Ancient Beads From Philippine Archaeological Sites

by Robert B. Fox and Rey A. Santiago

The many types of glass and stone beads which have been excavated in Philippine archaeological sites provide substantial evidence for extensive contacts and trade between the Philippines and countries of South and East Asia, the Near East, and indirectly Europe, hundreds of years prior to Spanish contact. Glass beads have been excavated in burial caves in Palawan which date to more than 2,000 years ago, suggesting that they were brought into the Philippines through the actual movements of people from the south mainland of Asia – either from Northern Indo-China or South China. By 200 B.C., unique types of etched stone beads which were made in India had appeared in the Islands. Glass beads – appropriately described as "Trade Wind Beads" – probably made in Europe, reached the Philippines through Arab trade before the Europeans; before Magellan! The Chinese trade of pottery into the Philippines, mostly after the 12th century A.D., was also an active trade in great numbers of glass and stone beads. The majority of the beads which were brought by the Chinese traders, however, were probably made in the Near East and Europe for glass beads and wares from the West which were traded for silk reached China at an early date, during the period of the Warring States about the 8th to the 3rd century B.C.

A universal expression of human vanity, attractive beads of semi-precious stones and colorful glass have been eagerly sought by people everywhere and at all times. The small beads were easily carried over great distances by migrating people. Excavations in Asia and Africa show that beads were a basic commodity linked with the earliest development of formal trade. The period of European expansion during the 15th and 16th centuries A.D. also saw the distribution of countless numbers and varieties of glass beads to the marginal peoples of Asia and elsewhere who treasured them in many instances above all other material items. The total absence of glass trade beads among the Tasaday of Mindanao, when first seen by the writer, provides additional evidence for the remarkable isolation from the outside world of these forest people.

It is not surprising that Magellan carried with him beads for trade during the voyage when his ships were to first circumnavigate the globe. Or, that the Pilipinos at first Spanish contact were already familiar with and prized glass beads. In 1521, shortly after the ships of Magellan had reached the Philippines, Pigafetta wrote in his chronicle:

When one of our men went ashore for water, one of those people wanted to give him a pointed crown of massive gold, of the size of a colona, for six strings of glass beads, but the captain [Magellan] refused to let him barter, so that the natives should learn at the very beginning that we prized our merchandise more than their gold (sic).

Dr. R. Fox was a former head of the Anthropology Division, National Museum, Philippines while Mr. R. Santiago is a senior researcher in the same office.

The photographs of beads used in the article are illustrative of those discussed.

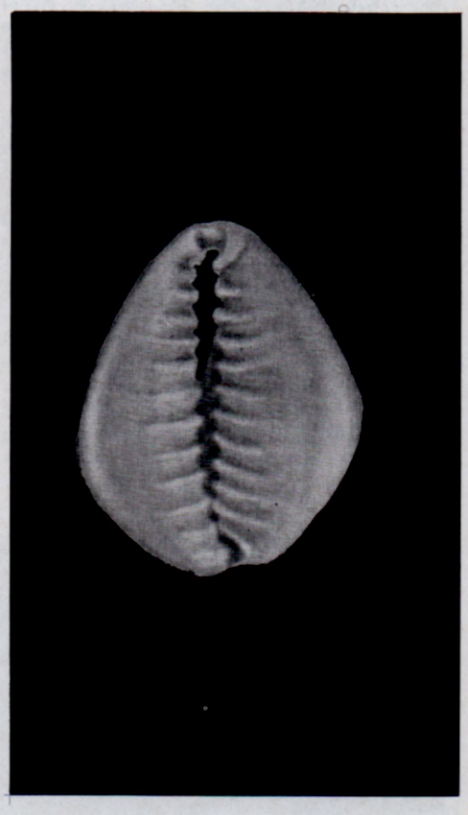
Later when the ships were at Cebu, Pigafetta noted, the king wore "...a necklace of great value hanging from his neck." One can easily imagine that this necklace was strung with beads of semi-precious stones, glass, and gold similar to types which are being excavated today in Cebu by the archaeologists of the University of San Carlos.

Stone and glass beads are still treasured by the mountain people in the Philippines, as among the Kalinga and Gaddang of northern Luzon, who may price individual heirloom beads in hundreds of pesos. A bead found among the Kalinga, a type named ***adungan,*** is said to have been valued at two water buffalos. The Kalinga have about one-hundred names for distinct types and classes of glass, stone, and metal beads. Heirloom beads, like jars, may have genealogies and in the past their possession brought great status to their owners.

Types of Beads Under Study

In this paper, 40 types of ancient beads will be discussed and illustrated, providing brief preliminary data from a much larger study now being undertaken jointly by the writer and Mr Rey Santiago of the National Museum and Mr. Jose B. Lugay, Glass Technologist, of the San Miguel Corporation. This on-going research involves the study of more than 300 visually distinctive types of shell, stone, metal, and glass beads which the Museum has excavated. The absolute or relative age of each of these type beads has been established based upon either C-14 determinations or the association of dated trade potteries from China, Thailand, or Annam. It must be stressed that only beads which have been recovered during controlled excavations will be included in the type collection. All of these beads have been assigned to one of three periods of Philippine prehistory based upon the archaeological evidences: the ***Neolithic;*** the ***Early Metal Age;*** the ***Developed Metal Age*** when iron was common (or present); and the ***Age of Contacts and Trade with the East.*** When the beads are thus arranged, the chronological order in which each diagnostic type of bead first appears becomes evident; as well as when particular types of beads were made in the Philippines.

