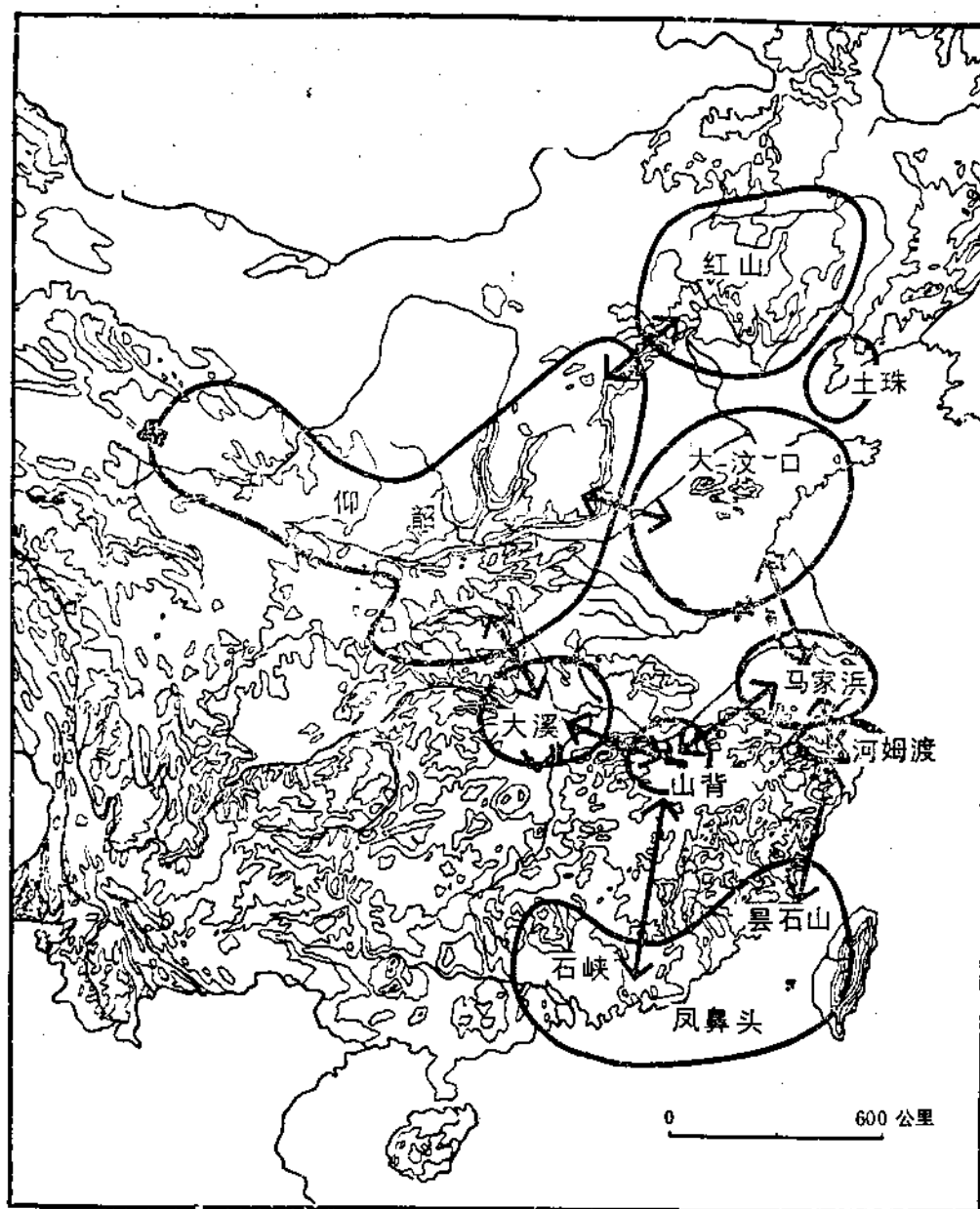
Examining my first conclusion ⁽³¹⁾, "vague cultural signs due to few early remains and poor stratigraphy make ties unreliable" ⁽³²⁾, but some occur in Xitou Site. Some Fuguodun potsherds in the bottom level are obviously mixed with Tanshishan remains ⁽³³⁾. The basic Tanshishan style changed - absence of shell pattern - while *din* and *dou* pots never occur in the older culture, although some traits may continue from Early to Late stages. "As both cultural distributions are on the lower Min River, some parallels exist: e.g. Fuguodun high-collared pots and bottom level Tanshishan fine red sand high-collared pots have wide convex collars and deep impressed patterns" ⁽³⁴⁾. But despite these few ties, Fuguodun and Tanshishan have different origins.



