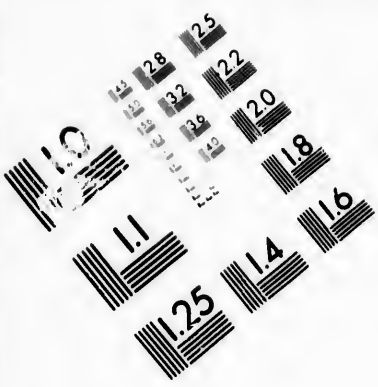

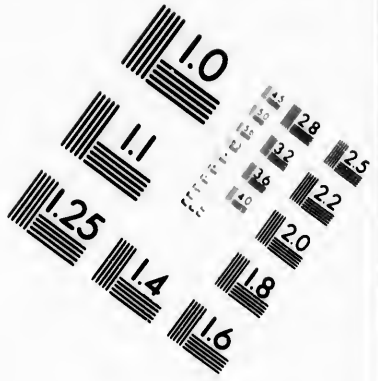

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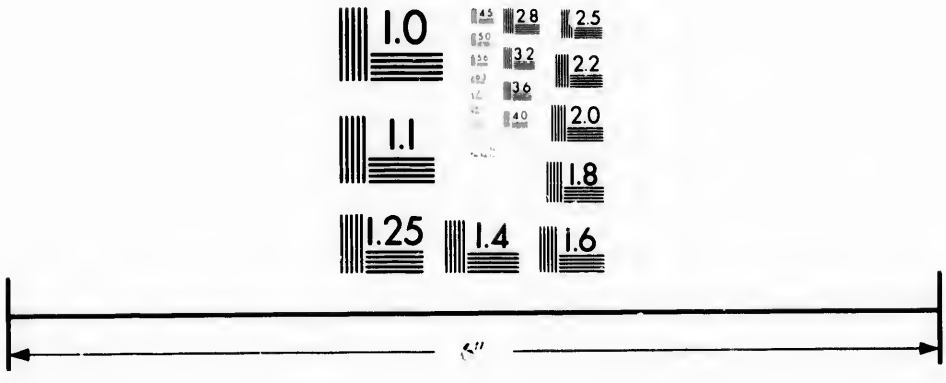

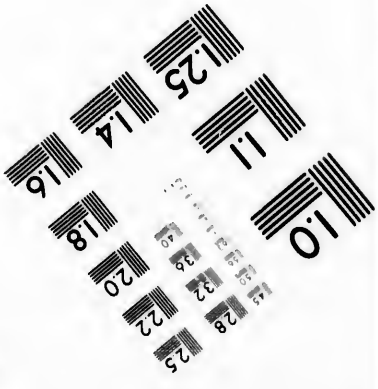

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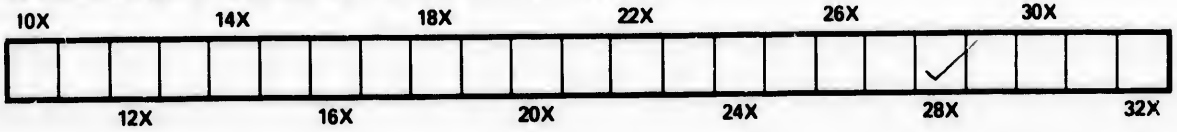

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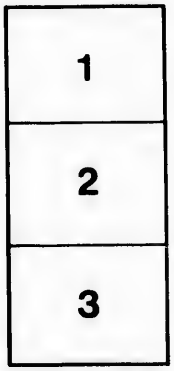

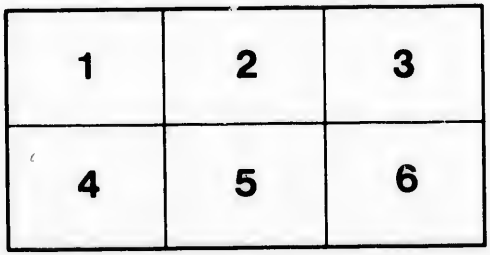

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OBSERVATIONS

ON

CUP-SHAPED AND OTHER LAPIDARIAN SCULPTURES

IN

THE OLD WORLD AND IN AMERICA

BY

CHARLES RAU

WASHINGTON
GOVERNMENT PRINTING OFFICE
1881

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OBSERVATIONS ON CUP-SHAPED AND OTHER LAPIDARIAN SCULPTURES IN THE OLD WORLD AND IN AMERICA.

BY CHARLES RAU.

INTRODUCTION.

The attention of European archæologists has been directed for several years to that very curious and widely-distributed class of antiquities, which are called *pierres à écuelles* in French, and *Schalensteine* in German, and to which the English designation "cup-stones" might with propriety be applied. In a general way, they may be defined as stones and rocks upon which cup-shaped cavities, varying in size and number, are executed by the hand of man. But as these cup-like excavations often appear, more especially in the Old World, associated with engraved figures of a different character, it will be necessary to consider them in connection with the latter.

Though the knowledge of the existence of cup-stones in Europe dates back many years, it is only of late that archæologists have commenced to view them in a broader light, and to speculate on their ethnic significance. Professor E. Desor, in particular, published not long ago a pamphlet, entitled "Les Pierres à Écuelles" (Genève, 1878),* in which he describes, with his usual clearness, their occurrence in different countries, making this distribution a basis for drawing inferences bearing on the important question of the migration of man in long-past ages.

*Reprinted in: Matériaux pour l'Histoire Primitive et Naturelle de l'Homme, 1878, p. 259, etc. Professor Desor republished this essay, enriched by additional facts, in his "Mélanges Scientifiques," Paris, Neuchâtel, et Genève, 1879.

It is certainly a matter of great interest that cup-stones, analogous to those of the Eastern Hemisphere, are found in the United States, and, as it appears, in other parts of the Western Continent. Before entering upon the task of describing them so far as my present information permits, I will give, for the sake of comparison and direct reference, a brief account of the cup-stones of the Old World, relying chiefly on Professor Desor's excellent pamphlet, yet availing myself in addition of such other writings of similar bearing as happen to be at my command. In consideration of the scantiness of my literary sources, I cannot claim for this résumé anything like completeness; but, nevertheless, I hope it will bring out the principal features of the subject.

PART I.

PRIMITIVE LAPIDARIAN SCULPTURES IN EUROPE AND ASIA

SCOTLAND, ETC.

Foremost among the works relating to the peculiar kind of sculpture under consideration stands that entitled "Archaic Sculptures of Cups, Circles, etc., upon Stones and Rocks in Scotland, England, and other Countries," by Professor J. Y. Simpson.* The author's descriptions chiefly relate to the occurrence of cupped and other engraved stones in Scotland; but also those that have been observed in England, Wales, Ireland, Brittany, Sweden, and Denmark are mentioned by way of comparison.