A few types of beads — the heirloom beads — continued to be used for hundreds of years after they first appeared in the Philippines. But, when discussing the age of heirloom beads, past writers have tended to exaggerate their antiquity. Beautiful, translucent carnelian beads — a class of crypto-crystalline quartz — first appear in quantity in sites of the Developed Metal Age which begins in some areas of the Philippines about 200 B.C. These carnelian beads are very different in forms from the large carnelian beads which are found in burial sites of the Age of Contacts and Trade with the East that date to only a few hundred years before Spanish contact (circa the 12th to the 16th century A.D.). It is generally (if not only) these later carnelian beads which form some of the heirloom beads found among the mountain peoples, such as the Kalinga and Bontok. Most of the stone beads of the mountain peoples were imported in historic or modern times, however, for they ***do not appear*** in pre-Spanish archaeological sites. Stone beads of antique forms are still being made in India



Late Neolithic Shell Beads from Palawan.

Glass Bead from Guri Cave

for trade. Modern beads of this type, including plastic copies, are being sold as "antique" beads to unsuspecting collectors.

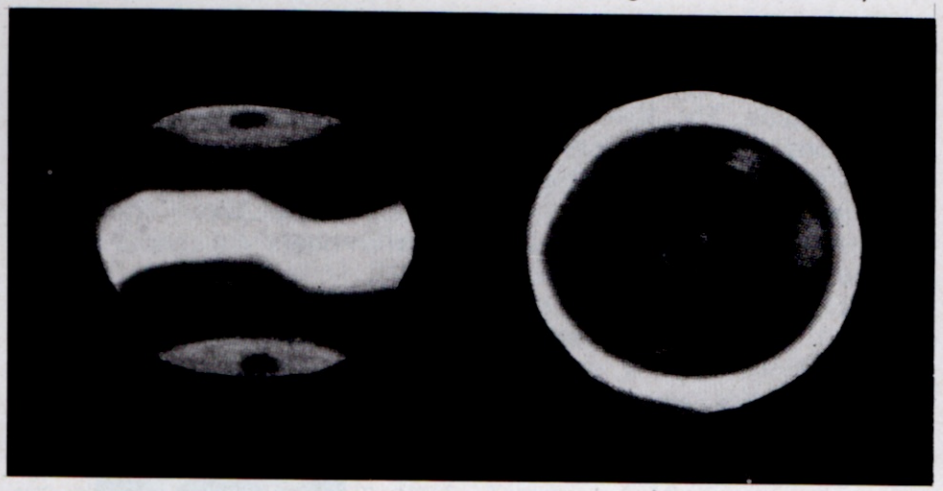
Chemical Composition

The study of ancient beads is incredibly complex and the project will require many future decades. Uncertainties as to the age and provenance of bead types will probably always exist. Each visually distinctive type of bead of whatever material – seed, shell, coral, stone, clay, ivory, glass, metal – must be described by standard procedures as to its form, color, material, method of manufacture, and so forth. If made of glass, it is also necessary to establish its specific gravity, its chemical composition, and the possible presence of trace elements, such as uranium. The appearance of a trace element can help to establish the origin of a bead. This can only be effectively accomplished through neutron activation analysis or X-ray fluorescence analysis of trace elements, as is being done at the Lawrence Berkeley Laboratory, University of California, by Clairo C. Davison who is cooperating closely with the Philippine bead project.

Determination of the origins of glass beads will ultimately depend upon establishing "chemical" classes of beads for dated archaeological sites which can then be correlated with traditional areas of glassmaking and specific factory sites. The problem of the widespread trade in the past of raw materials used in glassmaking, such as additives used for colorants, makes the designation of bead origins still more difficult. But considerable progress has been made in the study of when and where, for example, specific additives have been used in glassmaking, such as antimony used as a decolorant. Beads from Europe from the 9th to the 12th centuries A.D., it is now known, were made from potassium glasses; those from the Near East, of soda-lime glasses. Soda-lime glasses, however, are nearly universal in use, but further studies of trace elements in soda-lime glasses can still provide clues as to their place of manufacture.

The "Trade Wind Beads" – a number of types have been excavated in the Philippines – are distinguished chemically, as pointed out by Davison, by an unusually high content of the element uranium and could have been made either in Europe or possibly the Near East. Barium has been thought of as being a diagnostic element in the early (pre-Han and Han Dynasty) Chinese glass beads, but there is a chemical class of Chinese beads which contains no barium or lead. Old glass beads from Japan – 8th-10th century A.D. – have a high content of lead oxide. There is still another class of Chinese beads – melon type – which have a high percentage of lead and no barium. It will be necessary to subject all of the types of ancient glass beads found in the National Museum's type collection for analysis of their chemical composition, hopefully through the use of X-ray Fluorescence and Neutron Activation.

Lacking these pieces of technical equipment, the proposed "Asian Center for the Study of Ancient Glass" – a joint project of the National Museum and the San Miguel Corporation – is attempting other lines of inquiry. Among these are a thorough study of the method of manufacture of the stone, metal, or glass bead. Preliminary observations by Mr. Jose B. Lugay would suggest that the basic methods of manufacture may vary through time. Thus, specific manufacturing techniques may be related to known areas of beadmaking in the same way that "chemical" classes of beads can be related to known areas of glassmaking. Distinct methods of manufacturing beads may also be correlated with "chemical" classes. The initial analyses have concentrated of course upon an exhaustive study of each type of bead and of the distribution of these type beads through time and space in the Philippines.



