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GRINDING STONES AND MULLERS OF COSTA RICA

BY DORIS STONE AND CARLOS BALSER.

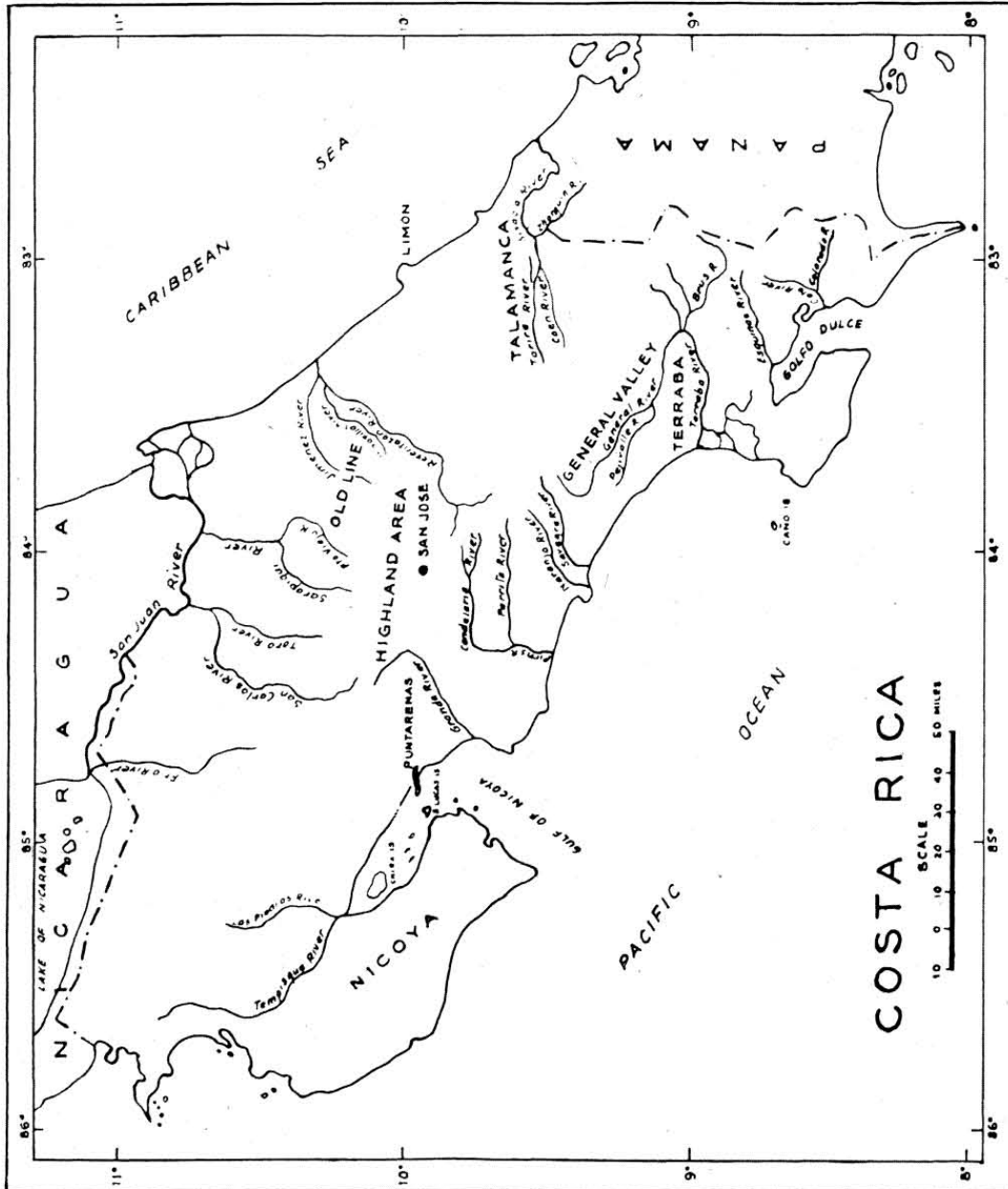
(Plates XXXV to XXXVIII).