图四 昙石山文化陶器

Fig. 4. Tanshishan pottery

Regarding similarities in Tanshishan and Longshan formative pottery, the "Longshan formative" is a concept I raised in 1959⁽³⁵⁾, in which east coast 3000 to 4000 BC cultures from Shandong to Taiwan are alike, especially their major *din* and *dou* cooking utensils. Lack of archaeological data at that time led me to consider southward human migration as a major factor supporting "Longshan formative" expansion. Now, it appears local cultures existed simultaneously on the east coast from north to south since ancient times, but at 4000 BC started to expand and meld, eventually forming the "Longshan formative" (Fig. 5). At 4000-3000 BC, Dawenkou culture in Shandong, Songze culture in the lower Yangtze basin, Daxi and Qujialing cultures in the mid-Yangtze Basin, etc. became important local cultures with noted similarities, e.g. *din* and *dou*. Thus, Tanshishan *din* and *dou* show "Longshan formative" southern expansion. Tanshishan existed ca. 3000 BC⁽³⁶⁾, several centuries after Shandong, Jiangsu and Zhejiang's "Longshan formative". This also shows that Fujian's "Longshan formative" began later and was influenced by northern cultures. Based on this, if Fuguodun culture represents ancestral Nandao, then Tanshishan culture represents dominant Han and Tibetan cultures. Current data shows Nandao distribution was mainly on coastal Fujian, Guangdong and Taiwan. It was ca. 3000 BC that north China's "Longshan formative" reached Fujian, forming Tanshishan, while original Nandao culture moved to east coastal Taiwan Strait to form ancestral Taiwan culture.

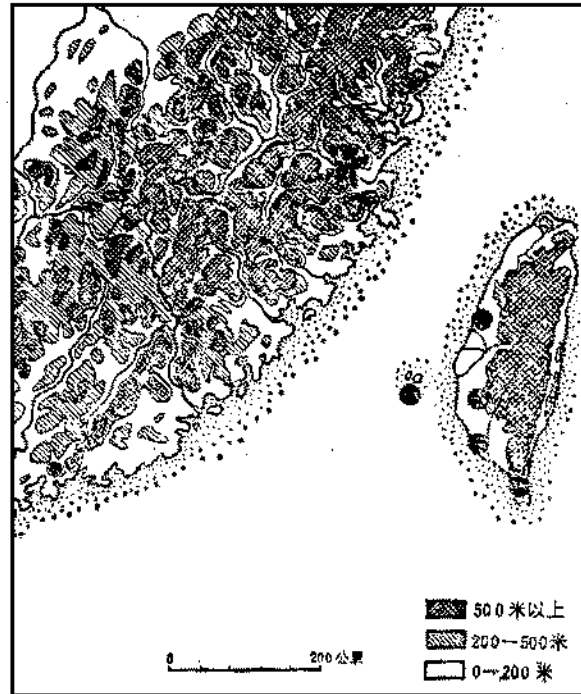


图五 龙山形成期的主要新石器文化

Fig. 5. Major Neolithic cultures in Longshan formative (cultures clockwise from top left are Longshan, Hengshan, Tuzhou, Dawenkou, Majiabang, Tanshishan-Fengbitou-Shixia, Shanbei and Daxi)

D. The Fengbitou culture on East Coastal Taiwan strait

As it is not accidental that new cultures appear simultaneously on both coasts of the strait at 3000-2500 BC, a new culture coincident to Tanshishan appeared on east coastal Taiwan Strait 3000-2500 BC after Dapenkeng (Fig. 6).