Onyx bead from Manunggul Cave shows how a hole is drilled in a bead.

The materials used in bead manufacture, are related (1) to the stage of technological development in the Philippines, and (2) to the intensity of external contacts and trade. No beads have been found in Philippine Palaeolithic sites, such as Tabon Cave in Palawan. The

ability of the early Filipinos to drill hard stones and shell for beads was not achieved until Neolithic times, when the people had a vastly improved stone technology; a technology which also made possible boat-building and agriculture.

Jade bead

Drilling a Hole

During the Neolithic, the majority of the holes (bores) in beads are conical in shape, the hole being drilled from both ends of the bead. It is probable that hard stones, such as chert, were used for drill points, as Professor H. Otley Beyer has reported. The ethnographic record would suggest that the very efficient "pump drill" was known and that a fine quartz sand was used as the abrasive. A "pump drill" is still used by the Ifugao in northern Luzon. Cylindrically shaped drills of chert have been recovered in India from where, the writer believes, the early beads of semi-precious stones came, including most of the types with cylindrical drill holes excavated in the Philippines, but the jade beads with cylindrical holes probably came from China or Indo-China. It is probable too that a nephrite (jade) bead found in Leta Leta Cave, a Neolithic site, which has a tiny cylindrical hole of less than two millimeters in diameter was carried into the Philippines from the coastal area of the south mainland of Asia by Neolithic people who had obtained such beads from technologically more advanced Metal Age cultures before outmigrating into the Island World of Southeast Asia. The ability of the early Neolithic peoples in Asia and the Philippines to shape and drill extremely hard stone beads is further evidence of the great value of beads and the emphasis which was placed on skilled craftsmanship; a craftsmanship which has persisted into modern times in traditional areas of beadmaking, such as India.

The method of manufacture of one type of jade bead — Museum Type No. 32-NL — found in Late Neolithic and Early Metal Age cave sites in Palawan is described by Rey Santiago, illustrating the skills involved:

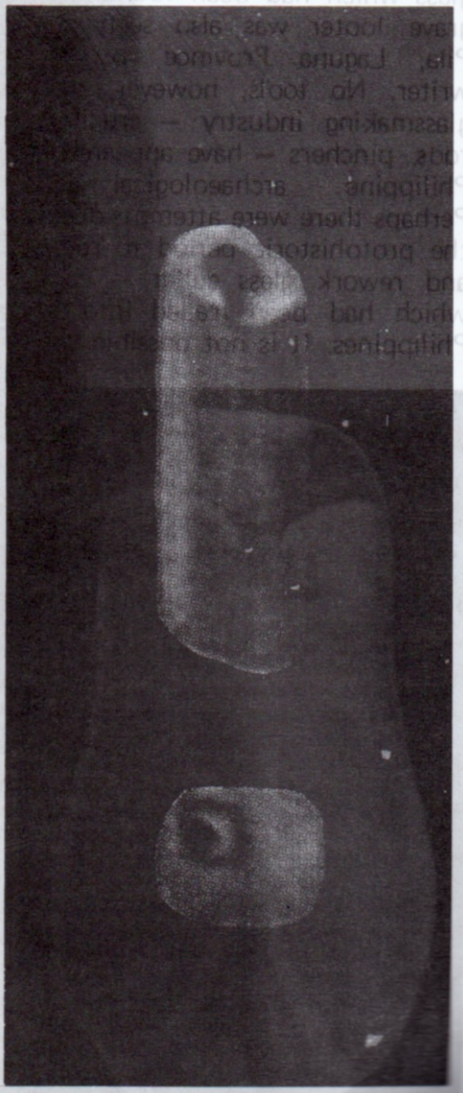
This nephrite bead with a Munsell color of 5 yellow — green 7/4 is 15 mm in length, as measured parallel to the axis of the bore, and 3 mm in diameter. The bore or hole is about 1.5 mm in diameter. The bead appears to be cylindrical but careful examination shows that it is actually rectangular in cross-section in which the sharp edges have been rounded by grinding.

The length of this bead, as well as others of the same type, was achieved by drilling tiny holes in the stone at right angles to the length. of the bead. The individual bead was then broken at the point of the drilled holes and finally ground at the ends to partially remove the drill holes.

Most of these beads have a grove parallel to the drill hole on one or more sides which were formed by drilling and then ground down. It is possible that this groove is a result of the basic method of manufacture — drilling, splitting, and grinding. Thus, holes were drilled in lines covering the entire surface of squared pieces of jade. The jade was then split using every other line of holes. This formed the rough bead for further grinding but which did not entirely eliminate the drilled holes.

Translucent beads show that the holes were drilled from both ends of the bead which would suggest that the maximum depth of the drill (or one-half of the longest bead) was approximately 1.5 mm. It is probable that fine quarts sand abrasives were used with a metal drill to make the holes, perhaps bronze, as stone drills would make a larger hole (2 to 4 mm.). It is also significant, as may be seen by examining the ends of the bead, that a larger hole was first made to guide the smaller drill which made the bore of the bead.

Microscopic examination of the surfaces of the bead clearly shows the direction of grinding which provides the basis for this reconstruction of the method of manufacture of jade beads.