The territory of Central America comprised one of the major meeting grounds of the New World, because of its geographical position between two continents and the presence of two of the four transversal passes in this hemisphere. It was the scene of many pre-Columbian migrations and the site of varied trader-colonies centuries before the European set foot on its shore. It is not surprising then that, when the Spaniard did arrive, he found the population consisted of peoples of southern as well as northern origin each with their own manner of living in this relatively reduced area.

It is this manner of living that concerns us at the present moment because it is through the artefacts associated with by-gone customs that we can create much of the genre or daily picture of a culture. The most important item among a people is food. Archaeology in Central America, and in particular in Costa Rica, points to four distinct basic elements of diet : maize, tubers, cacao, and the fruit of the pejivalle palm (*Guilielma utilis* Oerst). All four require mashing as part of their preparation for use. This immediately implies a grinding stone. In the popular mind, a grinding stone is associated with the maize tortilla or maize bread. In Costa Rica, as in most of Central America, there are innumerable varieties of grinding stones and mullers. The purpose of this paper is an attempt to explain the original function of types and to point out the fundamental culture, whether northern or southern, responsible for them.

The northern peoples who had penetrated south to Costa Rica before the advent of the European were the Nahuatl and the Chorotega. They subsisted largely on a baked maize bread which was prepared in the following manner. Crude maize was cooked with lime and ashes, washed to rid it of impurities, soaked in water over night, and then ground into a pulp by placing the wet grain on the curved surface of a special stone artefact or *metate* and rolling over it a cylindrical shaped or elongated stone, the muller. The ground pulp was then baked over an open fire in a shallow receptacle known in Aztec as *comalli*, and in Spanish today as *comal*. This resulted in a flat bread or what is known in Central America and Mexico as a tortilla.

The term *metate* is derived from the Nahuatl word *metlatl* or *metatl*. According to Mexican definitions, it is a quadrangular stone supported by three or four



feet with a curved surface from the ends to the center « on which maize, seeds, peppers, and other fruits are ground by crushing and rubbing with a hand-stone or muller (metlapilli) »¹. This last word is composed of *metla* (metate)

1. FRIEDERICI, 1947, p. 409.

and *pilli* (son). A grinding stone without the support of legs was called a *temetate* from *te* or *tell* (stone) and *metlall* = metate¹.

The peoples of southern origin constituted the bulk of the pre-Columbian Costa Rica population, and can be termed the true aborigines of this region. Although linguistical evidence points to their knowledge of maize, neither historical nor ethnological documentation suggest the use of maize bread, *nor* of this cereal, until Mexican groups penetrated their territory². Their basic diet until this event, consisted of tuberous plants, the fruit of the pejivalle palm, and cacao. With the exception of the last, these items were often made into a ball such as the South American *arepa*, or into a fermented drink which, like maize products, necessitated crushing in the process of preparation.

Contrary to maize products, these substances cannot be soaked in water. To mash them, however, requires considerable liquid. In other words, the process of preparation is fundamentally different. The need for more water during crushing does not permit the use of a borderless grinding stone. There must be a raised rim to avoid the overflow. The very muller must conform in size and shape with the container in which the foodstuff is placed for mashing. Instead of the elongated stone associated with the preparation of maize, a flat-edged river rock, or a stone shaped as a pestle, or in the form of a stirrup was employed. The method of mashing was also governed by the form of the grinding surface. The muller was rocked, at times with one hand, and not pushed forward and pulled backward.

The artefacts found in tombs in Costa Rica supply the archaeological evidence for such processes. In addition to this, they indicate by their artistic development certain cultural connections. Besides the natural boulder which is actually used as a grinding stone in Talamanca and the south of Costa Rica, and which although not found in graves is one of the indications of old dwelling sites, burials and ancient house locations yield metates without any legs, with three legs, with four legs, with two panels, and with pedestal bases. Some have a raised rim or a groove designating the edge of the grinding surface, while others are without any border. The grinding plates are flat or concave in varying degrees. Surfaces with raised edges are seen with all types of supports with the grinding plates differing from a flat to a slightly concave form. The concave rimless grinding plate, however, is only known on the three leg metates.