According to Professor Simpson, the cup-shaped cavities and other sculptured figures (presently to be described) occur in the British Islands, more especially in Scotland, as follows:—

I. On stones connected with archaic sepulture, as—

1. On stones of megalithic circles,
2. On stones of megalithic avenues,
3. On stones of dolmens,
4. On chambered tumuli,
5. On stone cists and covers of urns,
6. On standing stones or monoliths.

* Published in: Proceedings of the Society of Antiquaries of Scotland, Eighty-fifth Session (1864–65); Edinburgh, 1867. The copy at my disposal (from the Library of Congress) has no special title, and I find that the work is quoted under different titles. I select that given by Professor Desor in his essay on cup-stones.

It is a remarkable fact that Sir James Y. Simpson, the distinguished and much-occupied Edinburgh physician, who first employed anæsthetics in obstetric practice, found leisure to devote himself to thorough archæological investigations, and to produce a work of high merit.

II. On stones connected with archaic habitations, as—

7. In weems, or underground houses,
8. In fortified buildings,
9. In and near ancient towns and camps,
10. On the surface of isolated rocks (in places probably once inhabited).

III. On isolated stones.

Professor Simpson reduces the forms of the sculptures in question to seven elementary types, here reproduced and comprised under Fig. 1, in which each type is distinctly indicated. I also briefly present such extracts from the author's accompanying explanations as will serve to afford additional information on the subject.

First type.— *Single cups.*—They are the simplest type of these ancient stone-cuttings. Their diameter varies from one inch to three inches and more, while they are often only half an inch deep, but rarely deeper than an inch or an inch and a half. They commonly appear in different sizes on the same stone or rock, and although they sometimes form the only sculptures on a surface, they are more frequently associated with figures of a different character. He observes that they are in general scattered without order over the surface, but that occasionally four or five or more of them are placed in more or less regular groups, exhibiting a constellation-like arrangement.

Second type.—*Cups surrounded by a single ring.*—The incised rings are usually much shallower than the cups, and mostly surround cups of comparatively large size. The ring is either complete or broken, and in the latter case it is often traversed by a radial groove which runs from the central cup through and even beyond the ring.

Third type.—*Cups surrounded by a series of concentric complete rings.*—"In this complete annular form," says Professor Simpson, "the central cup is generally more deeply cut than the surrounding rings, but not always." The number of rings varies from two to seven, or even more.

Fourth type.—*Cups surrounded by a series of concentric but incomplete rings, having a straight radial groove.*—This type, Professor Simpson thinks, constitutes, perhaps, the most common form of the circular carvings. The

rings generally touch the radial line at both extremities, but sometimes they terminate on each side of it without touching it. The radial groove occasionally extends considerably beyond the outer circle, and in most cases it runs in a more or less downward direction on the stone or rock. "Sometimes it runs on and unites into a common line with other ducts or grooves coming from other circles, till thus several series of concentric rings are conjoined into a larger or smaller cluster united together by the extension of their radial branch-like grooves." This type usually exhibits from three to six rings, the outermost having a diameter of from ten to sixteen inches. But the author measured one specimen at Auchnabreach, Argyleshire, Scotland, three feet in diameter and composed of eight circles.

FIFTH TYPE.—*Cups surrounded by concentric rings and flexed lines.*—"The number of inclosing or concentric rings is generally fewer in this type than in the two last preceding types, and seldom exceeds two or three in number."

SIXTH TYPE.—*Concentric rings without a central cup.*—In a comparatively limited number of cases the concentric rings of the types already described appear without a central cup or depression, which is, however, most frequently wanting in the complete concentric circles of the third type.

SEVENTH TYPE.—*Concentric circular lines of the form of a spiral or volute.*—The central beginning of the spiral line is usually, but not always, marked by a cup-like excavation. "The volute or spiral is, perhaps, the rarest of the forms of circular ring-cuttings in Great Britain; but this type seems common on the incised stones of Ireland and Brittany."

It often occurs that two, three, or more of these various types are found on the same stone or rock, a fact proving, to use Professor Simpson's language, "that they are intimately allied to each other, belong to the same archaic school of art, and have a community of character and origin."

In Plate II of his work Professor Simpson represents what he calls "the chief deviations from the principal types." I reproduce here this plate as Fig. 2 without further comment, drawing only attention to the first four designs, which represent cups connected by grooves. This is a noticeable and frequently occurring feature, as will be seen hereafter. In order to show the co-existence of different types on the same stone surface, and the manner

in which they are grouped, I give in Fig. 3 (copied from Plate XXIII of Simpson's work) views of sculptured rock-surfaces at Auchnabreach, Argyleshire, Scotland. Simple cups, cups surrounded by one ring or by concentric rings with radial grooves, and spirals, appear here promiscuously mingled. Fig. 4, taken from Simpson's work (Plate XVII, 3), exhibits isolated as well as connected cups, a cup surrounded by a ring, and concentric rings with radial grooves, on a standing stone (menhir) belonging to a group of seven at Ballymenach, in the parish of Kilmichael-Glassary, in Argyleshire, Scotland.

In the many examples of rock-sculpture mentioned and illustrated by designs by Professor Simpson, groups of simple cups appear not very frequently as the only markings on a stone-surface; in most cases, as exemplified by Figures 3 and 4, they are accompanied with cups surrounded by rings or associated with other figures of a more or less complex character. But in view of the occurrence of simple cups on stones and rocks in North America, I will, for the present, direct my attention to corresponding sculptures in the Old World, and briefly enumerate the stones noticed by the Scottish savant on which the cup-like cavities appear unmixed with other figures, excepting the before-mentioned grooves by which they are now and then connected. These simple carvings, it will be seen, mostly occur on stones of megalithic monuments.

1.—Prop-stone of a dolmen at Lancresse, in the Island of Guernsey. It shows eleven cups of from three to four inches diameter, arranged in a row close to one of the edges of the stone and following its curvature (Simpson, Plate VIII, 3).

2.—Cap-stone of a dolmen in the vicinity of the village of Ratho, in Edinburghshire, Scotland. On its upper surface is sculptured a row of twenty cups, which runs in a straight median line from one end of the stone to the other. In addition, there is a cup placed on either side of the central row. The largest cups measure about three inches in diameter, and are half an inch deep. The cap-stone is a block of secondary basalt, or whinstone, about twelve feet long, ten in breadth, and two in thickness (Simpson, Plate IX, 1).

3.—Cap-stone of a dolmen near the village of Clynnog Fawr, in Caer-

narvonshire, Wales. Its upper surface is covered with a large number of cups running in oblique, but almost parallel, lines. Two long grooves, forming an acute angle, connect a number of the cups (Simpson, Plate IX, 2). This dolmen is represented as Fig. 3 on Plate III of Desor's "Pierres à Écuelles," but erroneously marked *Dolmen de Ratho.* I reproduce Professor Simpson's view of the dolmen as Fig. 5.