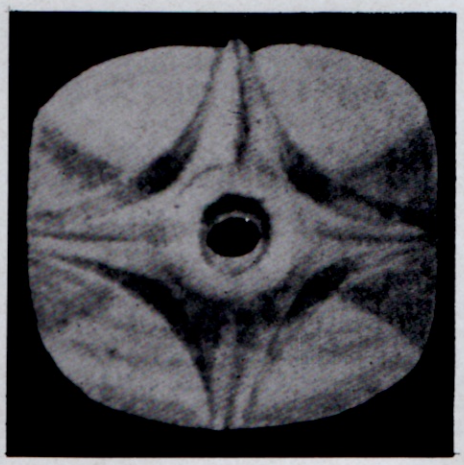


Jade bead

Glass Beads

After the 12th century A.D., during the Age of Contacts and Trade with the East, the great majority of the beads found in Philippine archaeological sites were manufactured from glass. Beyer, in fact, has written that light blue and green glass beads and bracelets were made in the Philippines. The Museum has recovered cullet or fragments of raw green glass at Calatagan, Batangas, which would appear to support Beyer's thesis. Cullet of an opaque light blue glass which had been found by a grave looter was also seen near Pila, Laguna Province, by the writer No tools, however, of a glassmaking industry — crucibles, rods, pinchers — have appeared in Philippine archaeological sites. Perhaps there were attempts during the protohistoric period to reheat and rework glass cullet — cullet which had been traded into the Philippines. It is not possible with the available evidence to state that a glass industry was present in the Philippines during prehistoric times.

Dr. T Kano, a Japanese ethnologist, and co-worker of Professor Beyer, believed that extensive influences from Philippine "Metal Cultures" were felt in Taiwan during the last phase of its prehistoric development, notably in the great similarities seen between glass bracelets found on the eastern coastal area of Taiwan and in the Philippines. Professor Chen Chi-Lu also points out that glass beads found among the aboriginal groups in Taiwan show Philippines and Southeast Asian affinities and not Chinese, a view prompted by the high lead content found in the beads of Taiwan which is also true for Philippine beads of the protohistoric period. It is possible that trade beads reached Taiwan from the Philippines but the archaeological record from Taiwan for beads is still uncertain.



Glass bead shaped like cicada wing from Uyaw Cave, left: side view, above: view from top.

The earliest glass beads which have been excavated in the Philippines were unquestionably imported. One large, green glass bead from Uyaw Cave in Palawan, an Early Metal Age site (circa 500- 200 B.C.). is shaped like a cicada and closely resembles similar Chinese carvings in jade. An assemblage of jade ornaments form south China or northern Indo-China, moreover, was also excavated in this cave. The writer feels certain that this bead came from China, although an analysis of the glass does not reveal the element barium which has been thought to be characteristic of pre-Han and Han Chinese glass beads. Colorless cicada beads of approximately the same date have been found in China, and these cicada beads do contain barium. The Chinese also made beads, however, which did not include either barium or lead. Dr. Davison sees possible similarities in the form and chemical composition of this bead with Egyptian types (pers. comm.). Glass beads were made in Egypt by at least 1500 B.C.

Eye Beads

Beyer has also discussed and illustrated a number of types of eye or banded beads which he called "Greek" and Roman" types and which he believed reached the islands before the Birth of Christ. But variants of eye glass beads and inlaid beads are international, appearing, in the La Tene or Late Iron Age of Europe and are now believed to have been made during the first millenium B.C. up until the Han Dynasty in China. Most of the eye beads found among the mountain peoples in Indonesia and Borneo, however, were sent out from England for trade during

the 19th century A.D. period of colonization. This would explain the presence of sizable number of eye beads among the T'Boli and other mountain peoples in Mindanao which is near "British Borneo" and their relative rarity among the groups in the Central Cordillera of northern Luzon. The Kalinga, nevertheless, have a traditional term for a recent type of eye bead (Fig. 41) – ***"Kalumbabanga".*** Only one large eye bead of classical type has been excavated by the Museum staff at Calatagan, Batangas, which was loaned to Professor Beyer who remarked that it was "an early type" (?).

Eye beads of plastic are fashioned today by the T'boli of South Cotabato, Mindanao, in attempts to copy the imported and highly valued earlier types. The ingenious manufacture of eye beads was witnessed recently among the T'boli by Miss Amy Rogel of the National Museum. She writes:

The T'boli produce two types of eye beads – a black bead with a simple white eyes and a bead with white eyes which is spotted with light blue or pink and red colors. The material used in making the eye beads is commercial plastic combs of the colors black, white, pink, red, and blue. Black combs melted in tin cans over live coals form the body of all eye beads. While still soft, a fragment of the black plastic is cut from a melted chunk which is then molded with the fingers into oval and round shapes. And while still, soft the shaped bead is perforated with a number of holes, depending upon the eye design sought, by means of a length of wire. The perforated bead is then reheated to obtain a high polish.

The color for the eyes is obtained by softening and stretching the combs into string-like lengths, using live coals for the source of heat as before. The white eyes are made by inserting the string-like white plastic into the holes of the bead, after the bead has been reheated. The whole bead with white eyes is then heated again to melt the white into the black body. The red and blue spots in the center of the white eyes are also achieved by inserting "threads" of pink, red, or blue colors into a shallow hole in the center of the white eye. It is finally heated again over the coals to consolidate the colors and to achieve further polish.