Mealing Stones. — Mullers are comparatively rare, but five distinct kinds appear in the graves. There is the elongated or cylindrical stone associated with maize grinding in Mexico and western Central America (fig. 12 *c*); a shorter loaf shape stone flat on one side probably developed from the former (fig. 12 *a*); a short rectangular and flat bottom muller (fig. 12 *b*); a stirrup shape stone (pl. XXXV, *a* and *b*); and two types of vertical pestles, one with a mushroom base and the other plain (pl. XXXV, *c* and *d*).

1. ROBELO, N. D., p. 177.

2. STONE, 1956.

The vertical pestles we feel belong more with mortars than with metates. They are found on the Old Line, the Reventazon, and the Highland area but are rare. The elongated muller is rounded and over-reaches the grinding plate on both sides. It is associated in particular with the Nicoya peninsula although it is found on the Old Line. The short rectangular mealing stone is occasionally

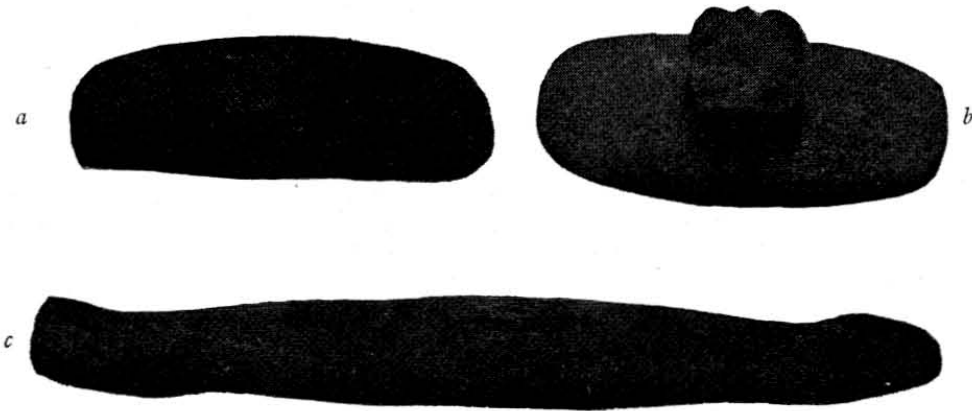


FIG. 12. — *a* : Loaf shape muller ; *b* : short rectangular muller ; *c* : elongated muller. Colec. Museo nacional, Costa Rica.

decorated with a figure which serves as handle. This and the loaf shape muller can be used on flat grinding plates in addition to which the short rectangular one can also be used on those with a raised edge. They are not common but have been found on the Old Line, in the Highland area, and less often in Nicoya. The grinding stone, however, which occurs most frequently in Costa Rica is stirup shape, either solid (pl. XXXV *b*) or with an open center (pl. XXXV *a*). The only way to use it is with a rocking or side-to-side movement. This is similar to the manner employed by the people of Talamanca, Boruca and Terraba today. It is the ideal muller for a raised edge grinding plate as there is no manner for one's fingers to be touched in the mashing process.

When considering the mullers from pre-Columbian Costa Rica, we should not overlook the possibility that wooden mullers may have been the common artefact. This in itself would explain the scarcity of mealing stones in many graves where metates are found. It also offers an answer to the question why many grinding stones show so little evidence of use.

Stone Objects Similar to Metates. — There has been some confusion among students of Costa Rican archaeology as to the terminology and use of certain pre-Columbian artefacts of stone. Perhaps the greatest dissention has centered around the circular and the four leg metates. If one examines the publications of Hartman or Mason¹ for example, the term seat, stool, altar or metate

1. HARTMAN, 1901, 1907 ; MASON, 1945.

is often applied to the same type of object. In addition, there are stone mortars which are generally circular but sometimes rectangular and are frequently deep walled. We feel, therefore, that it is necessary to clarify our classification in this paper. We have considered all objects with a raised rim and those with a concave, no matter how slight, surface as grinding stones. We place in the same category those stones with a flat surface and no design because as a rule this type of artefact shows evidence of use.