4.—Large stone which formerly occupied the centre of a still complete stone circle at Monerieff, a few miles south of Perth, Scotland.* It has carved upon its surface about seventeen irregularly-distributed cups of different sizes (Simpson, Plate IV, 2).

5.—Block of a small circle surrounding a kistvaen, or stone cist, at Oatlands, in the Isle of Man. The design shows in one corner of the block eighteen cup-markings, which form five irregular rows (Simpson, Plate VIII, 1). Fig. 6 of this publication.

6.—One of the roofing-stones in the chamber of the large elongated tumulus, Mont Saint-Michel, at Carnac, Brittany. It shows on the inner side six apparently large cups, placed without special order (Simpson, Plate XI, 6).

7.—Two stones in chambered tumuli at Clava, in Inverness-shire, Scotland. Upon the surface of one of them are seen twelve cups, apparently of equal size; the other stone shows five of them, which are placed in the shape of an irregular cross (Simpson, Plate X, 3 and 4). Fig. 7 represents the first-mentioned of these stones.

8.—Stone probably belonging to a chamber within a stone circle on Cloughton Moor, near Scarborough, England. One side shows four cups, the other three (Simpson, Plate XI, 4).

9.—Monolith standing near Dunbar, East-Lothian, Scotland. Upon one of its sides appear five cups, so placed that they might mark the angles of an irregular pentagon (Simpson, Plate IV, 3). Reproduced as Fig. 8.

10.—Conical standing stone in the bourg or village of the Forest, in the Island of Guernsey. There are upon it three apparently large cups, forming a row in the longitudinal direction of the stone, but placed far apart (Simpson, Plate VIII, 2).

* The size of the objects figured in Simpson's work is rarely indicated.

11.—Standing stone, nearly ten feet high, in the neighborhood of Edinburgh, where it is known as the "Caiy Stone." Between two and three feet from the ground is sculptured on one of its sides a horizontal row of six cups, placed closely together (Simpson, Plate XVII, 1). A view of this stone, differing from Simpson's representation, is given by Professor Daniel Wilson.*

12.—Isolated stone near Balvraid, in Inverness-shire, Scotland. It measures above six feet in length, and is covered with many cups, five pairs of which are joined by straight or curved grooves (Simpson, Plate XIV, 2). Reproduced as Fig. 9.

13.—Stone found among the ruins of an ancient fortification at Laws, in Forfarshire, Scotland. The stone shows sixteen cups, which form an irregular oval group (Simpson, Plate XII, 5). Fig. 10 in this publication.

14.—Rock lying in a wood behind the church-yard of Kirk Braddan, in the Isle of Man. On one side eight cups are distributed without order; on the other an equal number is recognizable, and here two pairs are conjoined by straight grooves (Simpson, Plate XXVI, 4).

15.—The Baal or Balder Stone, near Falköping, Sweden (Simpson, Plate XXXI, 1). It will be described and figured in my notice of Swedish cup-stones.

Professor Simpson represents in all about a hundred stones upon which figures are sculptured, and my enumeration shows that among these only sixteen bear exclusively cup-shaped cavities, which are in some instances conjoined by grooves. I have to mention, however, that he also alludes in his work to a number of simple cup-cuttings which he does not figure. I presented the preceding summary simply for the purpose of showing that cups unaccompanied by other figures are not very frequently met with on stones in Scotland, England, and the smaller islands belonging to Great Britain.

* Wilson: The Archæology and Prehistoric Annals of Scotland; Edinburgh, 1851, p. 96.

ENGLAND.

An important publication relating to English rock-sculpture of the peculiar kind here examined is that by Mr. George Tate, entitled "The Ancient British Sculptured Rocks of Northumberland and the Eastern Borders" (Alnwick, 1865).* While Professor Simpson chiefly treats of Scottish sculptures, yet draws also those of other countries within the sphere of his observations, Mr. Tate's work, as its title indicates, is mainly devoted to a narrower district in the North of England.

The rock-sculptures of Northumberland described by Mr. Tate are almost absolutely analogous to those hitherto considered, and appear to be of contemporaneous origin with them. The well-developed spiral line, however, does not occur among the English sculptures figured by Mr. Tate. For the rest, we behold here the same rings with central cups and radial grooves, etc., which form most curious and complicated groups, and are frequently accompanied by simple cups. Yet, in none of the illustrations published by the author do they constitute the sole sculptures of a rock-surface. The general results of Mr. Tate's investigations in Northumberland are summed up in the following résumé on page 27 of his treatise:—

"From this survey we find that fifty-three sculptured stones have been observed in Northumberland, and that there are inscribed on them about three hundred and fifty figures. All of them are more or less connected with ancient British remains. Four of them formed the covers of cists; four were probably covers of cists; two are within a few yards of barrows, beneath which are similar small sepulchral chambers; five of them are within ancient British camps; eight of them are not more distant from such camps than a hundred yards, most of the others are less distant than half a mile, and none further away than a mile. Their relation, however, to the camps, forts, and hut-circles—the dwellings of the ancient British people—is more apparent than to their sepulchres."

To this I will add that the sculptures observed by Mr. Tate within or

* The illustrated work on incised markings on stone in Northumberland, etc., published in 1869 by direction of the late Duke of Northumberland, was not within my reach.

in the neighborhood of camps and fortifications are mostly executed on sandstone rock *in situ*.

I shall have occasion to refer again to Mr. Tate's interesting monograph.

Of particular interest is a class of small English cup-stones, which the Rev. William Greenwell found in no inconsiderable number during his extensive exploration of English barrows. He refers to them repeatedly, but with special minuteness in his account of a barrow in the parish of Kilburn, in Yorkshire. This barrow, which measured forty-two feet in diameter, was no longer in its original state, having been much disturbed in recent times for the sake of the stones which formed it. No traces of any interment remained, a fact ascribed by Mr. Greenwell to the total disappearance of the bones by decay. According to his opinion, a burned body had never been interred in this mound, for in that case some fragments of calcined bones would have come to light. On the east side of the barrow was found a stone with two grooves running crosswise, and probably produced by the sharpening of some stone implement.