During all of these steps, Miss Rogel notes, the bead is handled by means of a length of wire, the same wire which is used to form the hole of the bead. The wire is removed after the eyes have been added. Metal or improvised bamboo thongs are used only when heating the chunk of black plastic prior the finger molding. A woman with the help of her husband or someone in the family can complete all stages in the manufacture of about 40 eye beads in three days. A necklace made entirely of plastic beads – a type now being purchased by tourist – including about a dozen eyebeads and solid colored plastic beads of black, blue, pink, and red, also made by the T'boli, is sold by the T'boli to wholesalers for about 15 to 18 pesos who then retail the necklaces in Manila for about 40 pesos. Tiny red, white, and black beads from Europe may be added to the necklace of plastic beads, the entire necklace being called ***hnumbu.*** Eye beads are worn by the T'boli only in the form of necklaces and an original necklace containing heirloom eye beads will sell locally for about two horses. The eye bead is called ***Hunung hadaw.***

Metal Age Beads

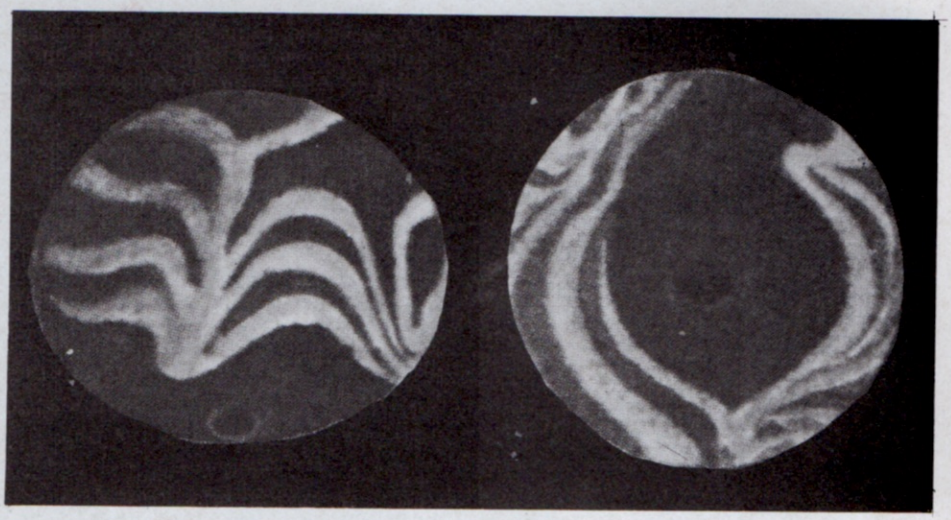
All of the earliest Metal Age beads which have been excavated by the staff of the National Museum are monochrome glass beads or beads of a single color, including translucent green types and an opaque red type. Utilizing the specific gravity of the type beads as the basis for establishing classes of glass (alkali glasses, 2.3 to 2.7; alkali-lead glasses, 2.7 to 3.2; and lead glasses, 3.2 to 4.0), Mr Lugay has shown that ***all*** of the earliest glass beads found in the Philippines which he has analyzed are made of alkali glasses; the type of glass first made by Man in the Ancient Near East. Soda-lime glasses, a chemical class, are included in alkali glasses. Lead (and lead-alkali) glass beads do not appear in the Philippines until the period of trade with China, after the 12th century A.D., as based upon Mr Lugay's analysis to date. In a discussion of the trade of glass beads into Island Southeast Asia, Tom Harrison based on his Bornean researches posits two main early sources: (1) beads with no lead or a small amount of lead which came from the West; and (2) beads with a large amount of lead which came from the North with the Chinese trade in T'ang-Sung (618-1280 A.D.) times or later. Harrisson's views are not inconsistent with the Philippine data except that the beads with no lead (or little lead) were the ***earliest*** types of beads to reach the Philippines from both the West (South Asia and the Near East) and the North (China); and that the latest types of trade beads, those with large amounts of lead, came into the Philippines from the North during the period of the "porcelain trade" which in the Philippines occurred primarily during the southern Sung and Early Ming Dynasties (1127-1572). Beads which came from China, moreover, may have originated in the Near East and even Europe – the "West"

Manufacturing Methods

Mr Lugay's study of the method of manufacture of glass beads from Philippine sites, when arranged chronologically, is also revealing. Metal Age beads were formed by glassmaking techniques known as "dipping," "blowing", and "pressing", whereas "spiral coiling" and "ring coiling" – types

also called wound beads – do not appear until the Age of Contacts and Trade with the East, after the 12th century A.D. Although the literature would suggest that blowing of glass was not known in the Ancient Near East until about the first century B.C., a blown bead was recovered in Uyaw Cave, Palawan, which has been dated to an earlier period – 300 B.C. to 500 B.C. The dating of the artifacts in this cave was based, however, upon cultural associations – the presence of jade and bronze objects and the absence of iron – and the tentative dates for the assemblage of Uyaw artifacts may be a few centuries too early. The assemblage of artifacts from Uyaw Cave is extremely early, nevertheless, around 2,000 years.