Although this study does not refer to seats and stools as such, it is necessary to point out that they were utilized in pre-Columbian times. Not only are such objects depicted in gold, stone, and clay with figures seated on them, but also they are encountered in graves and at certain ceremonial sites throughout Costa Rican territory. There are two distinct seat forms. One is round and similar to a legless stool, while the other is rectangular, is tetrapod or has two longitudinal slabs as supports. Both styles are nearly always decorated, often with motifs resembling those seen on the grinding stones, including bands of human heads or protruding animal, bird, or reptile heads. Both are comfortable for sitting, which is not characteristic of a raised rim. The circular seats are common throughout Costa Rica, while the other type does not seem to have been used in the Nicoya area. Rectangular benches or seats were known in the Antilles before the advent of the Spaniard and are associated with the Arawak culture. Wooden prototypes of these stools are found today among all the southern and eastern Costa Rican aborigines and many of the peoples inhabiting the Caribbean littoral of Central America as far west as the Paya of Honduras.

In the historical documentation concerning the Costa Rican aborigines, there is a curious lack of data referring to ritual. Archaeology, however, leads us to suspect that a kind of altar or ceremonial table was known. It is possible even that the over-sized stone object which appears to be a metate but lacks evidence of use, and the very elaborated stone seat served such a purpose. Considering this point further, we call attention to the cult of human sacrifice. Arawak peoples killed their victims by first teasing and then finally clubbing the neck and cutting off the head. The head appears to have been the only part of importance. Mexican groups made a fetish of extracting the beating heart of the victim placing the hapless person over a boulder-shape altar.

To be sure there are those who believe that human sacrifice represents Mexican influence and was transmitted to South America by the Caribs¹. We feel that human sacrifice is a more universal trait. Flaying, the cutting out of the heart, the thigh bone, etc., can well form part of the Tlacaxipeualiztli complex, but trophy heads and the manner of killing the victim seems to us to be a complex apart. It is probable that the Arawaks were responsible for this conception and that the presence of this practice in Costa Rica denotes Arawak rather than Mexican influence. On the other hand, in territory assoc-

1. Acosta SAIGNES, 1950.

iated with Mexican peoples such as the Nicoya peninsula trophy heads are absent along with the circular offertory table or altar.

Certain elaborately carved objects which seem to represent grinding stones, but which may have been used as altars bear out the importance of the head and not the heart. The one illustrated in fig. 13 (*a* and *b*), is adorned on both



FIG. 13. — *a*: Ceremonial grinding stone adorned with human heads and two decapitated bodies.
b: The same piece, partial view. The Old Line. *Colec. Jorge Hine.*

upper ends of the grinding plate with a headless human figure. A band of heads forms the border decoration while a single head is depicted on each of the four supports. Another interesting example is of wood with an open-work pedestal support (pl. XXXVI *a*). The border is decorated by a band of heads.

This artefact came from Retes on the slopes of the volcano of Irazu in the Highland area, and is similar to the stone metate shown in pl. XXXVI *e*. It bears no sign of use from grinding and the object itself is too delicate to have been employed as a seat. In view of this and the fact that it was found in what appears to have been a ceremonial cache of wooden and stone artefacts, we suggest that here was an altar dedicated to the head cult. The numerous stone figures with a head in one hand and a battle or sacrificial ax in the other is an added indication of the importance of the human head. The custom itself is further collaborated by the legends of the actual Bribri Indians of eastern Costa Rica who recount many a tale of magical heads captured in ancient wars.

THE GRINDING STONES : DESCRIPTION.

The grinding stones can be divided into divers groups, each with certain designs peculiar to the form and or the geographical location. This gives us a broader and more easily comprehended picture of the cultural trends in pre-Columbian Costa Rica.

