

The History of Prehistoric Research in Indonesia to 1950

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INTRODUCTION

THE oldest description of material valuable for prehistoric recording in future times was given by G. E. Rumphius at the beginning of the eighteenth century. Rumphius mentioned the veneration of historical objects by local peoples, and even now survivals of the very remote past retain their respect. On several islands we also notice a continuation of prehistoric traditions and art.

Specific prehistoric relics, like many other archaeological remains, are holy to most of the inhabitants because of their quaint, uncommon shapes. As a result, myths are frequently created around these objects. An investigator is not permitted to inspect the bronze kettle-drum kept in a temple at Pedjeng (Bali) and he must respect the people's devout feelings when he attempts to observe megalithic relics in the Pasemah Plateau (South Sumatra); these facts accentuate the persistence of local veneration even today.

In spite of the veneration of particular objects, which in turn favors their preservation, many other relics have been lost or destroyed through digging or looting by treasure hunters or other exploiters seeking economic gain. Moreover, unqualified excavators have compounded the problem.

P. V. van Stein Callenfels, originally a specialist in Hindu-Indonesian archaeology, became strongly aware of neglect in the field of prehistoric archaeology, and he took steps to begin systematic research. During his visit to kitchen middens in East Sumatra during a tour of inspection in 1920 for the Archaeological Service, he met with the digging of shell heaps for shell for limekilns. This scholar thereupon decided to offer more of his attention to this unendowed part of Indonesian archaeology (van Stein Callenfels 1920). In 1921 and 1922, N. J. Krom, then temporary head of the Archaeological Service, declared formally that the Archaeological Service must give more attention to prehistoric relics, particularly in East Java and the Lesser Sunda Islands.

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From this time, topics concerning prehistory were recorded in the Archaeological Service's annual report (*Oudheikundig Verslag*), which began including a formal section on prehistoric research. The establishment of a division in charge of prehistoric investigations became almost a certainty.

PERIOD OF CASUAL WORK AND UNSYSTEMATIC EXPLORATIONS

The eighteenth century through the early nineteenth century was a time before any conscious attempts were made toward comprehensive interpretation of Indonesia's prehistory, but nonetheless, some important discoveries and elaborate studies were carried out during this period. In particular, the material aspects of almost every stage of prehistoric life held the attention of many research workers. The results are novelties in archaeological recording, but they were considered outstanding information in the scheme of ancient Indonesian history. Recorded Indonesian history was just beginning to take form at that time. Facts that clearly did not indicate Hinduistic trends were simply grouped under the heading "Stage before the Arrival of the Hindus" or "The Period before History"; however, in some manuscripts prehistoric monuments were nevertheless ascribed to the Hindus.

Although the most significant activities began in the nineteenth century, long before that time informative work had been published by Rumphius (1705). He described polished stone adzes, bronze axes, and kettledrums from parts of Indonesia, but his interpretation cannot be justified by our present state of knowledge. Those axes were, according to Rumphius, transformations into stone or metal of condensed earthly vapors. Since the middle of the nineteenth century, studies have been made of prehistoric materials of various substances. Results of those works have been brought to light in scientific journals in and outside the country.

Neolithic Adzes

Neolithic adzes formed the first subject of serious survey. Private collections presented in part to the Museum of the Koninklijk Bataviaasch Genootschap (Royal Batavian Society), the present-day Central Museum at Djakarta, have been studied since 1850 by C. Swaving, W. Vrolik, C. Leemans, J. F. G. Brumund, J. J. van Limburg Brouwer, and C. M. Pleyte. These collections consisted of material found on several islands. Classification of these stone adzes was carried out by Leemans, who distinguished four types of adzes, as well as by van Limburg Brouwer, who divided the collection of adzes in the Museum of Djakarta into five types and added explanations on the raw materials used and the adzes' proper functions. The most important work was by Pleyte (1887). His classification included nine types of neolithic tools, particularly from Java, which form part of two main varieties: chisels and axes. This study of Pleyte's became a valuable source for the syntheses of R. Heine-Geldern and P. V. van Stein Callenfels. It can be said that systematic study was attempted by Leemans in 1852 and was finished later by Pleyte. The supposition that a Palaeolithic period existed in Indonesia in which these stone adzes were produced was encouraged by the theory of three successive stages of cultural development previously accepted and worked out in Europe. The study of neolithic stone artifacts, restricted to finds from localities of Sulawesi and Sumatra, was continued by A. B. Meyer, O. Richter, and J. Erb early in the twentieth century, and ended with the observations of A. Maass and P. Sarasin in 1914.

Bronze Drums

The most attractive products in bronze are the kettledrums. Rumphius recorded the drum at Pedjeng as early as 1704. E. C. Barchewitz later reported finding the drum on the small island of Luang (East Indonesia) in his publication of 1730: *Ost-Indianische Reise-Beschreibung*. A further report on a kettledrum was not noted until 1865, when J. van Kinsbergen excavated a broken tympan near the Punta Dewa Temple at Dieng (Central Java). After that, discoveries of kettledrums, mostly in Java, were recorded from time to time in the annual memorandums (*Notulen*) of the Koninklijk Bataviaasch Genootschap. A. B. Meyer mentioned the drums from Java, Salajar, Luang, Roti, and Leti in a publication of 1884. Meyer, an energetic scholar, later made a comparative study of kettledrums of Southeast Asia in cooperation with W. Foy (Meyer and Foy 1897). Other students of this important element of the bronze culture were G. W. W. C. van Hoëvell and J. J. M. de Groot. Speculations on the drum's origin led researchers to materials found in areas abroad. Meyer and Foy were of the opinion that the first drums were fabricated in Cambodia and were distributed from there to other parts of Southeast Asia including Indonesia. De Groot considered a tribe from northern Vietnam called "Man" to be the inventors of the drum. His opinion could not be reconciled with a theory formally submitted by F. Hirth, who identified the drum with the *t'ong-kou* originally contrived by the Chinese during a war expedition under Ma Yuan against tribes in southern regions in about the first century A.D. Before studies on drums began, J. J. Worsaae (1878–1883) provided the proposition that a culture acquainted with the use of bronze and apparently diffused from the mainland culture of Southeast Asia had existed in Indonesia.

In the early twentieth century the important work of F. Heger (1902) was begun. Heger's classification of bronze drums is still accepted as basic. Descriptions of drums from Indonesian localities were given by J. D. E. Schmelz, G. W. W. C. van Hoëvell, W. O. J. Nieuwenkamp, and G. A. Hazeu; studies of broader character were executed by W. Foy, G. P. Rouffaer, and H. Parmentier (Parmentier 1918). Parmentier studied an extensive number of kettledrums and tried to correlate the decoration and age of the oldest drums with that of bronze weapons of approximately the same origin. His study terminated the series of works on bronze drums carried out during the period of unsystematic research.

Other Bronze Finds

Finds of bronze material other than kettledrums were recorded during the early part of the twentieth century in the *Notulen* of the Koninklijk Bataviaasch Genootschap; for example, there were finds of socketed celts, rings, lance-heads, human and animal figurines, and ceremonial axes of various shapes. Discoveries of halberd-type ceremonial axes, mainly from West Java, were reported after 1864, decorated ceremonial axes of exceptional shape from Roti were unearthed at Landau (North Roti), according to a report of 1875, and a ceremonial axe with mask decoration on the semicircular blade from Sentani (West Irian) was acquired during the expedition of A. Wichman in 1903. Other bronzes as well have been found accidentally, mainly by the local population, and transferred to the Koninklijk Bataviaasch Genootschap afterwards through the intermediary of civil servants or private collectors. An estimation of the significance of the bronze period was propounded by Meyer and Richter in 1902. They noted the existence of cultural connections during that period between certain

Indonesian regions and the Southeast Asian continent and concluded that eastern Europe was the origin of this bronze-age culture.

Megalithic Remains

The earliest report on megalithic remains was presented in 1842 by J. K. Hasskarl, who described terraced structures with menhirs at Salakdatar (West Java). During the second half of the nineteenth century this site, and similar relics in sites situated in the same region, like Tjiartja, Lebaksibedug, and Kosala, were observed by J. Rigg, J. F. G. Brumund, A. G. Vorderman, R. D. M. Verbeek, and J. W. G. J. Prive. Terraces at Serang Lemo, in the surroundings of Tjirebon, likewise attracted the attention of F. C. Wilsen. Megaliths in the eastern part of Java were investigated by H. E. Steinmetz (1898), who described dolmens and sarcophagi from Besuki, and by J. Kohlbrugge, who in 1899 described terraces with menhirs at Argapura. Both men, however, were unaware of the megalithic derivations of these remnants. Kohlbrugge even took the Argapura megaliths for remains of a *lingga* sanctuary. The most important megalithic sites outside Java that were located or investigated were the Pasemah area (South Sumatra) and areas in Central Sulawesi. Among a large number of dolmens, upright stones, and mortars at the Pasemah Plateau statues were discovered that had a specific local appearance. A brief account of some statues was given by L. Ullmann in 1850 followed by a detailed description of more extensive material of E. D. Tombrink (1870). Both ascribed these Pasemah megaliths to the Hindus. Other observers on megaliths of this area through the end of the nineteenth century were H. C. Forbes and H. E. D. Engelhard. The survey on megalithic monuments in Sulawesi focused mainly on stone vats, statues, menhirs, and mortars; it started in 1908 with records of A. C. Kruyt and J. Th. E. Kiliaan, and was expanded subsequently by the accounts of A. Grubauer. These men also were unaware that these monuments were the result of an extinct megalithic culture. Speculations on the origin of the megalithic culture in Indonesia were explicated by J. MacMillan Brown in 1907 and W. J. Perry in 1918. Macmillan Brown put forward the idea that megaliths in Indonesia were built by a Caucasian race who migrated from the Mediterranean. Perry's hypothesis, elaborated later in 1923, explained that the tradition of building megaliths in Indonesia originated from ancient Egypt and that the people who introduced the usage of megaliths were highly educated, became a ruling caste in the new settlement, and claimed to be descendants of the "skyworld" (Perry 1918).