"A remarkable feature in this barrow," Mr. Greenwell continues, "was the very large number of stones (more than twenty) of various sizes, from five inches to eighteen inches square, and of different and irregular shapes, on which pit or cup-markings had been formed. These hollows were both circular and oval, and differed in size from one inch in diameter to three inches, and their depth was about two inches. The oval pits, as a rule, were not very regular in outline. Some of the stones had only one pit-marking upon them, others had as many as six; on some they were quite separate from each other, on others they were connected by a shallow but wide groove. They were all formed in a soft and very light oölitic sandstone, and the pits were in most cases as fresh as if only made yesterday, showing most distinctly the marks of the tool, which appeared to have been a sharp-pointed instrument, and very probably of flint. It is not easy to attribute any special purpose to these stones or to their markings. The condition of the pits, showing no signs of wear (for had anything been ground or rubbed in them, the marks of the tooling upon so soft a stone would have been speedily effaced), seems to preclude the idea that they were intended for any domestic or manufacturing process. On the whole,

I prefer to regard them as symbolic representations, though as to what their significancy may be, I confess myself unable to offer anything more than conjecture." He then draws attention to their resemblance "to the similarly-shaped pits which, found sometimes alone and sometimes in connection with incomplete circles, have been discovered so extensively in Northumberland, Yorkshire, Argyleshire, Kerry, and other parts of the United Kingdom, occurring in many cases upon rocks, but very frequently upon detached stones of greater or less size"* In general, Mr. Greenwell met with such cup-stones in barrows containing burned human remains. He lays particular stress on the freshness of their cavities, and the latter circumstance—if, indeed, these cup-stones were designed for any practical purpose—renders the solution of the question of their use extremely difficult, or perhaps impossible.

IRELAND.

Sculptures analogous to those hitherto considered have been discovered in Ireland, more especially, as it appears, in the southern part of the kingdom. A large stone slab, found in the County of Kerry, and figured by Professor Simpson on Plate XXVII, shows on its surface single cups as well as others surrounded by circles, the latter being in part traversed and connected by grooves. Mr. Tate likewise mentions similar Irish sculptures, and represents on Plate XI (Fig. 8) a stone found in the above-named county underneath several feet of peat. In lieu of a description of this stone, I present in Fig. 11 a copy of Mr. Tate's design of the same.

These simpler sculptures are often associated in Ireland with other devices, such as stars, rosettes, crosses, triangles, zigzags, etc., which, as far as I know, have not been observed in Great Britain. Such an assemblage of figures is exhibited on the side-surface of a block fashioned as a rude seat, and belonging to the stone circle which surrounds a large cairn at Lough Crew, near Oldcastle, Leinster. This block, of more than ten

* Greenwell and Rolleston: British Barrows, etc.; Oxford, 1877, p. 341, etc.

tons weight, and known as "the Hag's Chair," has been described and figured by Mr. James Fergusson.* Many of the stones forming the chamber of the tumulus at Lough Crew are likewise ornamented with various devices, as seen in the representations of two of them given by Mr. Fergusson.† I present as Fig. 12 a copy of one of his designs. The sculpture on this stone is even more characteristic than that on the Hag's Chair.

Of a still more artistic character are the sculptures on the stones in the celebrated cairns of New Grange and Dowth, in the neighborhood of Drogheda. Here are seen graceful groups of double spirals, scrolls, mathematical devices, and even designs resembling palm or fern-like plants—in general forms evidently belonging to a later period than the cup and ring-cuttings previously treated. Mr. Fergusson takes occasion to draw attention to the progressive development shown in Irish sculpture.‡

FRANCE.

The dolmen-stones of Brittany likewise exhibit sculptures far superior in design to those of Scotland and England, and doubtless belonging to a more advanced stage of primitive art. Though we behold here curious concentric circles and spiral lines, which bear a distant resemblance to the sculptures of Great Britain, we also meet with real ornaments, snake-like designs, and representations of hafted and unhafted celts. Some of the sculptures of Brittany are raised and not incised. A very characteristic outline of a celt in a plumed handle is seen on the roof of a dolmen called "the Merchant's Table," near Locmariaker. It is here reproduced as Fig. 13.

The tumulus on the Island of Gavr' Inis, in the Bay of Morbihan, a

* Fergusson: Rude Stone Monuments in all Countries; London, 1872, p. 215.

† Ibid., p. 216.

‡ Ibid., p. 222. In addition, however, he says on the same page: "It would be an extremely dangerous line of argument to apply this law of progressive development to all countries. In India, especially, it is very frequently reversed. The rudest art is often much more modern than the most refined, but in Ireland this apparently never was the case. From the earliest scratchings on pillar-stones down to the English conquest her art seems to have been unfalteringly progressive."

Illustrations of the sculptures of New Grange and Dowth are given by Simpson and Fergusson in their works here quoted.

few miles east of Locmariaker, is of great interest to archæologists, on account of the sculptured stones forming its chamber, upon which groups of intricate concentric and spiral lines, and outlines of objects generally considered as celts are traced. These stones have repeatedly been represented. Fig. 14 is a copy of one of Mr. Fergusson's illustrations.

Yet, the fact that cup-cuttings are not wanting in this part of France is exemplified by the roofing-stone of Mont Saint-Michel, at Carnac, which has been alluded to on a preceding page. The Rev. W. C. Lukis, moreover, communicated to Mr. E. T. Stevens that he had found in twelve cases cup-cuttings on dolmen-stones of Brittany (mostly upon cap-stones), and in one case on a slab near the entrance of a galleried chamber. He further observed them twice on menhirs, once on a rock *in situ*, and again on a loose stone block, all in the same region.* It is not mentioned whether these cups occur alone or, as is more probable, accompanied by other figures.

I am not aware that elaborate sculptures similar to those of Brittany have been discovered in the southern parts of France. Simple cup-cuttings, on the other hand, are not wanting there, and more of them doubtless will become known in the course of further investigation. Professor Desor draws in his pamphlet attention to the report of Messrs. Piette and Sacaze, who lately examined in the neighborhood of Luchon, in the Pyrenees, a large number of megalithic monuments, one of which, called *Le Cailhaou des Pourics* (the chicken-stone), has sculptured on its surface sixty-two cups, from five to six centimeters in diameter and from two to three centimeters in depth. Four cups in the middle of the stone are conjoined by grooves in such a manner that they form a cross.† Elsewhere in his pamphlet (page 21) Professor Desor observes that thus far cup-stones have not been noticed in the East of France, notwithstanding the abundance of erratic blocks in that region. Shortly afterward, however, M. A. Falsan described two cup-stones which he had discovered in the valley of the Rhône. One of them, in the neighborhood of Belley, in the Department of the Ain, deserves particular mention. It is a sandstone boulder of oval shape, a

* Stevens: Flint Chips; London, 1870, p. 490.

† Piette et Sacaze: Les Monuments de la Montagne d'Espiaup (Pyrénées); Matériaux, 1878, p. 246.

meter and a half long and sixty centimeters in thickness, having sculptured on its upper surface about sixty round cups, distributed in irregular groups, and in some instances conjoined by grooves, which, to judge from the very good accompanying illustration, here reproduced as Fig. 15, are much shallower than the cavities. The largest cup measures eight centimeters in diameter; the others are smaller, and their depth varies between a few millimeters and three centimeters. The people of the neighborhood call this block *La Boule de Gargantua*, attaching to it the legend that it was hurled from a distance to its present place by the giant of that name, the impressions of his fingers being the very cups seen on its surface.