Legless Metates. — The legless metate is in truth a flat stone slab which as a rule is slightly concave. It is found in the region of the Old Line and is practically unknown in southern Costa Rica.

Tripod Metates. — Tripod metates occur with and without a raised border, indicating that they served two different purposes.

Tripod Metates without a raised rim. — Such metates were primarily for grinding maize and are classified according to the shape of their legs, the form of their grinding plate, and their decoration.

The grinding plates associated with conical nodes, mammiform, and short tubular supports are either flat or slightly concave, sometimes with an extended end over the single support. In Costa Rica, they do not appear to have been decorated. Such metates are not common but are found with most frequency at Las Guacas on the Nicoya Peninsula, on the Old Line, in the Highland area, and very occasionally in the south¹.

The longer tubular and triangular slab supported stones have concave grinding plates, some more pronounced than others, and are nearly always elaborately decorated, especially on the under side and the legs.

Frets or geometric or textile motifs adorn the supports and often are used to form an incised border on the two upper ends of the plate, around the reverse side, or on the outer edge (pl. XXXVII, *c*). At times, a naturalistic animal or reptile design or a conventionalization appears on the reverse side. The triangular slab legs on the whole are decorated with an open work pattern. Furthermore, these metates frequently have the head of an animal, reptile, or bird, often exaggerated in size, projecting from the end where the single

1. MASON, 1945, pl. 60 f.

support is located (pl. XXXVII, *a* and *d*), or occasionally the head forms the single support (pl. XXXVII, *e*). An interesting exception belonging to this class of grinding stone, has only two slabs as supports running longitudinally (pl. XXXVII, *b*). This type is from Nicoya.

It has been suggested that the custom of decorating the under surface came from standing the stone on one end against the house wall when not in use¹. This could well be true as it is the practice of many Meso-american peoples today. Grinding stones are placed against the house wall with the muller on the top rim. This serves not only to keep the artefact out of the way, but also is a convenient manner of drying the metate after use. It is worth while to recall, however, that certain Meso-american peoples sometimes placed the stone upside down or with the reverse side apparent for a different reason. Sahagun, one of the authorities on Mexican life in the early conquest era, makes the following observations :

« He who played ball put the metate and the comal upside-down (mouth down) on the ground, and the muller or *metlalpilli* he hung in a corner, and by doing this they said that they couldn't be beaten, but had to win. Also when rats were abundant in the house, they put the muller outside ; they said that if it were inside the rats couldn't be caught, because the muller would advise them so that they wouldn't be caught². »

We would like also to draw attention to a very significant point. Stones with a decorated under plate always show signs of use and are as a rule not found with holes or partially chipped spots which denote ceremonial killing. In the majority of the graves, these metates were placed plate down, or better said legs up. It can well be that were adorned on the under part because this offered the only ample non-functional space for decorating. They were probably put in the tomb upside-down with the idea of drying to be ready for service in the next world.

Decorated under plates are sometimes seen in the region of the Old Line, but they are commonly associated with that of Nicoya, an historical Meso-american area. The territory of the Old Line appears to have been a trading section or at least a region where various cultures came into contact with one another. Many of the grinding stones from here show evidence of ceremonial killing, while some undoubtedly seem to have been made precisely for grave purposes and do not display any signs of use.

Both the longer tubular and triangular slab supported metates are found on the Nicoya Peninsula, particularly at Las Guacas, and on the Old Line at Las Mercedes³. The tubular tripod generally without a decorated under plate is found also in the Highland region.

1. DORSINFANG-SMETS, 1956, p. 138.

2. SAHAGUN, 1954, t. I, Apendice al libro 5, cap. XXI, p. 437.

3. In the region of the Old Line, these were probably trade pieces as they are very rare.

All of these types lend themselves to the use of the elongated or cylindrical muller which generally overextends the width of the grinding plate. In addition to this, the method of grinding, from the rear forward, then back, makes three rather than four legs as a support more logical. A side-to-side movement lessens the stability of the stone.