Caves

Important work in the field of cave research was carried out by the naturalists P. and F. Sarasin (1905). In the course of their second expedition to Sulawesi, in 1902–1903, they investigated caves in Lamontjong (Southern Sulawesi) and after systematic excavations turned up stone tools—flakes, blades, barbed arrowheads—and bone artifacts. Ancestors of the Toala, a tribe extant in the locality at that time, were supposed to be bearers of this cave culture. This so-called Toalian culture has interested many investigators in later periods of increasing study of mesolithic cultures. A. Tobler explored the Ulu Tjangko cave, situated in Upper Djambi, in 1913, the results of which were published by P. Sarasin in 1914. The artifacts found here represented an obsidian flake culture that probably belonged to a specific mesolithic culture group in the Indonesian Archipelago. J. Zwierzycki discovered a similar type of culture some years later in another cave in the same area.

Fossilized Human Remains

The most outstanding result of research was the now world famous discovery of fossilized human remains, in particular the low skull cap of *Pithecanthropus erectus*, made by E. Dubois (1894) in 1891–1892 at the village of Trinil (eastern Central Java). A year before this important discovery, Dubois had already found a fragment of a lower jaw of the same type hominid, as well as a second skull of the most progressive type of fossil man in Indonesia, the *Homo wadjakensis*. These finds were made respectively at Kedungbrubus and Tjampurdarat, which are both situated in areas of limestone hills in East Java. The first skull of *Homo wadjakensis* had been unearthed in 1889 by B. D. van Rietschoten during an exploitation of marble, but a description of both these skulls from Tjampurdarat was not published until 1920 by Dubois (Dubois 1920–1921). Large-scale excavations in the surroundings of the *Pithecanthropus* site were carried out during 1907–1908 by Leonore Selenka, who anticipated finding more remains of the *Pithecanthropus*, but the result was not as expected. Only a mass of fossilized bones of animals belonging to the Middle Pleistocene Trinil fauna were recovered. A publication on this material composed by L. Selenka and M. Blanckenhorn came out in 1911.

Ancient Beads

Ancient beads found on several islands have been subjected to examinations since the end of the last century. G. P. Rouffaer (1899) studied beads, especially small glass beads, or *mutisalah*, from the Timor Islands and drew the conclusion that beads of baked clay and carnelian beads were imported into Indonesia about the fifteenth century A.D. from Cambay. He believed that glass *mutisalah* in particular were brought into the Timor Islands after the fifteenth century A.D. This opinion proved to be untenable, since further surveys exposed their prehistoric origin. During the first decade of the present century reasonable suggestions were put forward on the spread of ancient beads. A. W. Nieuwenhuis saw resemblances between some beads from Kalimantan and Roman beads, while G. A. J. van der Sande assumed that glass beads from Irian were distributed from China in ancient periods.

PERIOD OF SYNTHESIS AND SYSTEMATIC RESEARCH

The many evidences of cultural endowments that were not cognate with the Hindu civilization corroborated the idea that an older level of civilization existed before the Historic stage. But even in 1921, shortly after N. J. Krom's statement emphasizing the beginning of prehistoric survey, qualified workers of the Archaeological Service still had no clear conception of prehistoric chronology. A description in the annual report of the Archaeological Service in 1922 mentioned the megalithic statues from Pasemah Plateau as Hindu remains, and the peculiar bronze vessel from Kerintji was interpreted in the same article to be the product of local art probably created during or after the Hindu period.

Chronology, Prehistoric Cultures

The first conscious tackling of specific prehistoric data began in 1923, when the annual report included a separate section on prehistory under the heading "Prehistorica," along with the existing sections on epigraphy, iconography, Dutch antiquities, and other subjects. This new section dealt with the discovery of an extended urn field at Melolo (Sumba) that

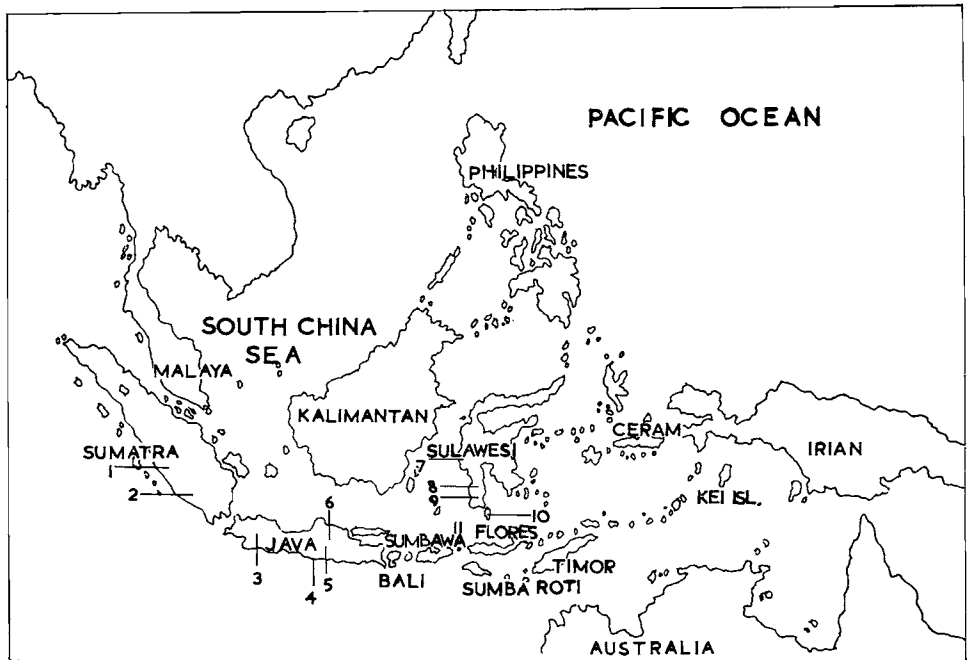


Fig. 1 Important prehistoric sites in Indonesia: 1, Kerintji; 2, Pasemah; 3, Bandung; 4, Patjitan; 5, Trinil; 6, Ngandong; 7, Kalumpang; 8, Tjabenge; 9, Toala; 10, Salajar; 11, Sangean.

was reported by E. R. K. Rodenwaldt. The find of a hand axe with palaeolithic characteristics at Duriatani (east coast of North Sumatra) in 1924 by J. H. Neumann was reported for the first time to the Archaeological Service and incited van Stein Callenfels to frame a chronological sequence of the Stone Age in the archipelago based on finds that were known up to that time. In an argument announced in the annual report of 1924, van Stein Callenfels correlated the artifact incorrectly (as subsequent research determined the tool to be of the mesolithic period and similar to the European Chellean type), but he aimed to demonstrate that a Stone Age with three successive stages, that is, Palaeolithic, Mesolithic, and Neolithic, existed in Indonesia. He introduced in the 1924 report the classification of the Stone Age cultures that was commonly used in Europe and proposed the beginning of a systematic survey in the archipelago on a comparative plan (van Stein Callenfels 1924). This thoroughgoing effort expanded, and van Stein Callenfels (1926) succeeded in establishing a chronological order, particularly of the Neolithic period, on a typological basis. An attempt at synthesis was also undertaken by R. Heine-Geldern in 1923 and 1926–1927. Both scholars contemplated the chronological frame of the Stone Age in the cultural-historical context of Southeast Asia. This way of thinking was relevant to the typologically similar, yet quantitatively limited (as a result of incoherent research), earlier finds in Vietnam, the Malay Peninsula, and Indonesia.

The setting of a chronological framework became the basis for further activities that steadily increased. Investigations were carried out in complementary fashion, excavations were performed methodically, and most significantly, theories and working hypotheses were formulated concerning the origin, diffusion, and entity of prehistoric cultures. All of these

investigations were managed within a considerable time-span, lasting until the onset of the Japanese occupation.

Van Stein Callenfels's primary attempt was to excavate systematically in 1925–1926 the kitchen middens in North Sumatra. These large shell mounds had been known since 1917, when W. Witkamp observed them and declared them to be the product of human occupation. Corresponding interest in the spread of the stone culture in Southeast Asia moved van Stein Callenfels to explore areas on the Malay Peninsula. During 1926–1927 he excavated with I. H. N. Evans several rock-shelters of which Guwa Kerbau (Perak) yielded the most important results—materials of the Bacson-Hoabinh culture. His next cave exploration was concentrated on the Gua Lawa or Gua Sampung (East Java), where a distinct bone culture was revealed after periodical excavations from 1928 until 1931 (van Stein Callenfels 1932).

Van Stein Callenfels's increasing activities put the field of Indonesian prehistory in a propitious position. Owing to his persistence, a meeting of prehistorians was organized at Djakarta in the course of the Fourth Pacific Science Congress in 1929. That group decided that a congress of prehistorians of the Far East should be held regularly and that the first session should take place at Hanoi in 1932. Other important results of van Stein Callenfels's efforts were the establishment of a prehistoric collection as a separate section at the Museum of the Koninklijk Bataviaasch Genootschap and the composition of a guidebook dealing with this collection (van Stein Callenfels 1933, 1934). This guidebook also gives a short general review on prehistory and seems to be an excellent introduction to the knowledge of Indonesian prehistory. Brief reports concerning van Stein Callenfels's investigations as well as information announced by him in newspapers or magazines remind us of the steady work of this energetic scholar. Many sites of the Toalian cave culture, the fertile Kalumpang neolithic settlement, and the Bali bronze-age sarcophagi were excavated during the years before his sudden death in 1938, and it is regrettable that van Stein Callenfels did not publish full reports on the results of these important investigations.