Polychrome glass beads



Polychrome glass beads

In the study of beads, as trade potteries, the archaeological date must be carefully evaluated. Two beads from Manunggul Cave: Chamber B, Palawan, have been tentatively grouped by Davidson as "Trade Wind Beads" although she noted that the amount of copper colorant in these beads was about four times higher than in other beads in this "chemical" class. She adds that: "These two beads show other peculiarities." This is understandable for the Manunggul beads were dated by C-14 from associated charcoal to 190 B.C., whereas the classical "Trade Wind Beads" from African sites date from about the 11th century A.D. to circa 1700 A.D. The C-14 date and archaeological associations from Manunggul Cave are reliable and it is certain, as Davidson suspected, that these beads belong to an earlier and variant "chemical" class and are not "Trade Wind Beads" The Manunggul glass beads were made by an early method described as "dipping" but the Philippine "Trade Wind Beads" which were all found in sites associated with Chinese trade pottery were made by "dipping" or "ring coiling, the latter manufacturing technique appearing only after the 12th century A.D. The "Trade Wind" beads of the Philippines were also made by dipping, pulling, and cutting and maybe reheating. These would appear to be similar to "Trade Wind Beads" from Africa which Davidson describes as "reheated canes"

Multicolored Beads

Polychrome glass beads – multicolored beads with complex designs-appear in the Museum's type collection only during the Age of Contacts and Trade with the East, after the 12th century A.D. It is highly likely that earlier polychrome beads will be recovered in the Philippines in dated archaeological contexts, for complex polychrome beads appear elsewhere, as in the Near East, which date to hundreds of years B.C.

One distinctive type of polychrome bead with chevron designs shows incredible continuity through times. This bead first appeared in burial sites at Calatagan, Batangas, which are Tagalog graves that date

from the late 14th to the early 16th century A.D. They have also been recovered in sites of a similar age, the protohistoric period, at Bolinao, Pangasinan and in Cebu. And, a visually identical type of bead has been found by the writer among the Kalinga of northern Luzon who call it *dumat.* The Kalinga beads of this type also appear in extremely large sizes. An identical bead of even larger size was seen by the writer in Beck's small but famous collection at the British Museum but despite great hopes of finding data as to its age and provenance, the accession record contained only the remark: "origin unknown"

Mr Lugay has carefully studied and compared these two beads — the 15th century example from Calatagan, Batangas, and the contemporary Kalinga type — and observes:

To untrained eyes, the two chevron decorated beads look alike, although their ages may be centuries apart, for both beads are similar in that they exhibit the same overlaying of colors concentric to the hole of the bead. Starting from the center, each color band has 12 serrations — white, cobalt blue, white, sealing-wax red, white, and finally cobalt blue. It is the serrations which form the characteristic Chevron pattern. When viewed from the end of the bead facing the hole, however, the serrated bands of color form a beautiful floral design. When the beads are viewed laterally, the blue outermost layer forms a series of shield-like patterns joined side by side around the bead.

The two beads are very different from each other, nevertheless, when examined closely under a magnifying lens. The shape of the older bead from an archaeological site is biconical and unsymmetrical, with the center (equator) almost round in cross section. The upper and lower portions away from the center are unequally faceted due to uneven grinding. The Kalinga bead is barrel-shaped and perfectly symmetrical. The cross section perpendicular to the length is also perfectly round.

The hole of the older bead is semicircular at one end and egg-shaped at the other end. This indicates that the rod used to form the bore was taken out of the bead while the glass was still soft. The newer bead, however, has a perfectly circular hole. The craftsman of this bead was obviously more skilled than the one who made the older bead.

The outer layer of blue color of the older bead is slightly corroded and has lost its luster, as might be expected, because of its age and burial. And the inner layer is green instead of cobalt blue. The serrations of the older bead are not regularly spaced and they have pounded ends. On the newer bead, the innermost white serrations are sharp pointed in counter-clockwise direction like the serrations of a circular saw.

The shield pattern of the older bead is pointed at both ends and the shield lengths are unequal. On the newer bead, the shield patterns are ovoid at both ends. They have almost equal lengths and they are spaced regularly.

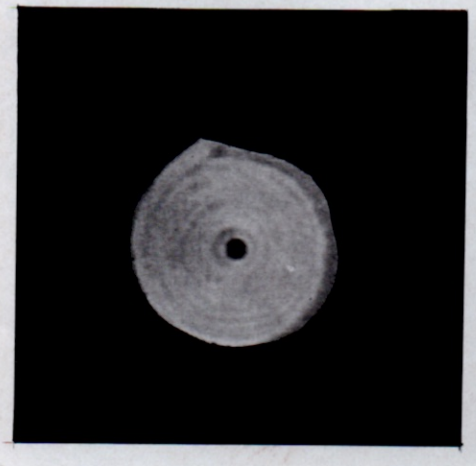
The new bead looks like a glazed ceramic piece with decorations painted on the surface. The old bead has a dull appearance. Both beads, nevertheless, were formed by "casting" or coating one layer of glass over another. The differences briefly cited show that the two beads were manufactured in two different ways, the newer bead involving a craftsman with more skills, better tools and better glass.

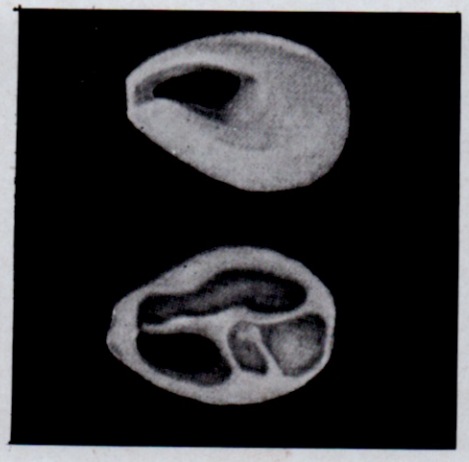
It should be apparent from the preceding discussions that there are few data available at present on the exact origins of the glass and stone beads which are excavated in Philippine sites. At least we do know from the Philippine archaeological record when and what kinds of beads, excluding glass, were made in the Philippines. And, if carried into the islands by man or traded, when and what kinds of beads appeared during the major periods of Philippine prehistory. The method for studying beads has been established but the research on each distinctive type of bead which has been found in the Philippines covering nearly a four-thousand year period still needs to be done.