Tripod Metates with a groove or raised edge. — Undecorated grinding stones with a trough or groove down the center, generally with one end open more than the other, and with three short legs are not common in Costa Rica. They are known, however, on the Old Line ¹ and on the Pacific coast, in the vicinity of Quepos where there is historical documentation of a small Mangué nucleus ².

Tripod metates with mamiform or tubular legs and with a raised edge, as a rule have a flat grinding plate, but sometimes, whether on purpose or accidentally cannot be said, the plate is slightly concave. The edge itself is usually decorated by a band of full-faced human heads interpreted naturally or stylized. This conventionalization often takes the form of a fringe-like or bump-like border (pl. XXXVI, c) at times extending on the reverse side (pl. XXXVI, f). The legs of these metates are never incised. Such grinding stones occur on the Old Line, the Reventazón, the Highland area, and on the Pacific near Quepos.

An interesting development of the tripod raised edge metate has a center brace or flying panel and often a buttress-like projection of the two rear supports (pl. XXXVI, b). They are found in divers sizes. The center brace or panel runs from the single support vertically down the center of the stone and ends midway between the rear supports ³. The brace or panel is adorned by figures of mythical subjects associated with pre-Columbian theology and cut in the round, e. g., the double-headed crocodile and the jaguar-alligator god, or the beak bird. The legs themselves are tubular and are not incised. The rear supports in particular, and often the forward one, have a monkey or bird figure cut in the round and stemming from or connected to them. The raised edge of the grinding plate is frequently adorned with a band of human heads either interpreted naturally or conventionalized. Such metates generally come from the Old Line, the Reventazón, and the Highland areas. Less elaborate but similar types are known in Chiriqui and Veraguas ⁴.

Tetrapod Metates. — By far the most numerous class of metate in Costa Rica is that with four legs. These nearly always have a raised border, and very few have flat edgeless grinding plates. Legs are found in a variety of forms

1. See e. g. MASON, 1945, pl. 13, fig. c.

2. Vázquez de CORONADO, 1908, p. 52.

3. For illustrations of some of these grinding stones in Costa Rica, see BALSER, 1955 : for Panamá see LOTHROP, 1950, p. 29-30. Also see DORSINFANG-SMETS, 1956, pl. IV, figs. 2-3, for a variation of the center brace in the form of a human head.

4. LOTHROP, 1950, p. 29-30.

including mammiform (pl. XXXVIII, *c*), tubular (pl. XXXVIII, *d*), animal legs, human arms (pl. XXXVIII, *e*), figures of animals, birds, and human beings (pl. XXXVII, *b-c*). For this reason, the tetrapod metates are divided according to the design or adornment of the whole stone as well as the shape of the grinding plate.

Jaguar Interpretations. — The majority of these stones represent a jaguar with four feet, a pronounced knee, a protruding head, a tail which stems from the raised edge of the grinding plate, rises in a semi-loope, and ends at the ankle of the right hind knee (pl. XXXV, *g*), or less frequently terminates as a projecting half tail or stubb. The grinding plate itself is rectangular, oval, or circular. The legs vary from short stubs to slender elongated supports, always emphasizing the knee. As a rule there is a raised edge decorated in a geometrical design but occasionally with human heads. At times, there is no edge, only a flat or slightly concave surface. The head, neck, tail and legs are usually incised with geometric motifs.

The exceptions to this general type is a brace adorned with a human head, between the two fore and two hind supports, or a twisted rope or serpent motif stems from the mouth of the projecting head to the fore legs while the double tail connects with the rear supports. Sometimes there is a brace or adornment between the hind and fore leg on both sides of a monkey or bird cut in the round or semi-round, or, instead of a jaguar head, that of a crocodile or puma projects from the traditional jaguar metate, or, instead of the tail there is an extra head (pl. XXXV *e*). Variants such as these or similar decorative changes, for example a projecting head turned slightly sideways (pl. XXXV, *f*), are the exception and may have been an interpretation of the individual artist or may represent a combination of theological subjects. These jaguar metates were made in many sizes ranging from miniature to two feet in height. They are found throughout southern Costa Rica, Talamanca, The General Valley, and the Old Line, and less in the Highland region and in Nicoya. They are common in Veraguas and Chiriqui, Panama ¹.