M. Falsan alludes to the existence of other yet unexamined cup-stones in that region, and a further search probably will amply reward the investigator.*

Quite recently M. Louis de Malafosse has pointed out the occurrence of cup-cuttings on rocks in the Lozère Department, mentioning in particular a schistose rock *in situ* near the rivulet Rioulong, not far from a place called Chirac. A cornice-like projection of this rock shows about forty cups, apparently grouped without order, and in some instances connected by grooves, as indicated in Fig. 16, which is a copy of M. de Malafosse's illustration. The grooves are shallower than the cups, the latter being from three to four centimeters in diameter and from three and a half to four centimeters deep. The cup marked A is larger than the others. These cavities are conical in shape and some terminate in a flat bottom. M. de Malafosse thinks that, though the rock is very hard, the cavities might have been produced by the rotation of a flint implement.†

Additional discoveries of cup-stones in different parts of France may be confidently expected.

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*Falsan: De la Présence de quelques Pierres à Écuelles dans la Région Moyenne du Bassin du Rhône; Matériaux, 1878, p. 280.

†De Malafosse: Les Pierres à Bassins et les Rochers à Écuelles dans la Lozère; Matériaux, 1879, p. 97.

SWITZERLAND.

In this country erratic blocks bearing cup-cuttings are not rare. According to Professor Desor, about fifty were known some years ago, twenty of them having been found in the French cantons of the republic; and owing to the closer search on the part of geologists and archæologists their number steadily increases by new discoveries.

He figures on Plate I of his pamphlet the cup-stone observed as early as 1849 by Professor F. Troyon at the foot of the Jura, near Mont-la-Ville, in the Canton of Vaud, and then and afterward described by him.* This block consists of chlorite slate, is ten feet and a half long, and from four to five feet in breadth. Its surface exhibits twenty-seven irregularly-distributed cups, of which the largest measures nine inches in diameter and four inches and a half in depth; the others are considerably smaller. Some of the cups forming the central group are connected by undulating furrows of insignificant depth, and a short straight groove conjoins two cups near the upper end of the rock. I give Professor Desor's illustration as Fig. 17.

Dr. Ferdinand Keller has described the cup-stones of Switzerland in a memoir which is not within my reach.† In J. E. Lee's translation of Dr. Keller's reports on the lake-dwellings of Switzerland I find the description and representation of a block in the *Luterholz* near Bienne, in the Canton of Berne, which shows twenty-one cups, arranged without apparent order, and partly connected by grooves. The block weighs about twenty hundred-weight, and consists of gneiss‡ Professor Desor refers (on page 14) to the discovery of similar blocks in the neighborhood of Bienne, without describing them in detail; he also alludes to several cup-stones in the environs of Zürich.

Cup-cuttings appear to occur in Switzerland mostly on boulders of granite and gneiss, and, as a rule, unassociated with other sculptured figures.

* Troyon: Habitations Lacustres des Temps Anciens et Modernes; Lausanne, 1860, p. 158, note.

† Die Zeichen-oder Schalensteine der Schweiz, in: "Mittheilungen der Antiquarischen Gesellschaft in Zürich," Bd. XVII.

‡ Keller: The Lake-Dwellings of Switzerland and other Parts of Europe; translated by J. E. Lee; London, 1878, Vol. I., p 460; Vol. II, Plate XXXIX, 14. In the description eighteen cups are mentioned; the figure shows twenty-one.

Yet, according to Professor Desor (page 12), a rock exhibiting a number of simple cups and one cup surrounded by two circles was formerly seen near the village of Mels, in the Canton of Saint Gall. Unfortunately, this rock has been destroyed. This isolated case, however, is in so far of interest, as it exemplifies the transition from the simpler and earlier cup-type to a somewhat more developed form.

Dr. Keller states that smaller cupped stones have been found in the Lake of Neuchâtel, at Corcelettes, at Font, above Estavayer, and at the lake-dwelling of Cortaillod, just opposite the shore, almost always in places which are dry at low water.

"The implements met with in the neighborhood of these hollow stones," he continues, "belong in general to the bronze age. The cups vary from three to ten inches in diameter; they are seldom more than an inch in depth. They are made on the surface of the stone without any kind of order, except that when they are three in number, they form, as it were, the points of an equilateral triangle."* Though he alludes on the same page to a relation between these stones and the large cup-bearing boulders of Switzerland, he seems to have afterward changed his view, and to regard the former as utensils designed for some domestic purpose, perhaps for grinding cereals or other substances (Desor, page 8). This was Professor Troyon's original opinion.†

GERMANY AND AUSTRIA.

As far as I could learn, no cup-stones have yet been discovered in Southern Germany, but it hardly admits of any doubt that they will be found in that district, when diligent search is made for them. Their occurrence in North Germany, however, is well established. Mr. C. Jessen describes in the "Zeitschrift für Ethnologie" (Vol. IV, 1872, p. 223) a real cup-stone discovered by him not far from Eckernförde (Schleswig), and to

* Keller: Lake-Dwellings, etc., Vol. I, p. 460. Figs. 12 and 13, on Plate XXXIX of the same work represent two of these cupped stones, one with three, the other with four cavities; but their size is not indicated, either on the plate or in the text.

† "D'autres pierres portent de petits bassins, de 2 à 3 pouces de diamètre sur 5 à 8 lignes de profondeur, destinés sans doute à broyer des grains, mais dont l'usage a pu être fort varié."—*Troyon: Habitations Lacustres, etc.*, p. 158.

which he attributes, doubtless erroneously, the character of a stone upon which stone axes were ground. This block, which is figured in the "Zeitschrift" (Plate XIV), consists of granite, is five feet long, half as wide, and exhibits upon its surface twenty-four cups of unequal size. Miss J. Mestorf, the accomplished custodian of the Archæological Museum at Kiel (Holstein), mentions, as the result of her careful examination of various records, that sixteen cup-stones have been found in the duchies of Schleswig and Holstein, of which five only are still known to exist, the others being either destroyed or no longer traceable. She refers to a specimen taken out of a garden-wall in Schleswig, and preserved in the Museum of Kiel, upon which four of the cups are joined by grooves, thus presenting the shape of a cross. Another specimen in the same museum, which consists of white marble and is only 7.5 centimeters in size, shows on both sides a number of diminutive cups, resembling those seen on large stones and rocks. It was found in a burial-urn from a cemetery pertaining to the early age of iron, near Altona (Holstein), and is considered as an amulet. There is further mentioned a cupped stone near Albersdorf (Holstein), which formed one of the three lid-stones of a cist covered by a mound of earth, and containing only a fractured flint lance-head. On the upper side of the stone, which has not been removed, are sculptured more than a hundred cups and a figure like a wheel with four spokes—a design not uncommon in Denmark and the Scandinavian countries, as will be seen in the sequel. Another stone, found in a tumulus at Risby (Schleswig), shows a curious system of cups and connecting grooves, both rather shallow, to judge from a representation by Dr. Henry Petersen.* This relic is now in the Museum of Copenhagen. A stone found in a tumulus near Arrild (Schleswig) had cups sculptured on one side, and on the other the word *Fatur*, in runic characters. This remarkable piece of lapidarian sculpture was put out of sight by its last owner, who used it in building the foundation of a barn. Five or six of the cup-stones traced by Miss Mestorf occurred in or in connection with burial-places.†

* In: Mémoires de la Société Royale des Antiquaires du Nord, 1877, p. 335.