图六 台湾海峡两岸新石器文化分布图之二

Fig. 6. Distribution of Neolithic sites on east coastal Taiwan Strait (2)

This new Taiwanese culture has two major groups. Yunshan of unknown origin in Taipei valley in the north is represented by circle-patterned polychrome pottery, a section of a stone adze, various stone axes and jade ware⁽³⁷⁾. Using lithics, Wenxun Sung said it is analogous to Neolithic coastal Guangdong and Indochina⁽³⁸⁾, but similar lithics and pottery are absent there.

The other group in central and southern Taiwan has fine cord-marked red pottery and is the more important Neolithic culture since west coastal Dapenkeng began on both sides of Taiwan Strait. Some scholars call it Niumatou in central Taiwan and Niuchouzi, Eluanbi or Kendin in south Taiwan⁽³⁹⁾. As pots and stoneware from central or south Taiwan or Penghu Islands are alike, there is no need to divide them. The Fengbitou stratified type site has two periods, the earlier with fine cord-marked red pottery, the later with cord-marked, striped or engraved gray or red pottery⁽⁴⁰⁾. Greatly improved over Dapenkeng, Fengbitou has many agricultural stone tools (axe, hoe, sickle), *din* and *dou* pots and rice remains in sherds⁽⁴¹⁾, but its origin is unresolved. I

saw differences between it and Dapenkeng, hinting it originated in mainland Majiabang or Qingliangang cultures ⁽⁴²⁾. The 1970's "Zhuda project" excavated Niumatou site in Qingshui County on the central coast, finding fine cord-marked red pots like Dapenkeng ⁽⁴³⁾. Later, some Taiwan archaeologists believed such culture rose from aboriginal Dapenkeng ⁽⁴⁴⁾. Indeed, important Fengbitou early pottery traits in south and central Taiwan and the Penghu islands possibly grew from original Dapenkeng culture, but new Fengbitou achievements like rice farming, agricultural tools, and *din* and *dou* pottery relate to Majiabang, Songze, Hemudu and Tanshishan cultures from west coast Taiwan Strait rather than Dapenkeng. As Taiwan's new Fengbitou culture resembled Tanshishan culture, it may have been created under mainland cultural influence.

Scarce data prohibit solid conclusions, but the following hypotheses may explain important phenomena: (1) 5,000-3,000 BC Taiwan Strait Neolithic is Nandao ancestral culture, *i.e.*, Fuguodun and Dapenkeng; (2) "Longshan formative" tied closely with Han and Tibetan people, and greatly influenced SE coastal culture ca. 3,000 BC; and (3) Tanshishan culture replaced Fuguodun and Dapenkeng, the old Nandao persisting on west coastal Taiwan, and was transformed into Fengbitou culture by Longshan cultural influence.

E. Discussion

We mentioned several times at the beginning of the present article that the Taiwan Strait Neolithic is relatively unknown and needs new data. East coastal Taiwan Strait research led first by Japanese archaeologists is more advanced ⁽⁴⁵⁾. The Department of Archaeology and Anthropology of National Taiwan University led or participated in several important excavations ⁽⁴⁶⁾: e.g. east coastal Palaeolithic Baxian cave excavations and several west coast sites of the 1960's ⁽⁴⁷⁾; the 1970's "Zhuda project" ⁽⁴⁷⁾; the advocacy of "new archaeology" and excavation at Kendin ⁽⁴⁸⁾ and Neolithic graves in the Pinan site in Eastern Taiwan ⁽⁴⁹⁾. As obviously fewer excavations are on the west coast of the strait (mainland) ⁽⁵⁰⁾, Fujian archaeology is promising, with current or planned excavations complementing or correcting problems discussed here.

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