Topics of the entire Prehistoric stage were subjected to ample investigations during this constructive period (the twenties and thirties). The list of discoveries of Fossil Man was enriched by significant finds. A team of the Geological Service conducted by C. Ter Haar and W. F. F. Oppenoorth, later supported by G. H. R. von Koenigswald, found 11 calvarial fragments and 2 tibiae of the *Homo soloensis*—supposedly a local variant of the Neanderthalian, but also claimed to pertain to a more developed type of the *Pithecanthropus*—during excavations in 1931–1933 at Ngandong, a small village on the left bank of the Solo River (Oppenoorth 1932). Members of the *Pithecanthropus* group and of a more primitive type were unearthed from different strata owing to the persistent searching of von Koenigswald. These consisted of a mandible of *Meganthropus palaeojavanicus*, various remains of *Pithecanthropus modjokertensis*, including an infant cranium and skull fragments of an adult, and two more skulls of *Pithecanthropus erectus* (von Koenigswald 1940). The human fossils were discovered in the area of Sangiran, Central Java, with the exception of the infant skull of *Pithecanthropus modjokertensis*, which was found in the surroundings of Djetis, East Java.

Chronology, Prehistoric Fauna

The survey of fossil vertebrates that began about the middle of the preceding century and was carried out in depth by (among others) K. Martin contributed greatly toward the establishment of a chronological order of the prehistoric fauna. Surveyors of this second period included those focusing on vertebrates from Java, such as J. Cosijn, K. W. Dammer-

man, G. H. R. von Koenigswald, F. H. van der Maarel, H. G. Stehlin, and J. Zwierzycki. Post-pleistocene fauna from Gua Sampung was studied by Dammerman. Comprehensive descriptions of fossil vertebrates were composed mainly by van der Maarel (1932) and von Koenigswald (1933). Von Koenigswald was able to place the results of these extended surveys in chronological order, and his classification of the pleistocene fauna in the succession *Djetis* (lower Pleistocene), *Trinil* (middle Pleistocene), and *Ngandong* (upper Pleistocene) fauna has been widely accepted (von Koenigswald 1934).

In close connection with the founding of the faunal sequence, positive results have been attained in the field of pleistocene stratigraphy based on geological data. J. Duyfjes's further division of the pleistocene deposits into lower pleistocene *Putjangan* beds, middle pleistocene *Kabuh* beds, and upper pleistocene *Notopuro* beds continued to influence research (Duyfjes 1936).

Palaeolithic Tools

The discovery of lower palaeolithic implements (see Plate I) in the Karst region of Punung (Patjitan, Central Java) made by von Koenigswald in 1935 was followed by an intensive research of the same sorts of implements, covering areas in eastern Asia. This survey was done during 1937–1938 by the Joint American Southeast Asiatic Expedition for Early Man that was headed by H. de Terra. Later, H. L. Movius interpreted these tools from Patjitan—in the opinion of von Koenigswald (1936) they resembled Chellean specimens—as belonging to a specific pleistocene chopper-chopping tool industry of East Asia (Movius 1949). In the course of his surveys in the area of Sangiran (Central Java), at the important site of Pithecanthropi, von Koenigswald had collected in 1934 a number of flake tools from different places (Plate II). This series of small stone implements belongs to an exclusive flake culture that was claimed by von Koenigswald to originate from middle pleistocene layers (von Koenigswald 1936). His viewpoint was discarded, however, when de Terra and Movius attested to the real positions of these tools in upper pleistocene deposits. Tools of bone and deer antlers and flake instruments of chalcedony (Plates III, IV) were found on terraces of the Solo River in the area surrounding Ngandong at the time of Palaeontological explorations in 1931–1933. These tools were considered typologically as upper palaeolithic specimens.

Hoabinhian versus Melanesoid

Since investigations of kitchen middens in Northern Sumatra performed by van Stein Callenfels proved the existence of a pebble-tool industry—called Hoabinh culture in a wider context—which is chronologically classified into the mesolithic culture period, other students, such as H. M. Schürmann, H. Küpper, F. Mühlhofer, and V. Lebzelter, grew interested in this special branch of culture. Their observations on the pebble-tools produced distinct classifications of which Lebzelter's (1935) was the most comprehensive. The implements principally consisted of *sumatraliths*, that is, flat monofacial-worked pebbles with elongated oval shapes (Plate IV). Other variations of forms occurred, such as triangulars, discs, rectangulars, picks, high-backed cores, and bifaces. The find of *sumatraliths* was reported for the first time in 1899 by J. Bosscha. These tools were exposed accidentally on a hill at Sakang (Sambos, West Kalimantan) during diggings to construct the foundation of an estate building. In Java, evidences of this Hoabinh-like culture were discovered in Gua Lawa by van Stein Callenfels, in caves of Besuki by van Heekeren (1931, 1937) during 1931–1938, and in caves of Tuban by W. J. A. Willems in 1938. A few *sumatraliths* have been found in caves,

but this industry and the other parts composing the Hoabinhian (mortars, pestles, and short axes) have always been found in Java associated with bone implements (Plate IV).

Excavated human bones from the kitchen middens were analyzed by J. Wastl (1939), while those from caves in East Java were studied by W. A. Mijsberg (1932). These examinations concluded that the skeletal remains made up part of the Papua-Melanesian racial group. Using as evidence the discoveries of human remains of Melanesian characteristics in association with Hoabinh-culture elements as found in Vietnam, the Malay Peninsula, and Sumatra, van Stein Callenfels (1936) pointed out that there were many aspects of these indicating relationship to the Melanesian culture that flourished over areas of Southeast Asia, whereas the Hoabinh culture had been strictly limited to the region of southern Tonkin. This opinion was not accepted by H. D. Collings, I. H. N. Evans, and F. D. McCarthy. McCarthy (1940) rejected van Stein Callenfels's proposal to adopt "Melanesoid" cultures instead of the generally accepted term Hoabinhian on the ground, among others, that the Hoabinhian occurred in Australia.

Caves: East Java, Sulawesi, Timor, and Roti

Researches on caves increased during this period of activity. Tens of caves situated in East Java, Sulawesi, Timor, and Roti were investigated. The results significantly supplemented our knowledge of a living condition that was the prelude to the agricultural stage, but which on the other hand aroused disagreements on chronological interpretation, as the cultural layers yielded artifacts of late palaeolithic technique, frequently mixed with or overlapping material of neolithic affinity. The caves contained a considerable amount of flake and blade artifacts and the caves in East Java in particular, as mentioned above, showed Hoabinhian elements. In Tuban caves, besides flakes and blades, a great percentage of shell artifacts, bone instruments, arrowheads, and some Muduk bone points were discovered. W. J. A. Willems did not complete reports on his explorations, but he announced briefly his conclusions in the annual report of the Archaeological Service in 1938 and made summarizing remarks particularly on the shell instruments in a publication concerning the distribution and function of shell artifacts in the Indonesian archipelago (Willems 1939).

Proto-Toalian. Caves in the well-known Toala limestone area in South Sulawesi were investigated systematically during the period between 1930 and 1940. Field observations were made by A. A. Cense and resident Ter Laag, combined with periodical excavations carried out by van Stein Callenfels, van Heekeren, Willems, and McCarthy. The results included the following items: blade and flake tools, microliths, barbed arrowheads, instruments of bone and shell, a few neolithic adzes and bark-beaters, fragments of glass rings and bronze bracelets, and decorated potsherds (Plate V).

Van Stein Callenfels (1938) succeeded in settling, on the basis of the cave material, the stratigraphical position of the Toalian, namely: (1) the proto-Toalian from lower layers of crude flake and blade tools of which tanged instruments were the most remarkable, and (2) a younger compound containing northern elements, such as barbed arrowheads and borers with broad flattened bases. The proto-Toalian could be correlated with the crude stone industry from caves of East Java, Timor, and Roti, and barbed arrowheads were assumed to be the result of impact from the north, that is, Japan, Korea, and the Philippines. Van Stein Callenfels suggested that these questions be solved: (1) Where did the proto-Toalian originate? (2) Which route of penetration had the group of arrowheads been following? (3)

Where did the neolithic and bronze-age strains come from? Reports on these Toala explorations were not kept up consistently, except by van Heekeren, who published constantly on his systematic investigations. Human skeletal remains found in the Toala caves have not been subjected to profound anatomical observations, and, incorrectly, they have been believed to be of a Vedoid racial group. A. Bühler excavated several caves on the islands of Timor and Roti in 1936 (F. Sarasin 1936). Supplementary excavations were performed by Willems in Timor in 1938. In these caves were unearthed many potsherds and a flake-blade industry comprised of tanged stone instruments.

Flake-Blade Industry in Sumatra and West Java

A peculiar type of flake-blade industry whose cultural position is still questionable was the obsidian industry that was found distributed in Sumatra (Kerintji, Djambi) and West Java (Bandung, Bogor). Sites on mountain ridges along an extinct lake in the surroundings of Bandung Plateau have been surveyed intensively by A. C. de Jong and von Koenigswald since 1930, followed by J. Krebs in 1932–1933. Researches in the region of Kerintji Lake were carried out by A. N. J. Th. à Th. van der Hoop in 1937 and on the hills of Leuwiliang (Bogor) by C. J. H. Franssen and van der Hoop in 1938–1939. The material from West Java and Kerintji, which was collected entirely from the surface of the ground, consisted mainly of obsidian artifacts (arrowheads, borers, scrapers, etc.) (Plate VI). At several sites this obsidian industry was found closely connected with material such as neolithic artifacts and bronze objects of later cultural periods. Correlated with the obsidian industry from West Java and Kerintji were finds previously discovered in caves of Djambi (South Sumatra), where very similar types of obsidian tools occurred and where an early metallic layer directly overlaid the layer of obsidian. Von Koenigswald (1935) and van der Hoop (1940) indicated that the obsidian artifacts were “microliths”—a term used incorrectly, however, for many tools technically did not satisfy the requirements for microliths in size and form—and put this industry into the neolithic culture according to associated finds of the neolithic or later periods. This peculiar culture is assumed to have spread from the north, since similar finds have been made in the Philippines (Luzon).