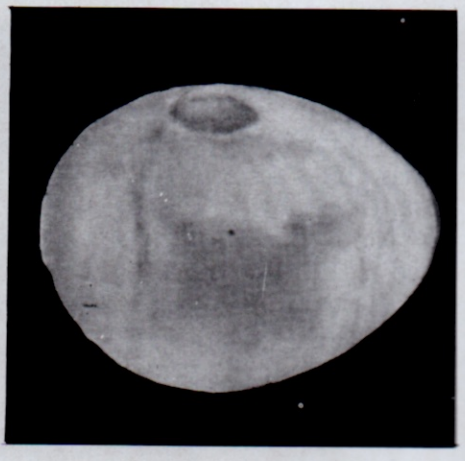
Philippine Bead Horizons

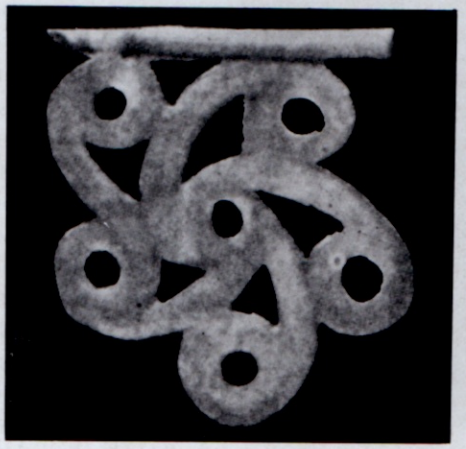
Beads have not been found, as noted, in archaeological sites of the Old Stone Age, such as in Tabon Cave, although seeds and other perishable materials which could have been pierced by a thorn may have been worn. During the hundreds-of-thousands of years that Palaeolithic Man lived in the Philippines, it is highly probable that he used at some time ornaments, such as beads of seeds, or necklaces and armlets woven from plant fibers.

Characteristic types of late neolithic shell beads found in Palawan.

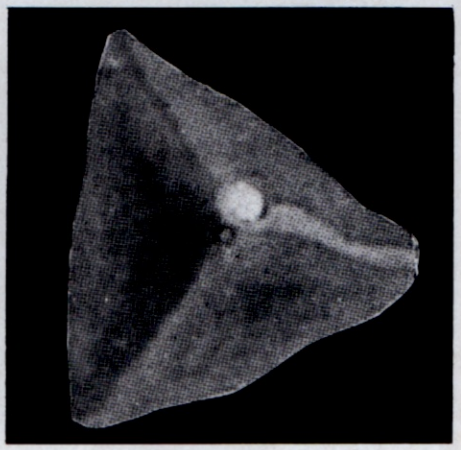








Gold Beads



Beads of the Neolithic or New Stone Age — Beads of many materials are numerous in Neolithic sites, for techniques of grinding and drilling stone, shell, and teeth were known, beginning by at least 6,000 years ago. A Neolithic grave in Duyong Cave, Palawan, which dates to the 5th millenium B.C. yielded perforated shell pendants, but no beads. Another grave in Sa-gung Rockshelter, Palawan, excavated by Jonathan Kress of Duke University contained a necklace of at least 95 corcodile teeth (Fig. 1), as well as a pendant identical to those found in the Duyong grave. Teeth of crocodile prized for magicoreligious purposes are still worn by the mountain peoples in the Philippines. The date of the Sagung grave is uncertain, according to Kress, but it is certainly an Early Neolithic grave containing the earliess necklace yet found in the Philippines.

Many types of shell, stone, and teeth beads were being locally manufactured by late Neolithic times, at least by 1,500 B.C. Leta Cave, a Late Neolithic site at El Nido, Palawan, yielded more than 5,000 beads of shell, stone, and testh. Common were small shell beads (Fig.3 and 4) made by removing the dorsal surface of coweries *(Cypraea annulus* and *Cypraea moneta)* and *Nassarius* spp., which can be gathered on nearby reefs. Beads of. porcupine (?) teeth were also present in which the hole had been ground manually in the softer root of the tooth using a sharp pointed object; a similar technique was also used in forming the holes in the crocodile teeth from Sa-gung Rockshelter This would suggest that drilling was not known during the earliest phase of the Neolithic. The great majority of the beads from Leta Leta Cave were tiny, round, thin and flat disks. The most common of these sequin-like beads were made from the operculum of a small land snail *(Ophisthoporus quadrasi* Hidalgo) identified by Mr Jaime Cabrera of the National Museum, found only in Palawan. The operculum — the thin plate of shell which is attached to the foot of the animal and protects the animal in the shell when the foot is retracted of his shell-has a slight indentation on the center of the interior which is easily pierced for stringing and forming beads. The use of tiny operculum for beads was not discovered until the field team began to collect land snails in order to study their use as food by Ancient Man in Palawan, although the beads had been in the Museum's collections for a number of years. Large round beads with a hole carefully drilled from both ends were commonly made of Giant Clam *(Tridacna gigas).* Elongated biconical-shaped shell beads are common today among the Bontok of northern Luzon.