† J. Mestorf: Ueber Schalensteine. I., in: Correspondenz-Blatt der Deutschen Anthropologischen Gesellschaft, 1879, S. 3;—Worsaae: Die Vorgeschichte des Nordens nach gleichzeitigen Denkmälern; in's Deutsche übertragen von J. Mestorf; Hamburg, 1878, S. 41.

Since the above was written, I have been favored with a letter from Miss Mestorf, dated April 3,

According to Mr. Friedel, cup-cuttings occur on megalithic monuments in the Island of Rügen, situated in the Baltic Sea, opposite Stralsund, Prussia, and on rocks in different parts of Silesia. He refers to a rock called the *Bischofs-Stein* (Bishop's Stone), at or near Niemegk, in the Province of Brandenburg, Prussia, upon which are sculptured, on one side a Maltese cross and the date 1590, and on the other a chalice, a cross, and several cups, while its top shows a trough-shaped cavity.* The communications of that gentleman relative to the cup-like cavities executed on the walls of many churches in Germany and Sweden, and thus bearing witness to the practice of cup-cutting within comparatively recent times, are of great interest.† But as I shall revert to this subject in another section of this essay, I refrain from enlarging on it in this place.

Though of late years much has been said in Germany concerning cupped stones, it appears that two of them, long ago briefly described and figured by Samuel Christoph Wagener, have recently escaped the notice of German archæologists. One of them is thus mentioned by Wagener among the antiquities in the neighborhood of Ober-Farrenstädt, near Querfurt, in Prussian Saxony: "There was also found in this district the memorial stone, Fig. 895, with many drill-holes" (*Auch fand sich in hiesiger Gegend der Denkstein, Fig.* 895, *mit vielen Bohrlöchern*) ‡ The illustration, a very rude outline sketch, of which Fig. 18 is a fac-simile, evidently represents a cup-stone. The size of the stone is not indicated. The other cupped stone, represented in an equally rude manner by Fig. 1367 in Wagener's work, is a granite block near Zadel, in the neighborhood of Meissen, Saxony. The people of the neighborhood call it *Riesenstein* or Giant Stone. It is six feet high and seven feet broad, and marked with many cup-excavations, of which the upper ones, placed in rows, are oval, three inches long, from one inch to an inch and a half wide, and from a fourth of an inch to half an inch in depth.

1880, in which she enumerates the cup-stones which have become known in the duchies of Schleswig and Holstein up to the year 1880. There are eighteen in all, of which the last in the list has not yet been described. It was discovered at or near Bunsoh (Holstein), is conical in shape, sixteen centimeters high, and shows twenty-seven cups, three of which are surrounded by single rings.

* As early as 1751 mention is made of cupped boulders in the Province of Brandenburg in a historical work on that province by J. C. Bekmann. The author calls them *Näpfchensteine*.

† Verhandlungen der Berliner Anthropologischen Gesellschaft; Sitzung vom 16. Februar 1878, S. 23.

‡ Wagener: Handbuch der vorzüglichsten in Deutschland entdeckten Alterthümer aus heidnischer Zeit; Weimar, 1842, S. 479.

The lower cups are circular, and vary from two to three inches and a half in diameter.* Fig. 19 is a copy of Wagener's sketch of this rock.

I was totally in the dark as to the occurrence of cup-stones in Austria until my esteemed correspondent, Dr. M. Much, of Vienna, favored me with a full reply to a letter of inquiry addressed to him. Though cup-stones have thus far been mentioned only in a transient manner in the publications of the Anthropological Society of Vienna, they are, nevertheless, by no means uncommon in Austria, more especially in Bohemia and in that part of the empire where the three provinces, Bohemia, Moravia, and Lower Austria border upon each other. In this district the soil is often covered with rounded granite blocks, some of which are cupped like the boulders of Switzerland and Northern Europe. The sketches of Bohemian cup-stones sent to me by Dr. Much show rather large cups, either isolated or in groups, and frequently connected by grooves. "These are only hasty sketches," he says, "and, moreover, not based upon personal observation, but communicated to me by others. Absolute correctness cannot be claimed for them. At any rate, however, they prove the existence of cup-stones in Austria; and I am of opinion that they are not at all rare in Bohemia, in the northwestern part of Austria, and in Northern Upper Austria. Those which I have seen on the Vitusberg and Stolzenberg, both in the neighborhood of Eggenburg, occurred in a region characterized by prehistoric settlements and places of sacrifice; yet I am not prepared to state whether these are to be referred to the age of polished stone or to a later period, though the latter appears to me more probable."

DENMARK.

My statements relative to primitive lapidarian sculptures in Denmark, called *Helleristninger* in that country, are almost exclusively taken from an article by Dr. Henry Petersen, published in the "Mémoires" of the Royal Society of Northern Antiquaries.†

* Wagener: Handbuch, etc.; S. 755.

† Petersen: Notice sur les Pierres Sculptées du Danemark, in: Mémoires de la Société Royale des Antiquaires du Nord; Copenhague, 1877, p. 330–342.

According to his account, cup-cuttings are found in most of the Danish islands (Seeland, Laaland, Fünen, Langeland, Bornholm) and in Jütland. "The stones upon which these cup-cuttings occur," he says, "are generally large erratic blocks lying in the midst of fields; but there is a special interest attached to them when they are sculptured on stones that have served in the construction of sepulchres of the age of stone, namely, covered galleries, oblong or round dolmens, or, as is often the case, on the surface of slabs forming the coverings of funeral chambers. Their presence on these slabs is not in itself a decisive proof that they were made in the stone age, for the slabs were rarely covered with earth, and the figures may have been engraved upon them long afterward, as upon any stone found in the fields. But the motive which led to the selection of stones of dolmens probably is to be sought in the peculiar protection these monuments afforded, to which an almost sacred character was attributed. A more conclusive proof, however, that these cup-cuttings reach as far back as the stone age is furnished in the fact of their presence upon the inner walls of sepulchral chambers; for it is evident that they could not have been engraved on these stones after their application in the construction of the chambers" (page 332). He cites several examples in support of his view; but he also states that cup-stones have been found in Denmark in connection with burials of the bronze age, mentioning in particular a tumulus at Borreby, in the Southwest of Seeland, which inclosed a stone of considerable size, exhibiting on its upper convex surface from seventy-five to eighty cup-cuttings. There have been found in Denmark several stones bearing runic inscriptions, dating from the ninth to the eleventh century, on which cups, in all probability of earlier origin, are sculptured. In a few instances the runic lines even traverse the cup-shaped cavities. Fig. 20, copied from Dr. Petersen's article, represents the cupped backside of a runic stone at Ravnkilde, in Jütland.