The Neolithic Period

Research on the Neolithic has been very limited. The Museum of the Koninklijk Bataviaasch Genootschap enlarged its collection of neolithic material originating from areas of the archipelago by way of purchase, conveyance, and gift. Excavations of neolithic sites were conducted by Cense at Sikendeng (Central Sulawesi) in 1933, van Stein Callenfels at Kalumpang (Central Sulawesi) in 1933, and van Heekeren at Kendeng Lembu (East Java) in 1941. A report on the Kalumpang excavation was submitted by van Stein Callenfels in 1935 at the Second Congress of Far Eastern Prehistorians in Manila and was published after his death (van Stein Callenfels 1951). Owing to the outbreak of World War II, van Heekeren was compelled to break off his excavation, and it has never been completed. Sporadic finds of neolithic sites, mostly workshops of adzes, were reported mainly from East and West Java. The most interesting objects of speculation have been the adzes (Plates VII, VIII, IX) because of their abundant occurrence and varied shapes, whereas associated materials, like stone bracelets or rings, grindstones, bark-beaters, spearheads, and pottery (plain or decorated), which were fewer in number, have been used to support interpretations on the age, position, diffusion, and origin of the Neolithic. It was determined that two main types of

adzes were found distributed over broad areas, namely, the quadrangular type in the western part (Sumatra, Java, Bali, Kalimantan, the Lesser Sunda Islands, Maluku) and the round or oval type in the eastern part (Minahasa, North Kalimantan, Seram, Gorong, Tanimbar, Leti, West Irian) of the archipelago. Specific types were tanged, stepped, and roof-shaped adzes that developed in very bounded areas.

Observations of the adzes led to hypotheses on their origins and distributions in a scheme of cultural processes of East Asia, such as those hypotheses set forth by van Stein Callenfels (1926), Heine-Geldern (1932), and van der Hoop (1938). It was commonly accepted that the quadrangular adze type, classified into the Normal Neolithicum, entered Indonesia ca. 2000 B.C. from the mainland of Asia (most probably from Southern China) as part of the culture of Austronesian peoples, while the round axe, referred to the Papua Neolithicum, which was from an older stage, reached Indonesia by following the route of migration from the north, probably from China or Japan via Formosa and the Philippines. Small-scale penetration was demonstrated by the stepped and the tanged adzes. The stepped adze developed in North Sulawesi and entered Indonesia from the Philippines, while the tanged adze that was to be found only in Central Sulawesi was dispersed from the mainland of Asia by way of the Philippines. The pick-adze as a highly developed type of the quadrangular adze group was found restrictedly in Sumatra, Java, Bali, and Kalimantan and found its counterpart in Asia only in the Malay Peninsula. The roof-shaped adze distributed in East Java, Kalimantan, the Lesser Sunda Islands, and Maluku seemed to be locally developed in the archipelago. No stratigraphical data were available to describe the evolutionary stages of the Neolithic, nor were sufficient data at hand to constitute a clear picture of life during this important period of human progress.

The Kalumpang excavation carried out by van Stein Callenfels (1951) threw some light on a neolithic settlement, although no distinct stratification was disclosed. On a typological basis, van Stein Callenfels explained the successive stages of this local neolithic phenomenon as follows: (1) the proto-neolithic stage, including adzes with oblique edges, prototypes of shouldered adzes and probably Hoabinhian artifacts and primitive pottery; (2) the late neolithic stage comprised of polished adzes and undecorated pottery of good quality; and (3) a type of civilization characterized by polished stone arrowheads, small stone chisels, and pottery with incised decoration. Manchuria might be the place of origin of this third stage that reached Central Sulawesi via the Philippines. Van Heekeren was able to distinguish two cultural levels at Kendeng Lembu: a late neolithic level that yielded polished adzes and undecorated potsherds, succeeded by a historic stratum with Madjapahit pottery.

A special component of the neolithic culture consisted of stone arrowheads (Plate VIII) that developed in definite areas of Java (Bandung, Punung, Sampung, Tuban) and South Sulawesi (Toala). Nearly all of these arrowheads were manufactured of limestone, both surfaces were trimmed, the base is winged or sometimes convex, and the edges are sometimes serrated. This arrowhead tradition seemed to have been introduced from Japan by way of the Philippines. [This type of arrowhead is not known in the Philippines. Ed.]

Megalithic Surveys

Megalithic surveys were executed mainly on the big islands: Sumatra, Java, Sulawesi, and Kalimantan, and on some islands of the Lesser Sunda. Well-known megalithic sites were reinvestigated to gain deeper insight into the meaning and function, as well as the local style and origin, of objects, and in particular, megalithic burials were excavated methodically.

Perry's theory on megalithic diffusion, Heine-Geldern's (1928) view on the socio-religious background of the megalithic culture, as well as comparable results in Southeast Asian countries, stimulated a more profound study of the megalithic culture in Indonesia, which was undertaken by a number of investigators. L. C. Westenenk (1922) misinterpreted the megaliths of Pasemah Plateau as products from a very early Hindu period. G. K. de Bont at the same time described large oblong cover stones carved with human figures and geometric designs (concentric circles, meanders) from Upper Djambi without being aware of their prehistoric character. Even later, in 1929, A. M. Sierevelt reported on sarcophagi on pillars with carved human figures and on rock-chambers from Apo Kajan (East Kalimantan), ascribing their origin to former local tribes. Nevertheless, toward 1930 researchers increasingly tended to be well posted on the prehistoric value of stone remains, a fact perceivable from the argument of J. C. van Eerde about Pasemah images and B. van Tricht (1929) about terraced structures and primitive images from West Java. Obstacles in interpretations were caused by the circumstance that the megalithic monuments continued to be erected until present times in areas of the archipelago. Living megalithic culture is to be found yet in Nias, Flores, Sumba, and Toradja, and survivals of this pertinacious tradition can be observed in many other localities.

Within a decade after 1930, when theories on megalithic diffusion and origin obtained a foothold, important results were gained, proving that the custom of building megaliths proceeded during the Bronze and Iron ages and even far into the historic period. Megalithic explorations in Sumatra were focused in the Batak region and the Pasemah Plateau. Megalithic remains existed until very recent times on the island of Samosir and the surrounding area, as well as in certain places in Central and South Sumatra; they have been described by F. M. Schnitger, G. L. Tichelman, and P. Voorhoeve. Pasemah megaliths, consisting of human and animal images, upright stones, dolmens, terraces, troughs, mortars, and graves, were subjected to profound study by van der Hoop, C. J. Batenburg, C. W. de Bie, and H. W. Vonk. Not only have these objects been described minutely and photographed, but particularly megalithic graves, that is, stone cists and stone chamber-graves (Plate X), have been excavated.

From the results of his explorations, especially from occurrences of elements of the Bronze Age, Van der Hoop (1932) concluded that the Pasemah Megalithic must be of a period not earlier than the beginning of the Christian era. Surveys on megaliths in Java have been limited. F. Buning reported in 1936 on a stone-cist grave near Tjirebon (West Java) that had been dug by local inhabitants. The grave contained an earthenware jar and several neolithic adzes. Stone-cist graves near Wonosari (Central Java), reported by J. L. Moens in 1934, were investigated by van der Hoop (1935). Several excavated stone-cists yielded iron tools (Plate XI), small glass beads, earthenware pottery, bronze rings, and fragments of bronze objects. Van der Hoop saw relationships between these Wonosari finds and stone-cist burial systems from the Malay Peninsula, Sumatra, and the Philippines. Other finds of stone-cist graves were reported by Willems in 1940 from the region of Tjepu (East Java), but an investigation for more details was not made. E. W. van Orsoy de Flines noticed a complex of stone seats at Gunung Lasem (Central Java) during his surveys in 1940-1942, but this investigation also was not completed.

Research in East Java was carried out by A. E. Dunnwald, who discovered a new megalithic site (mainly composed of pit-marked stones or stones with cup-shaped holes) in the surroundings of Patjet (Modjokerto) in 1938; by van Heekeren (1931) and Willems, both rein-

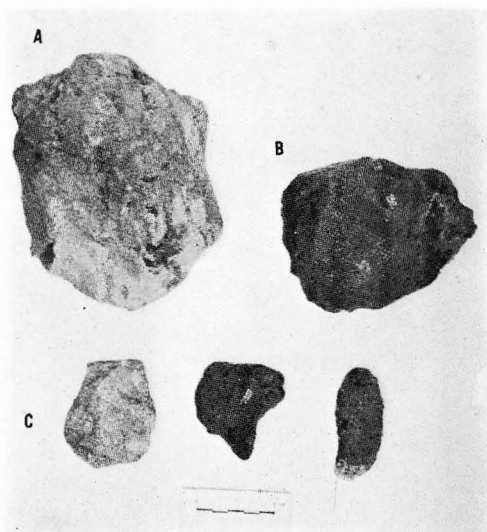


Plate I Lower palaeolithic implements:
Patjitanian. *a*, chopper; *b*, chopping
tool; *c*, flake and blade tools. (Plates
I-XIV are photographs of the Central
Museum's collection, Djakarta.)

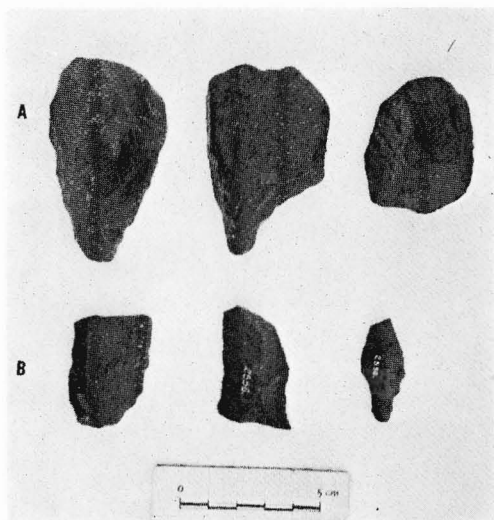


Plate II Upper palaeolithic implements:
row a, tools from Ngandong; *row*
b, tools from Sangrian.