A particular type of jaguar grinding stone which undoubtedly was influenced by the more common kind has been found at Las Mercedes on the Old Line ². The supports of these pieces are two extended jaguar figures, each one running the length of the grinding plate as a brace. A deviation from the jaguar motif but obviously influenced by the extended brace is shown in the plate XXXV, *i*.

Atlantean Supports. — Four human figures in Atlantean style support grinding stones with oval or rectangular plates which are slightly deeper in the center than the rectangular ones (pl. XXXVIII, *b* and *c*). Monkeys with upturned tails and birds are also associated with this class. The raised border is generally decorated with a very stylized interpretation of human heads and

1. LOTHROP, 1950, p. 28.

2. MASON, 1945, pl. 26.

what might be a feather pennant at the two ends. Occasionally, however, combinations of styles are seen (pl. XXXVIII, *c* and XXXV, *k*). The oval grinding plate decorated with a band of heads and the feather pennant also occurs with plain tubular legs (pl. XXXVIII, *d*), and with a brace across the ends with a monkey figure cut in the round (pl. XXXV *h*). These grinding stones are found on the Old Line and in the Reventazón areas.

Circular Grinding Stones. — Circular grinding stones have tripod (pl. XXXVI, *b*) or tetrapod legs or a round Atlantean base (pl. XXXVI, *g*), or apedestal base, solid or open (pl. XXXVI, *e*). The first two supports mentioned and the pedestal base seem to be associated with a band of human or animal heads on the raised edge. The pedestal base is either solid or shaped somewhat like a toadstool stem or has vertical or diamond-shape cuts. A few rare pieces have a human face alternating with a complete figure as a support. The Atlantean figures are of three kinds: human, with or without masks, monkey with an uplifted tail, or a jaguar with a downward tail. The grinding plates connected with such bases are circular with a raised edge or are small bowl-shape containers. This last type is sometimes used by the actual inhabitants of Talamanca to crush cacao. It is very possible that the majority of these circular metates, in particular the more elaborate ones, were for ceremonial purposes, such as the preparation of certain drinks for a special occasion, or, as we have said before, for altars, and not for daily use.

Design Motifs on Grinding Stones. — The triangular slab leg metates are the only Costa Rican rimless grinding stones which do not range in height from miniature to four feet. Whereas other rimless metates occasionally are seen in minute size. In connection with the former, it is interesting to note that grinding stones with similar plates and supports, generally undecorated, as well as a projecting animal, serpent, or bird head, occur in northeastern Honduras¹, in the Comayagua valley, and much of highland Honduras². In the Sula Plain³, the islands in the Bay of Fonseca, El Salvador⁴, and Ecuador⁵, grinding stones with projecting heads are also known. We should not lose sight, therefore, that where this type of Costa Rican metate is concerned, the artistic motifs could well have been borrowed from a Central American or Circum-Caribbean culture complex non-Mexican in character.

The raised rim metates have long aroused the interest of the curious by the great variety of sizes as well as the diversity of design motifs. There seems little room for doubt that some of these grinding stones were for ceremonial purposes, perhaps as altars, or for the ceremonial preparation of chicha from tubers or pejivalle, or merely as tomb offerings, in particular for children. It

1. STONE, 1941, fig. 3, p. 20; fig. 34, p. 44.

2. POPENOE, 1936, fig. 4, p. 569.

3. STONE, 1948, pl. 26, fig. *c-e*.

4. LONGYEAR, 1944, pl. XII, fig. 10.

5. VERNEAU et RIVET, 1912-22, pl. IX, fig. 7-8, 10

is worth noting that in 1956, in Talamanca, *miniature* bows, arrows, and certain household effects were placed in children's burials, the objects depending on the sex of the individual.