Some artificial foot-tracks, set in pairs, have been observed in Denmark: in one instance on a slab belonging to the covering of a gallery in Seeland; in another on one of the blocks surrounding an oblong tumulus in the Island of Laaland. The first-named sculptures, figured by the author on page 337, are not unlike the well-known foot-sculptures so often seen on rocks

in the United States.* Danish popular legends refer to these tracks as to real impressions of human feet. Figures resembling wheels with four spokes have repeatedly been found in Denmark on isolated blocks and on stones of megalithic structures, and in one case in connection with cup-cuttings on a rock in the Island of Bornholm. Dr. Petersen's statements render it probable, if not certain, that these wheel-shaped sculptures pertain to the stone age as well as to that of bronze (page 337).

Sometimes they appear associated with rude designs of ships, the crew of which is indicated by upright straight lines. A group of this kind is seen on the cap-stone of a funeral chamber near Herrestrup, in the Northwest of Seeland. According to Professor Simpson (who quotes from Holmberg), the chamber was entirely concealed within an earthen mound until discovered by treasure-diggers, and hence there is a strong probability that the sculptures are coeval with the chamber. The latter contained some urns, with tools and pieces of flint. The sculptured group consists of three wheel-shaped figures and three very rudely executed manned ships, together with some imperfect linear markings, perhaps not of artificial origin. The figures are so slightly carved that they become very distinct only in a good light.† I give in Fig. 21 a representation of this structure, copied from Fergusson's "Rude Stone Monuments" (Fig. 106 on page 303). In 1875, Dr. Petersen states (page 338), two blocks with similar figures (a wheel, manned vessels, and human figures of the most primitive character) were discovered in the neighborhood of the denuded chamber. The latter has been thought by some to have been erected during the stone age; but Worsaae‡ as well as Petersen incline to the opinion that Danish sculptures among which figures of ships occur, generally belong to the age of bronze. The last-named gentleman takes occasion to draw special attention to analogous designs of ships and other figures engraved on Danish bronze knives (razors?), two of which he represents on page 341.§ Mr.

*Dr. Petersen's illustration bears much analogy to Fig. 222 on page 57 of my publication entitled "The Archæological Collection of the United States National Museum." In both cases the soles of the feet are represented as being covered.

†Simpson: Archaic Sculptures, etc., p. 72.

‡Worsaae: The Primeval Antiquities of Denmark; translated by W. J. Thoms; London, 1849, p. 91.

§For representations of others see Worsaae: Nordiske Oldsager i det Kongelige Museum i Kjöbenhavn, Figs. 171–175.

Fergusson is even inclined to ascribe to the stone chamber in question a still more recent origin.*

Sculptures on rocks *in situ* are not found in Denmark, because, as Dr. Petersen states, rock-formations suitable for their execution are, excepting perhaps the Island of Bornholm, wanting within the present limits of the Kingdom of Denmark (page 332).

SWEDEN.

The primitive sculptures forming the subject of this essay are, so far as variety is concerned, perhaps better represented in the territory of Sweden than in any other part of Europe. Simple cup-cuttings on erratic blocks are not wanting in that country; but cups also occur there among the more elaborate figures engraved on boulders and stones of megalithic structures as well as on natural rock-formations.

Reference was made on a preceding page to the Baal or Balder Stone, at Ranten, near Falköping, in the Län of Mariestad. This block was first described by Professor Sven Nilsson, who states that it is a granite boulder from six to seven feet in length, oval in shape, and more than three feet high. On the upper slightly convex surface are numerous cup-cuttings of unequal size, the largest of which occupies nearly the centre; and a projection near the base of the block exhibits additional cup-like excavations. Fig. 22 is a copy of Professor Nilsson's representation of the stone.† He is of opinion that this block and others of the same description served as sacrificial altars in the worship of Baal or Balder, which, he thinks, was at one time prevalent in the North of Europe; and that the cup-shaped cavities were designed for the reception of the blood of the victims. This view will be considered in another part of this essay. A cup-stone in the Län of Halland is figured in the "Matériaux" for 1878 (on page 268); another in the "Archiv für Anthropologie" (Vol. XII, page 106). The latter, which was found near

*Fergusson: Rude Stone Monuments, etc.; p. 303.

†Nilsson: Die Ureinwohner des Scandinavischen Nordens; das Bronzealter; aus dem Schwedischen übersetzt; Hamburg, 1866; Nachtrag, S. 45.

Göteborg, and is now preserved in the Historical Museum of that city, is apparently a boulder, and of small size, having one side entirely covered with cups, while there are only three on the opposite surface. The cups are not over six centimeters in diameter. Other cupped stones are known to exist in various parts of Sweden, where, indeed, these remarkable antiquities are so familiar to the people that they designate them by the name *elfstenar*, or elf-stones, connecting with them curious superstitions—either descended from ancient times or of later origin—to which allusion will be made hereafter.

Dr. Petersen figures on page 331 of his previously-quoted article in the "Mémoires" of the Royal Society of Northern Antiquaries two erratic blocks found in the Province of Scania, upon which cups as well as figures resembling wheels with four spokes are sculptured, and which appear to be of contemporaneous origin.

Professor Nilsson represents in his work on the bronze age a heavy diorite slab from a tumulus in Scania, called Willfaralıög.* This slab shows the designs of two horses drawing a two-wheeled chariot, and of three ships, two of them manned. In addition, the stone shows thirteen cup-markings, two of which are inclosed by the figure of one of the ships, while a third is traversed by its lower line, as seen in Fig. 23, which is a somewhat reduced copy of Nilsson's delineation. Professor Simpson is certainly right in believing that the cup-cuttings are in this case of earlier date than the incised figures.† Nilsson, however, draws no such inference, but finds in the presence of the cups a support for his view that the slab occupied a horizontal position in the tumulus, and served as a sacrificial altar. In this tumulus, which inclosed no stone chamber, were found a rotten tooth of a horse, fragments of a clay urn, pieces of charcoal, a lance-head and an arrow-head, both of flint, and a fine flint dagger; and, in addition, a medallion-like piece of bronze, ornamented with graceful spiral lines, such as are peculiar to the earlier bronze age. Professor Nilsson, therefore, has good reason for ascribing the Willfara tumulus to the age of bronze.‡ He points out the analogy existing between the sculptures on the Will-

* Nilsson: Das Bronzealter; Nachtrag, S. 42.
† Simpson: Archaic Sculptures, etc.; p. 78.
‡ Objects of flint and bronze are often associated in burials of the bronze age.