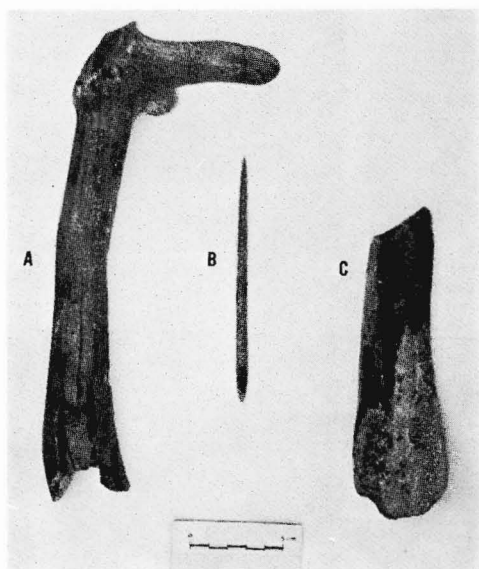


Plate III Upper palaeolithic implements:
bone tools from Ngandong: *a*,
deer antler; *b*, spine of stingray;
c, spatula.

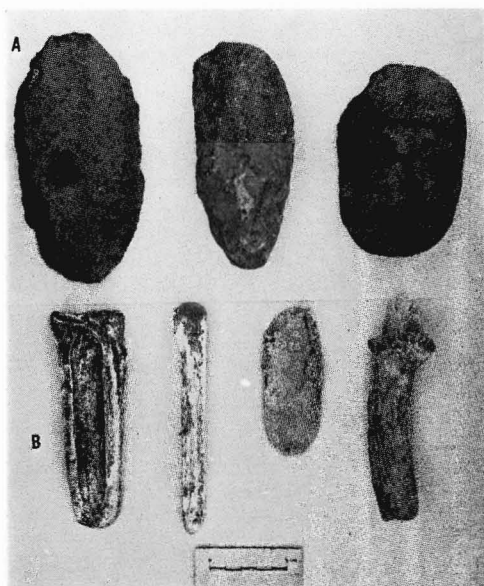


Plate IV Mesolithic implements: Bacson
Hoabinhian. *row a*, Sumatraliths;
row b, bone spatulas from Gua
Lawa, Sampung.

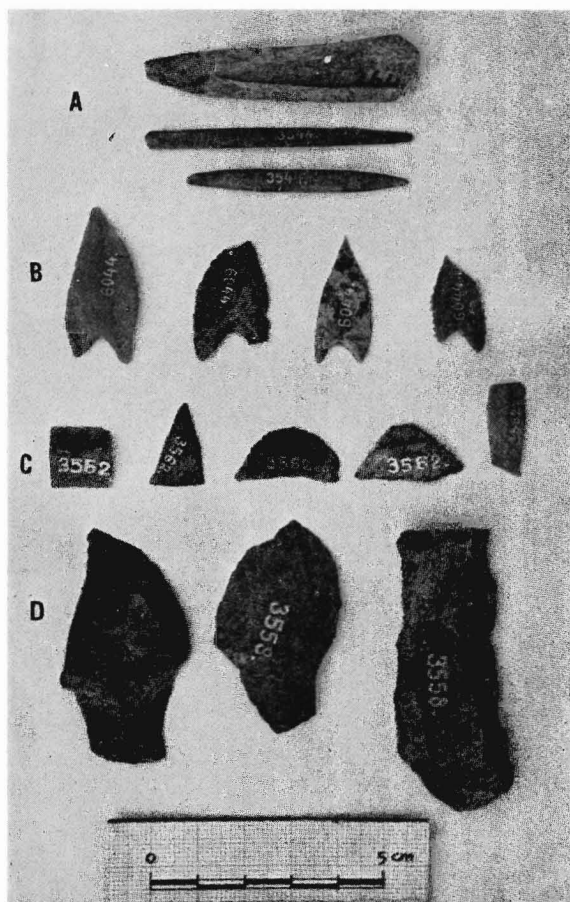


Plate V Implements of Toala culture:
row a, bone tools; *row b*, barbed
 arrowheads; *row c*, microliths;
row d, crude flakes.

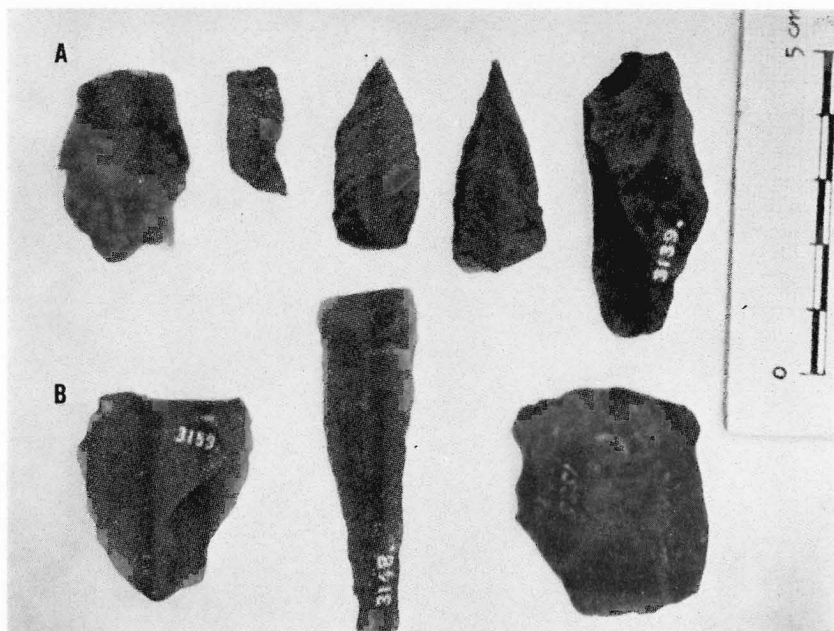


Plate VI *Row a*, tools from Bandung
 Hills; *row b*, tools from
 Kerintji.

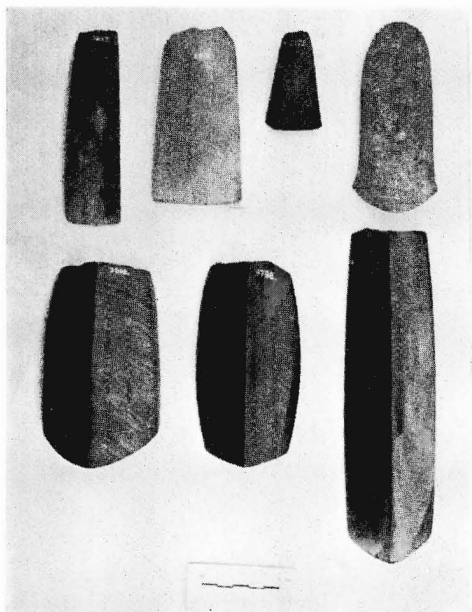


Plate VII Neolithic implements: Quadrangular Adze culture. Of the general types in the upper row, the third and fourth from left show the influence of Bronze culture.

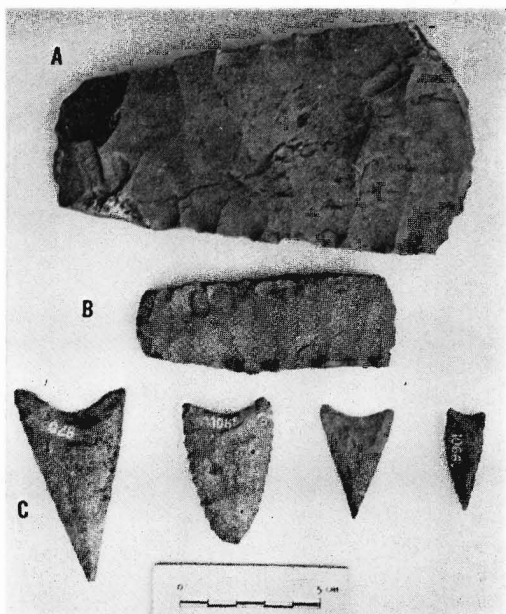


Plate VIII Neolithic implements: *a*, *b*, "planches"; *c*, winged arrow-heads from Punung, Patjitjan.

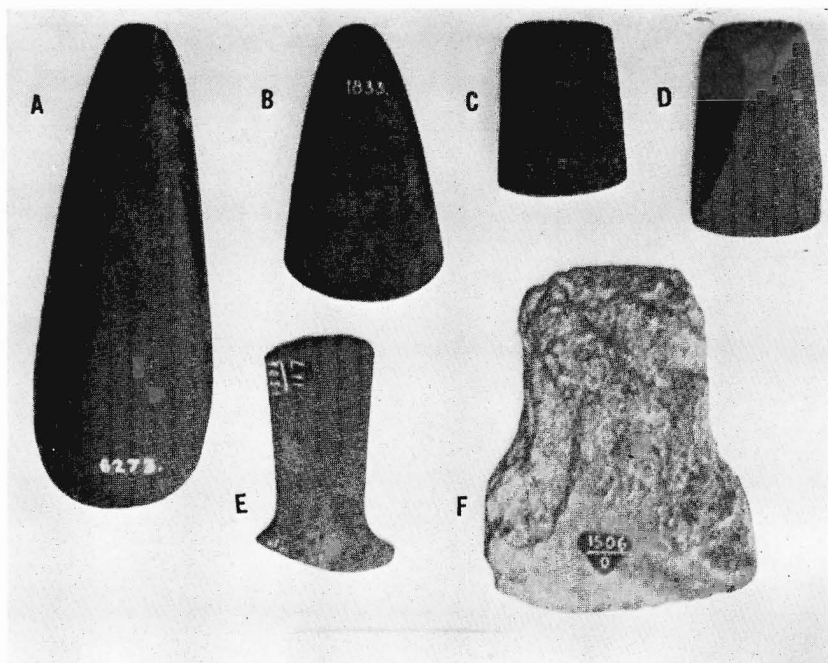


Plate IX Neolithic implements: *a*, *b*, round axes; *c*, stepped adze; *d*, roof-shaped adze; *e*, *f*, tools from Kalumpang; *e* may be a variation of a shouldered adze; *f* is a primitive shouldered adze.