Many of the motifs used to adorn the metates have a theological significance. The feline, monkey, crocodile, and serpent were popular subjects in pre-Columbian art and especially in South America, were held in the light of dieties ¹. Although there is no historical documentation citing these creatures as aboriginal gods in Costa Rica, there is ethnological evidence that the Talamancan peoples at least consider certain animals as clan guardians, and others as evil forces or spirits ².

Human sacrifice, which in Costa Rica developed into what might be called a cult of human head, was practiced every moon ³. Such a cycle emphasized all the more the importance of this practice and makes the frequent use of heads as a decorative motif easier to understand. Occasionally a band of animal instead of human heads is seen and may represent a mythical god-man, a particular animal associated with sacred events, or mere masks. The tribes of Talamanca recount that their greatest culture hero in one of his experiences was left as a head in a basket. During this period he seems to have changed mystically into certain animals.

Beak birds also have their religious significance. Definitely associated with Antillean mythology ⁴, they appear to have been connected with fertility rites at least on the Caribbean side of Costa Rica ⁵.

The Utilitarian Purpose of the Grinding Stones. — The metates of Costa Rica served very distinct purposes which is indicated by the style and the size. Rimless and concave grinding plates point to the crushing of maize. Raised borders and troughs lend themselves to the mashing of tubers and the peji-valle fruit. Small grinding stones with raised rims greatly outnumber the rimless variety. Both, however, may have been used for cacao, shells for the manufacture of paint, or for chile peppers. Miniature stones were in most probability grave or votive offerings, or were children's playthings. Many of the larger, and perhaps even the smaller metates were undoubtedly for ceremonial purposes only. Often the grinding surface of these stones do not show signs of use. This and the relative scarcity of stone mullers leads us to suspect that wooden crushers or manos were frequently employed.

The significance. — On the whole, the grinding stones of Costa Rica reveal that this territory was a meeting ground of two very different cultural trends, one from the north with maize as a basic diet, and the other from the south

1. LOTHROP, 1937.

2. STONE, 1952.

3. FERNANDEZ, 1886, t. V, p. 156.

4. MÁRTIR DE ANZLERÍA, 1944, dec. 1, Lib. 9, Cap. 5.

5. BALSER, 1955, p. 384-385. At Las Mercedes on the Caribbean litoral phallic symbols and a bas-relief of a naked female are cut in rock.

with the importance given to tubers and the fruit of the pejivalle palm ¹. Two cultures are further emphasized by the decorative motifs associated with them. The northern influence is manifested in the use of frets and geometric border designs. Whereas the appearance of human heads as a rim band point strongly to the south. Regardless of the cultural implications as shown in the form and design of the grinding stones, however, it cannot be overlooked that the Costa Rican metate represents one of the most artistic achievements in American archaeology.



FIG. 14. — *a-b* : Metate with a geometric design in white.

While this paper was already in press, a metate painted with a geometric design in white was excavated in Costa Rica. It belongs to the group of the « flying panel » types and no doubt it is the first of this kind (fig. 14).

1. STONE, 1956.

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a, b: Sírupo shape Mullers; *c, d*: Vertical Pestles; *e, f, g*: Jaguar type Metates;
h, i, j, k: Variations of atlantean Supports. *Colec. Museo nacional, Costa Rica.*



a : Wooden ceremonial grinder with human heads, Retes, Irazu Volcano ; *e* : Ceremonial grinding stone with human heads, Los Guayabos, Turrialba ;
c, d, f : Tripod metates with a raised edge ; *b, g* : Circular metates. *Colec. Museo nacional, Costa Rica.*



Metates with : *a, d, e* : three triangular slab legs ; *c* : tribular legs ; *b* : slab legs. Nicoya area.
a-d : *Colec. Museo nacional, Costa Rica* ; *e* : *Colec. Lic. Maximo Acosta.*



Terrapod metates with raised edge, *a, b, c, d* : Collec., Museo nacional, Costa Rica.