Hard stones, including jade and microcrystalline quarts, were ground and drilled into beads, but not infrequently, softer stones were used including steatite and shale. A quartz bead but having an unfinished drill hole was excavated in the Pato Caves of Late Neolithic date, Sorsogon Province.

Beads of the Early Metal Age — Many new types of beads appeared about 500 B.C., when bronze, copper, and gold (possibly iron) were present in Philippine archaeological sites. Most noteworthy, as discussed, are the first types of glass beads to appear, as well as beads fashioned from semi-precious stones, including nephrite jasper, agate, opalline stone, and carnelian. The carnelian beads are not common, however, until iron is present in the archaeological sites. Beads made from coral were also exacavated in Guri Cave, Palawan, and Early Metal Age site.

Three types of gold beads have been found in Early Metal Age sites, all being made of worked leaf gold. It is possible that gold beads were brought into the Philippines before iron. The gold beads of other methods of manufacture were not common until the Age of Contacts and Trade with the East, more than 1,000 years later.

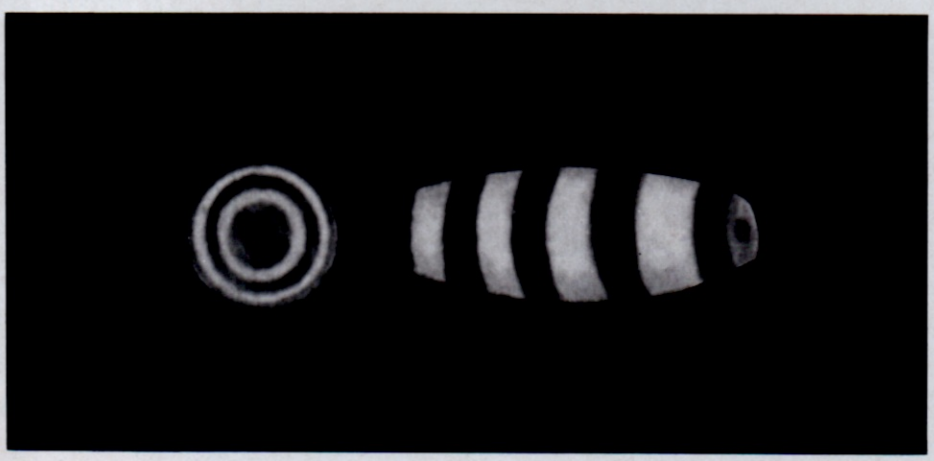
The most striking bead excavated in an Early Metal Age site in Palawan is banded red-and-white which to a casual observer would appear to be made of glass. It is actually a stone bead, carnelian, in which the white bands were made by caustic etching. Similar etched stone beads have been found in India. The process of etching stone has been known in India for thousands of years and the writer believes that the early etched stone beads found in the Philippines came from this area.

Beads of the Developed Metal Age — When iron has been identified in Palawan archaeological sites, beginning about the second century B.C., colorful beads of semi-precious stones are a characteristic feature — beads of a banded onyx and agate, as well as jasper and carnelian of many shapes. Round beads of black flint which have also been etched with caustic to form white panel-like designs are also prsent. According to Alistair Lamb, these types of etched stone beads are extremely rare in Island Southeast Asia, although common in India and the south mainland of Asia. The many types of stone beads which have been found in early Philippine archaeological sites containing iron, beads which may be identified with India, would support the view of some scholars that iron was introduced into the Philippines from India, rather than from China.

Jade beads continue to be found in the Developed Metal Age sites and one beautifully polished, dice-shaped bead of hard chert should from a classic early "time-marker" This bead has a cylindrical hole which measures less than 1.5 mm. in diameter, evidence of a very effective drilling techniques. Large glass beads of the Metal Age may also be drilled like stone.

The glass beads of the earliest phase of the Metal Age — translucent blue and opaque red types — are usually extremely small, some being less than two mm. in length as measured with the axis of the hole. These were made as long canes of glass which were broken into small beads and then reheated to smooth the edges of the holes. Small beads can only be recovered by arduously sifting all deposits with a fine mesh screen. Visually identical glass beads of the later phases of the Metal Age are much larger, although still small when compared with the glass beads of the Age of Contacts and Trade with the East.

Beads of the Age of Contacts and Trade with the East — Formal trade between the Philippines and Asia has been closely identified with ceramics because of the great interest in Chinese, Siamese, and Annamese pottery. But this trade also included great quantities of iron, cloth, and beads. More than 60% of the types of beads which are found in the Museum's collection date from only the 12th century A.D., a clear evidence of the intensity of trade during the protohistoric period. All of the beads from this period are true trade beads of which 81% are glass types. Multicolored glass beads with complex designs now appear in quantity and all trade beads analyzed include lead in their composition Beads which have been formed by a coiling technique — the wound beads — are now present. A number of types of glass beads are actually copies of stone types, a practice which appears to be even more common during the historic period. Mellon beads, possibly of Chinese origin, are invariably excavated in sites associated with trade potteries from Asia. Beads with eye designs, although not of classical form, are present but rare gold beads of complicated types are common only in sites of the protohistoric period and show striking Indo-Indonesian affinities. Interlocked brass beads identical to pre-Spanish gold beads were made of brass by the mountain peoples in the Philippines.



Acid etched carnelian bead from Manunggul Cave

continued on page 23