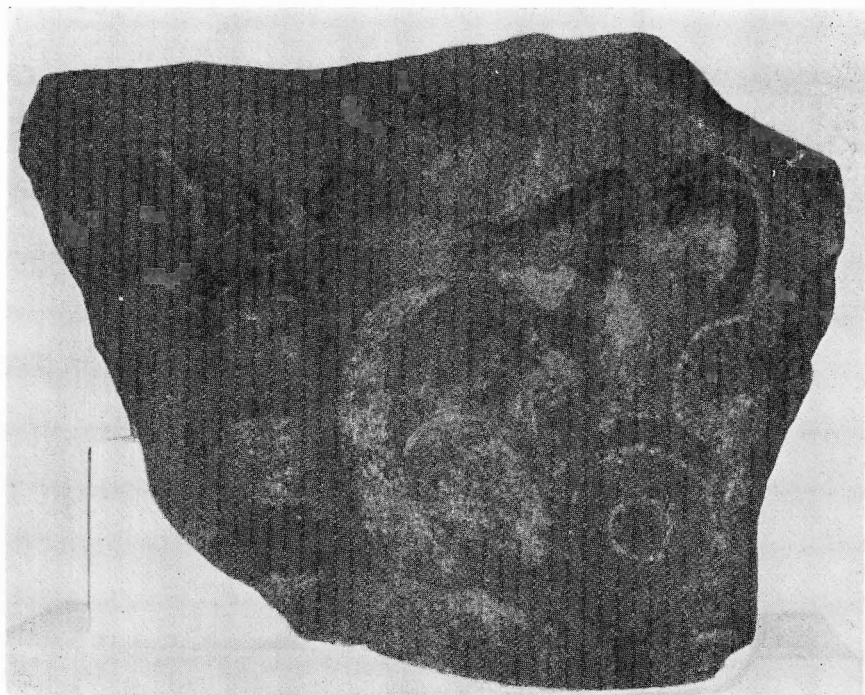


Plate X Painted slab of chamber grave from Tandjungara, Pasemah—in black, white, red, and yellow colors. Height: 127 cm.

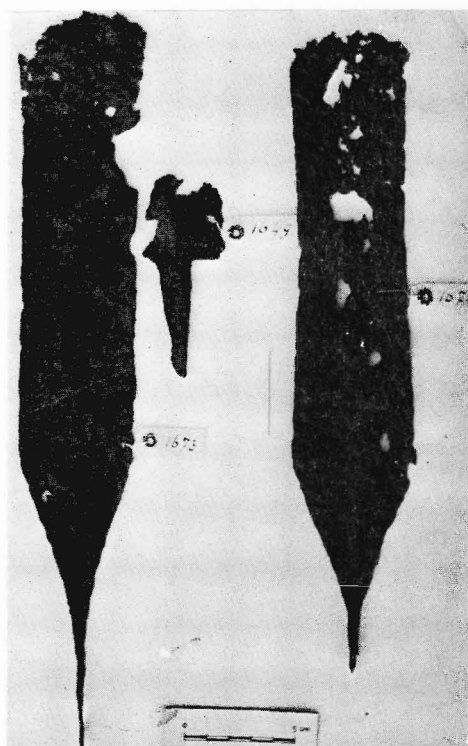


Plate XI Iron implements from stone-cist graves at Wonosari.

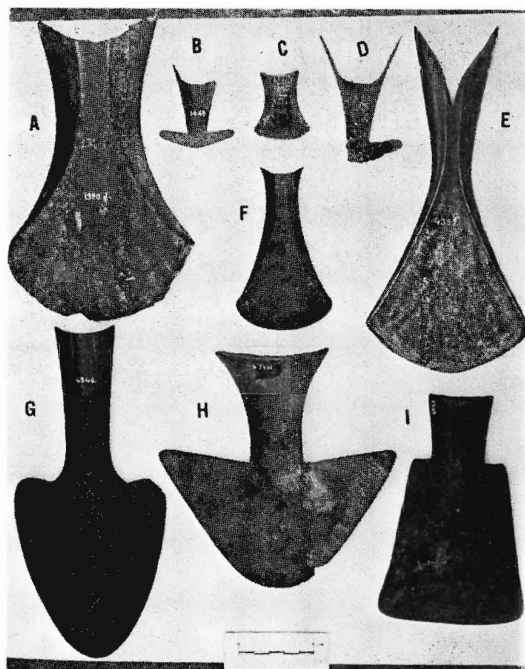


Plate XII Bronze-age socketed implements: variations of axes: *a, c, f*, general types; *b, d*, votive axes from Bali; *e*, type of northern West Java; *g, h*, types from Bali; *i*, hoe from Sulawesi.



Plate XIII A bronze kettledrum: Heger-I type. A specimen from Sangean. Height: 73 cm.



Plate XIV Urns from Melolo: *a*, reddish-brown color, height, 46 cm; *b*, light brown, height, 43 cm.



Plate XV Burnished jars from urns of Melolo with incised mask motifs: *a*, dark brown, height, 25 cm; *b*, dark brown; height, 29.5 cm.

vestigating megaliths of Besuki (main elements were sarcophagi and dolmen graves); by J. A. de Jong, who attempted new surveys on the megaliths of Yang Plateau; and by L. Adam, who recorded terrace structures on tops of Gunung Lawu and Gunung Wilis during 1938. Willems (1938) excavated several dolmen graves at Pakauman (Besuki) and estimated that these monuments dated from the ninth century A.D., owing to finds of sherds of Chinese porcelain of that period inside the graves. Other materials recovered consisted of remnants of decorated pottery, mainly cord-marked, and beads of glass and earthenware.

In Bali, sarcophagi have been the most interesting objects of research since 1921. Investigators of sarcophagi were P. de Kat Angelino, E. Evertsen, P. A. J. M. Mooijen, V. E. Korn, and van Stein Callenfels. Of the bronze objects found inside the sarcophagi, small votive axes (Plate XII) of peculiar shape were the most prominent gift. Van Stein Callenfels, who did some excavations in 1931–1932, without publishing a full report, argued that besides the bronze culture wave from Dongson, there probably was a second wave that reached Indonesia from the north, characterized by particular objects such as those Bali votive axes.

The survey of megaliths in central Sulawesi was intensified by H. C. Raven, A. C. Kruyt, and W. Kaudern (Kaudern 1938). The main elements here were statues, menhirs, mortars, and vats. The huge stone vats, or *kalambas*, are very similar in shape to the stone jars from Laos. C. T. Bertling described stone urns, or *warugas*, in Minahasa that were in use until recent times. Kruyt (1932) was of the opinion that the stone builders in Sulawesi were migrators from the north. Kruyt's opinion was founded on the existence of stone urns in Minahasa that he believed reached Indonesia via Japan southward to Taiwan, the Philippines, Minahasa, Toradja, and East Java.

Accounts were given of discoveries of megalithic remains on several islands of the Lesser Sunda; mentioned were four sarcophagi with human- and animal-figure decorations found in West Sumba by G. Kuperus during 1937 and fields of menhirs at Berloka (West Flores) surveyed by Heynen in 1940. Results of van der Hoop's investigations at Pasemah and evidence of metal finds inside megalithic graves became fundamental supports of Heine-Geldern's (1934) theory on the successive expanding of the megalithic culture in Indonesia.

Heine-Geldern distinguished two complexes, each entering Indonesia by a series of cultural waves. The first or older complex was introduced during the Neolithic period between 2500 and 1500 B.C. by peoples of the quadrangular adze culture. This complex was comprised of the commonly occurring objects like menhirs, dolmens, stone terraces, etc.; the style of art was mainly sculptural and monumental. Evidence of this older complex is observable over broad areas of the archipelago. The second and younger complex developed since the middle or the second half of the first millennium B.C. during the Bronze and early Iron period. Stone-cist graves, dolmen-like slab graves, stone sarcophagi, and stone vats were introduced during this period of development. The art style was mainly ornamental and gave preference to motifs of decoration, such as double spirals and curvilinears. Survivals of this younger complex are still found with the Bataks, Minangkabauans, Dayaks, Toradjas, Ngadas, and other tribes in Eastern Indonesia.

Bronze Culture

Items of the early Metal Age were for a time investigated in the course of activities of megalithic research, as mentioned above. (Megalithic graves that were still in use throughout the succeeding ages were of major interest.) Further, bronze, iron, and glass objects, and urn-burials, constituted the materials of research of the megalithic culture period. Excava-

tions were attempted particularly on burial sites, and activities were for a long time conspicuous for extending material collections and for building up hypotheses on the origin, spread, and techniques of the bronze culture on the basis of comparable discoveries in Southeast Asia. Besides bronze objects (rings, votive axes, pendants, fishhooks, etc.), iron objects (chisels, spearheads, knives), earthenware pottery, and beads (of glass, baked clay, carnelian) excavated from burials in South Sumatra (Pasemah), Java (Wonosari, Sampung, Besuki), Bali, Sulawesi, and Sumba, a large number of stray finds from almost the whole region of the archipelago is kept in preservation at the Museum of the Koninklijk Bataviaasch Genootschap. These have become subjects of theoretical consideration regarding their historical positions and cultural backgrounds.

During the preceding period of research, especially at the onset of this century, a bronze culture was guessed to have existed in Indonesia and to have had a close relationship with the bronze culture in Southeast Asian regions. It was not until after V. Goloubew's (1929) spadework revealed typologically the substance of bronzes (kettledrums, swords, daggers, socketed axes, spearheads, statues, girdles, vases, etc.) from the Dongson site (Thanhhoa, Vietnam) that a certain class of Indonesian bronzes with Dongson similarities indicated a prehistoric bronze culture that developed comparatively at the same chronological level as the bronze culture in Vietnam. In 1929 the dubious position of a miniature kettledrum from Tjibadak (West Java) was noted; this bronze discovery was reported in the annual report of the Archaeological Service under the heading Epigraphy and Iconography. It was owing to van der Hoop's keen observations of the Pasemah remains in 1931 that a prehistoric bronze culture became apparent that seemed to have existed contemporaneously with the megalithic culture. Shortly thereafter, a bronze culture, later designated by Heine-Geldern (1936) as the Dongson civilization—and much later (1945) designated the Dongson culture by the same scholar—formally assumed its proper place in the chronology of Indonesian prehistory. It was settled that the Dongson finds dated from the Han period and included specimens that dated from ca. the first centuries A.D.

The most prominent products of the bronze culture found in Indonesia have been the socketed axes (Plate XII) and kettledrums. The socketed axes demonstrated varieties of shapes ranging from the simplest to the most complex forms. Ceremonial axes with peculiar forms are ornamented mostly with eye and mask or head motifs. Significant additions to the collection of kettledrums were the six specimens from the island of Sangean (Sumbawa) discovered by S. Kortleven and forwarded in 1937 to the Museum of the Koninklijk Bataviaasch Genootschap, two damaged specimens from the island of Koer (Kei Islands) sent by J. W. Admiraal in 1935, and one specimen from Banten (West Java) acquired in 1940. The drums from Sangean show interesting ornamentations, such as scenes inside and around pile-dwellings with saddle-shaped roofs, men wearing long jackets or bell-shaped clothes, elephants, tigers, deer, etc., while one of the drums from Koer is known because of its rare decoration depicting hunting scenes. The drum from Banten is unique, as it is the only drum of the Heger IV type ever found in Indonesia. Kettledrums in Indonesia could be divided into two main types, the Heger I type (Plate XIII), which is the more common, and the regional type called *moko*. The first type was distributed over a large portion of the archipelago (Sumatra, Java, Bali, Salajar, Sangean, Roti, Luang, Leti, Kei Islands), and judging from its motifs of ornamentation, this first type of kettledrum was indicated as imported ware from mainland Southeast Asia. The second or *moko* type, sometimes also called the *Pedjeng* type, was produced in Alor, Bali, East Java, and Central Java. *Mokos* were cast until recent

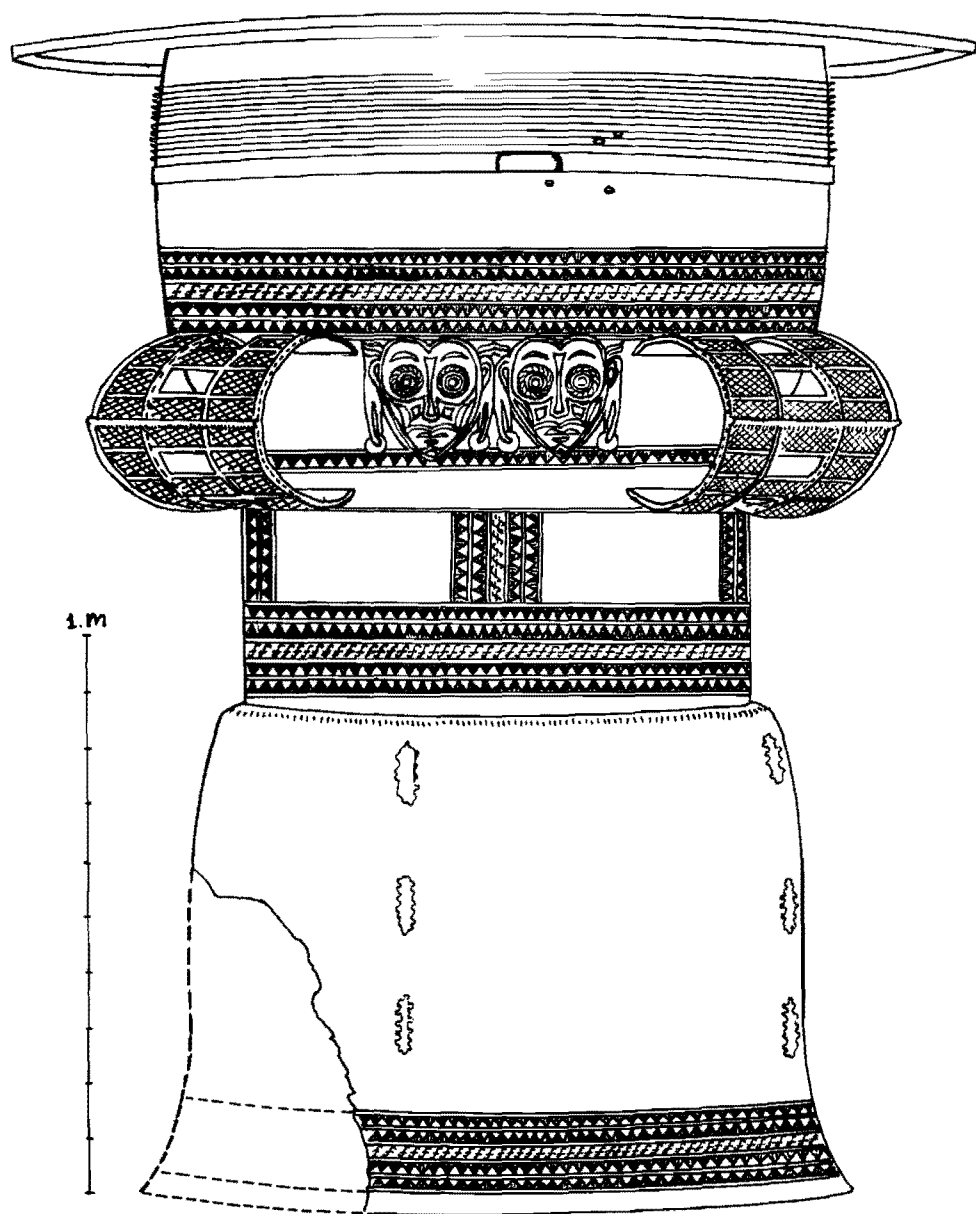


Fig. 2 Bronze kettle drum: moko type. A unique specimen from Pedjeng, Bali. After drawing by W. O. J. Nieuwenkamp.

times in East Java and even now play an important part in the social life of people in Alor. In the village of Pedjeng the big bronze *moko* (Fig. 2) is still kept and is an excellent model of the Indonesian regional type.

Proof that the *moko* type was manufactured locally was established by the occurrence of fragments of stone molds of bronze *moko* that were kept at the village of Manuaba (Central Bali). W. Spies was first to give attention to these molds, and K. Ch. Crucq reported on them in 1932. Proof of local bronze production was strengthened by finds of terracotta molds for bronze axes, spearheads, and rings in West Java and West Sumatra during later periods of research. Because of the growing interest in bronze objects, the techniques of manufacturing bronze goods were considered. Van Stein Callenfels and van der Hoop explained that two methods of bronze casting had been practiced: the *cire perdue* method, used for producing complicated forms, and the bivalve method, used for producing larger or simpler forms. Chemical analyses were carried out on some bronzes and glass beads to gain knowledge of their compositions. Van Stein Callenfels (1937) gave his opinion of the dating of the bronze culture in Southeast Asia on the basis of types of ornaments applied to kettledrums. He stated that the oldest pattern of ornamentation on the continent dated from 600 to 500 B.C. and that the southward move of this bronze tradition took place at 400 to 300 B.C. bringing with it ornaments of more degenerate types. At the same time, Heine-Geldern came to an almost similar conclusion. The base that he used was on a much broader scale. By looking at correlations of types of tools, weapons, and patterns of decoration between early iron-age cultures of eastern Europe, Caucasia and the Dongson culture, Heine-Geldern surmised that Western invaders brought their influences to cultures in Vietnam (Dongson culture) and China (late Chou culture) at about the eighth century B.C., and the spread of the Dongson culture to the south should have taken place not earlier than ca. 600 B.C. and not later than some time during the second half of the first millennium B.C. (Heine-Geldern 1937).

Urn-Burial Tradition

A burial tradition of the early Metal Age of using urns to inter the dead was observed in South Sumatra, East Java, Central Sulawesi, South Sulawesi, Salajar, and Sumba. To which cultural period this tradition belonged was then unknown, because results of some systematic excavations did not reveal that associated artifacts could be treated as an indicator, and the most important element, earthenware, did not support a chronological estimate, as the study of earthenware was still in its initial stage. Finds of urns on the island of Salajar had been reported in 1922 by E. E. W. G. Schröder, who found beads, bronze rings, and gold leaves in one of the urns. At Ngrambe (East Java), inhabitants had discovered accidentally in 1937 a large earthenware urn that yielded fragments of iron tools (chisels, lance-heads) and carnelian beads. Stone urns and urns of earthenware had been encountered in Central Sulawesi by Kruyt and Kaudern in 1938, but further investigation has not been pursued. In 1938 Willems excavated a site at Sa'bang (Central Sulawesi) suspected to have urn-burials. This work did not yield definite results, as the urns found seemed to be empty.

J. C. Noorlander reported in 1939 an accidental discovery of urns at Tebingtinggi (South Sumatra) that contained human bones and burnished gourd-shaped jars with incised motifs of decoration (meanders, circlets, fish-bone). The most interesting sites of urn-burials have been found at an extended region at Melolo (Sumba). Between 1923 and 1926 excavations were performed by D. K. Wielinga, E. R. K. Rodenwaldt, L. Dannenberger, and K. W. Dammerman. Complete reports on results of these excavations were lacking. Renewed

investigations began in 1936 when L. Onvlee undertook systematic excavations, and were continued by Willems, who conducted diggings in 1939. Numerous earthenware urns (Plate XIV) were unearthed containing human bones and grave goods, such as polished earthenware flasks (Plate XV), adornments of shell (rings, bracelets, pendants, beads), some quadrangular adzes, and some other articles. However, full reports of these results were not available at the time; not until almost twenty years later did van Heekeren summarize the total results of these Melolo investigations (van Heekeren 1956). The Melolo human skeletal remains have been examined by J. P. Kleiweg de Zwaan (1941) and C. A. R. D. Snell (1948). According to Snell, the Melolo urn-burial people showed a mixing of Negroid and Malay elements, while Kleiweg de Zwaan considered these Melolo people to be a mixture of proto-Malayan and Veddah characteristics. Based on the fact that quadrangular adzes were found inside urns, while metal objects were totally lacking, van der Hoop classified the Melolo burial tradition in the Neolithic Age, whereas Willems was inclined to accept it as a custom practiced during the period of the bronze culture.

As briefly remarked above, research on prehistoric pottery was just beginning. Systematic study of pottery was not well developed because sufficient data on the proper stratigraphical situation of finds of potsherds or complete vessels was lacking. Except in caves, which mostly yielded undecorated sherds, no exact stratigraphical information was available from open sites. Although found repeatedly in a context bearing mesolithic traits, the pottery was commonly thought to be of a date after the Neolithic and that those adorned with certain ornamentations (geometric designs et al.) or exhibiting developed shapes originated from the Bronze Age. Van der Hoop deals with motifs of ornamentation and the technique of decorating pottery in a short chapter. Some patterns of decoration such as fish-bone motifs seemed to develop deep into the historic period, and even into recent times. The most common designs of neolithic pottery have cord and mat motifs. Impressions of delicate plait-work indicates that textile art had already developed during the Neolithic period (van der Hoop 1938).

During the early Metal Age, penetration of Chinese elements from the Late Chou and Han periods was noticeable. Van der Hoop and Heine-Geldern pointed to their appearance in the archipelago on some Pasemah sculptures, as well as on ornamental designs of a Sangean kettledrum. The encounter with Chinese burial vessels, a few bronze axe-daggers, or *ko*, and Chinese socketed axes on several of the big islands provided further evidence of penetration by Chinese elements.

Critique

One of the weak points of prehistoric research during the twenties and thirties was that living prehistoric cultures, or prehistoric traditions that held out until recent times, had not been seriously subjected to profound archaeological analysis. Attention to isolated regions, particularly in the easternmost part of Indonesia, was limited to recording reported local finds. West Irian as a territory (prehistoric customs are flourishing there now) fell outside the searching attention of explorers of the Archaeological Service. One of the main reasons for this lack must have been the shortage of competent persons to cover the broad area of the archipelago. Nonetheless, the finds of a few investigators should be discussed here.

In 1937 J. Röder excavated the cave of Dudumir on the island of Arguni (Maccluer Gulf) and disclosed a flake industry mixed with potsherds in the upper layers (Röder 1940). Cave or rock-paintings dating from the same mesolithic stage have been the most attractive items

of research. These paintings consisted chiefly of hand and foot stencils; further animal and human figures were found spread in the western and northern parts of West Irian and have been profoundly studied by Röder, W. J. Cator (1939), and G. L. Tichelman (1940). Stone walls and stone altars of megalithic character, occurring on small islands in the north, and on the west coast, have been surveyed by B. A. Vroklage (1935). This megalithic influence supposedly comes from the western part of Indonesia. Finds of rock-paintings (hand-stencils, human figures, fish, etc.) were reported from the Kei Islands and Seram by Röder (1938).

Taking into consideration the results of investigations during the period of systematic research, which was of a relatively short duration, the following remarkable developments are obvious:

1. Definite steps were made toward outlining explicitly the chronology of prehistoric Indonesia. This was only possible by viewing results of work in the surrounding areas of East Asia and Southeast Asia. Works on prehistoric chronology by van Stein Callenfels (1934) and Heine-Geldern (1936) were followed by the work of van der Hoop (1938), which represented a peak of systematic and synthetic orientation.

2. The abundance of prehistoric finds caused attempts to grasp as many items as possible over broad parts of the archipelago, but using only a small number of competent investigators; this, on the other hand, has led to inadequacy in providing complete reports on many important investigations. A rather large portion of prehistoric data has been gained from explorers without specialist training (amateurs, civil servants, military officers, missionaries, etc.) and from specialists in other fields of science.

3. Methods of survey and excavation advanced, owing to the strenuous efforts of scholars—in particular, van der Hoop (on the Pasemah megaliths), van Heekeren (on the cave cultures in East Java and Toala), and Willems (on the megaliths of Besuki and the urns of Central Sulawesi).

4. The establishment in 1934 at the Museum of the Koninklijk Bataviaasch Genootschap of a division responsible for the prehistoric collection was a strong influence toward systematization. Van der Hoop's effort to compose a catalogue of the prehistoric collection of the museum (van der Hoop 1941) exemplified the systematic recording that continues today.

THE PERIOD AFTER WORLD WAR II UP TO 1950

During the Japanese occupation, research of prehistory almost stopped. Only W. Rothpletz was able to continue research in the Bandung hill region (West Java) during this period. Results of this survey were published after the war (Rothpletz 1951), together with H. G. Bandi's article on the Bandung obsidian artifacts (Bandi 1951). Conclusions of both scholars threw some new light on the Bandung culture complex; particularly, types of obsidian artifacts became clearly distinguished.

In this very short period of concern, prehistoric work was carried out by van Heekeren who, as the only person appointed to be prehistorian at the Archaeological Service since 1946, accepted responsibility for resettling prehistoric research. Circumstances compelled van Heekeren to localize activities in areas of Central Sulawesi and South Sulawesi. His activity included chiefly researches on the palaeolithic, Toala, and Kalumpang sites, and it attained significant results.

Van Heekeren's first postwar excavation, which took place in 1946, was of a tumulus at Lampoko (South Sulawesi). It brought no results, as neither human bones nor artifacts were

found. Upper palaeolithic flake implements associated with fossil animal remains were discovered by van Heekeren on a river terrace in the Tjabenge region (Central Sulawesi). These implements were recovered in 1947 and became thus far the first palaeolithic find in Sulawesi. Van Heekeren saw a close relationship between these implements and the Sangiran flakes from Java. Probably both of these industries were offshoots of pleistocene flake cultures from India, Burma, and South China (van Heekeren 1949a). D. A. Hooijer (1949), who examined the Tjabenge animal remains, distinguished species of elephants, pigs, turtles, and anoa. He further stated that pleistocene vertebrates must have reached Sulawesi by way of a migration route from the north, namely, from South China via the Philippines. The Toala culture still drew van Heekeren's attention. He excavated the cave of Bola Batu (South Sulawesi) in 1947 and made preliminary surveys in the region of Maros in 1949. Van Heekeren emphasized that the Toala culture comprised at least three distinct levels: a palaeo-Toalian (with crude flakes as elements), a late palaeolithic blade culture (similar to "proto-Toalian"), and an arrowhead culture (similar to Toalian). Afterwards he revised these terminologies and reset the composing elements of each cultural stage. The finding of Chinese porcelain sherds that infiltrate into deeper layers in Bola Batu cave opens the possibility that the Toala culture in isolated places could have persisted until the sixteenth century (van Heekeren 1949b).

Kalumpang Culture

Van Heekeren's next excavation was in 1949 at Kamasi Hill, Kalumpang (Central Sulawesi), near the spot formerly excavated by van Stein Callenfels in 1933. The total find disclosed by van Heekeren here was quite like van Stein Callenfels's discoveries. Van Heekeren considered the Kalumpang culture as one compound that was built up of two components: (1) an early neolithic consisting of stone adzes with lenticular cross section (primitive shouldered or tanged adzes or the so-called protoneoliths) and undecorated earthenware pottery; (2) a late neolithic yielding quadrangular adzes, polished spearhead, tanged arrowheads, and decorated earthenware pottery (van Heekeren 1950). W. F. Beers, an expert on soil, estimated the age of the Kalumpang earth-layers as between a minimum of several hundred years and a maximum of one thousand years. This valuation led van Heekeren to place the age of the Kalumpang culture at about 600 years B.P. It is thus obvious that there might be a process of retardation affecting the Kalumpang culture that is caused by isolation. Van Heekeren in this way did not agree with Heine-Geldern's conclusion that settled the age of the Kalumpang culture at ca. the second half of the first millennium B.C. From these Kalumpang finds van Heekeren concluded that both neolithic elements, including the saw-and-drill techniques on artifacts, were closely related to the neolithic culture of Hoifung, Hong Kong, and Batangas (Philippines), whereas the decorated potsherds demonstrated influence of the Dongson culture.

Megalithic Remains

During the same year (1949) van Heekeren discovered new localities of upper pleistocene vertebrates near Tjabenge and a site of urn-burials, stone mortars, and menhirs near Sengkang (South Sulawesi). He also undertook surveys in Sumba, where he concentrated on megalithic objects of very recent times, among others, the megalithic burial sites and complexes of dolmen.

A Bühler, leader of the Swiss expedition in Sumba, reported in 1949 his discovery of new urn-burial sites at Rende-Mangili and Palindi (Southeast Sumba) and his small-scale

excavation at Melolo, the well-known site of urn-burials. A report from Bali dealt with the digging of a sarcophagus at Pudjungan (South Central Bali) by the local people. This sarcophagus contained human bones, several bronze spiral chains, bronze rings, and colored beads. K. W. Galis was active in West Irian and in 1948 found a new area of rock-paintings at Mumamura (Northwest West Irian). Drawings of fish, lizards, and human-like and animal-like figures were done in red-colored lines about 1 cm wide.

A Summary

Significant work published by Heine-Geldern just after World War II traced and interpreted research of prehistory in Indonesia from its beginning until the outbreak of World War II. In a comprehensive way, Heine-Geldern explained the stages of research and discussed the results comparatively to portray prehistoric development closely related to events in areas near and far. Sources of information were presented in detail, and in this way Heine-Geldern's work provides comprehensive data on prehistoric activities as well as on the historical process of Indonesian research (Heine-Geldern 1945).

The time following the period of systematic research will be mostly concerned with filling the gaps to complete and expand the chronological framework that has already been established, notwithstanding handicaps in extending researches and misinterpretations that were caused by lack of qualified executors. The chief aim will be to reconstruct prehistoric life in Indonesia in as many of its aspects as possible.

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- BRM* *Bulletin of the Raffles Museum*, Singapore, Series B.
- JKBG* *Jaarboek Koninklijk Bataviaasch Genootschap van Kunsten en Wetenschappen*, Batavia.
- KAW* *Koninklijke Akademie van Wetenschappen*, Amsterdam.
- OV* *Oudheidkundig Verslag van de Oudheidkundige Dienst in Nederlandsch-Indie*.
- PCPFE* *Proceedings of the Third Congress of Prehistorians of the Far East*, Singapore, 24 January–30 January 1938, Singapore, 1940.
- TKBG* *Tijdschrift voor de Indische Taal-, Land- en Volkenkunde*, uitgegeven door het Koninklijk Bataviaasch Genootschap van Kunsten en Wetenschappen, Batavia.
- TKNAG* *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap*, Leiden.
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