fara slab and on the chamber-stones of the well-known monument at Kivik, in Christianstad Län, Scania, which, according to his view, was erected by Baal-worshiping Phœnicians, who, he thinks, had colonies in the North of Europe, and introduced there the use of bronze. The Kivik sculptures, executed on seven unground granite slabs, four feet high and three feet wide, exhibit a variety of figures, among them a man standing on a two-wheeled chariot drawn by two horses, several unharnessed horses, ships, groups of men (supposed to represent warriors, musicians, prisoners, and priests), various ornamental (perhaps symbolical) designs, four wheel-shaped figures, a cone or obelisk (the emblem of Baal or the sun-god, according to Nilsson), and two handled axes, evidently representing weapons of metal (see Fig. 24). Cup-cuttings are entirely wanting on the Kivik slabs. The sculptures on them, as interpreted by Nilsson, commemorate a victory, probably a naval one, and the succeeding sacrifice of prisoners of war.*

Dr. Petersen claims, as it were, the Kivik and similar Scanian sculptures for Denmark, not only because Scania formed a part of that country until the year 1660, but also for the reason that the Scanian monuments of the ages of stone and bronze partake more of a Danish than a Swedish character.†

Lastly, I must refer to the sculptures which are often seen on natural rock-surfaces in different parts of the Scandinavian Peninsula, but are particularly abundant in the Län of Bohus. They represent scenes of war and hunting, manned and empty ships, etc., and some of these groups seem to be executed in a quite spirited manner. There appear among the figures warriors armed with weapons resembling the leaf-shaped swords peculiar to the bronze age, to which, indeed, these rock-engravings have been referred by several authors. Professor Nilsson, however, believes that they originated during the age of iron, ascribing them to the Vikings of the eighth and ninth centuries.‡ A. E. Holmberg's work on the subject, entitled "Scandinaviens Hällristningar" (Stockholm, 1848), is not within my reach; but I am able to give in Fig. 25 a specimen illustration of this kind of sculpture, which I

* The subject is treated quite in detail by Nilsson in his work on the bronze age. His illustrations of the Kivik slabs have been copied by Simpson in his "Archaic Sculptures," where also a résumé of Nilsson's interpretation is given.

† L. c. cit., p. 330.

‡ Nilsson: Das Bronzealter; S. 90.

have taken from an article by Dr. Lennart Åberg.* It will be seen that cups and wheel-shaped figures accompany the more elaborate representations.

INDIA.

Professor Desor lays particular stress on the circumstance that cup-stones are found in various parts of India. "We touch here upon the main point of our thesis,"† he says in his often-quoted pamphlet (page 33), in order to render his appreciation of the fact more conspicuous. He mentions that a number of years ago, Colonel Meadows Taylor and Dr. Wilson have drawn attention to the analogy between the megalithic monuments of India‡ and those of Great Britain, while recently the similarity of the figures sculptured on them was pointed out by Mr. J. H. Rivett-Carnac, an officer of the Bengal civil service. Just at the time when I was engaged in preparing this treatise, that gentleman sent copies of his publications to the Smithsonian Institution, and I became thus enabled to draw my information from the original sources.

In the district of Nagpoor, tumuli surrounded by single, or, less frequently, by double stone circles are quite numerous; but the most extensive groups of this class of barrows are situated near Junapani, a hamlet lying about five miles westward of the civil station of Nagpoor, on the high-road to Katole. These mounds were explored in 1867 by Mr. Rivett-Carnac and two other gentlemen.

"From the people of the neighborhood," he says, "and even from the Brahmans and other learned persons of Nagpoor, who speak with authority on the ancient history of the province, no satisfactory information regarding the tribes who constructed these barrows is to be obtained. Some will tell you the story that these mounds are the work of giants, or of the Gao-

* Åberg: Hällristningar uti Bohuslän, in: Annaler for Nordisk Oldkyndighed; Copenhagen, 1839, Plate X, p. 386.

† "Nous touchons ici au point capital de notre thèse."

‡ Descriptions and representations of megalithic monuments in India, derived from sources hardly attainable in this country, are found in Fergusson's "Rude Stone Monuments" (p. 455, etc.), where also interesting details concerning the recent erection of menhirs, dolmens, etc., by the Khasias in Bengal are given.

lees or Shepherd Kings, regarding whose rule in Central India, at a period prior to the Aryan invasion, a deep-rooted tradition exists. That the circles are very old, the condition in which they are now found distinctly shows, and the remains discovered therein leave no doubt that they were once the burial-places of a people of whom these circles are now the only trace that remains to us."*

The tumuli forming these groups are all of the same type, consisting of circular mounds of earth, at present not exceeding four feet in height, and the circles surrounding them, from twenty to fifty-six feet in diameter, are constructed of trap boulders, such as occur abundantly in the neighborhood. A map of the locality, accompanying Mr. Rivett-Carnac's description, shows no less than sixty-four tumuli, distributed in several groups, the largest of which comprises fifty-four. Each circle contains a few stones larger than the rest and comparatively regular in shape, perhaps in consequence of artificial modification; and such stones are distinguished by the peculiarity that their upper surfaces or sides exhibit cup-cuttings, differing in size, and mostly arranged in regular groups formed by parallel lines or other nearly symmetrical dispositions, as shown on one of the plates illustrating Mr. Rivett-Carnac's report. Thus far ring-sculptures have not been discovered by him on stones belonging to circles; but he thinks "they may be yet brought to light, together with perhaps other and more striking particulars, linking these tumuli still more closely to the remains found at home."†

The few of the mounds under notice which have been opened inclosed no cists, the objects found in them being covered, without any special protection, with the now much-hardened earth composing the mound. The contents dug out from the centres of the barrows were fragments of urns, accompanied by a whitish earth, probably produced by the decomposition of bones, and articles of *iron*, thickly covered with rust and of antique forms (celts, daggers, spear-heads, a snaffle-bit in good preservation, stirrups (?), etc). Ornamented bangles or bracelets of copper, supposed to be alloyed with gold or silver, but containing neither tin nor zinc, are also

* Rivett-Carnac: Prehistoric Remains in Central India; reprinted from the Journal of the Asiatic Society of Bengal; Calcutta, 1879, p. 2.

† Ibid., pp. 3, 4, 15.

mentioned and figured. The author ascribes the absence of vaults in the Junapani mounds to the want of stones suitable for their construction, drawing attention to the circumstance that they are not wanting in the tumuli of other parts of India where the proper material is within reach. Finally he enumerates the points of resemblance between the barrows of Europe and those of India, referring in particular to the cup-marks found on stones surrounding tumuli in both regions.*

Somewhat later Mr. Rivett-Carnac discovered on stones and on rocks *in situ* in the mountains of Kumaon not only cup-sculptures, but also such of rings, resembling very closely those seen in Great Britain and other countries of Europe. The results of his explorations in this region and the deductions therefrom made by him hardly can be overestimated, in view of their bearing on a most interesting problem of prehistoric archæology. The locality chiefly examined by Mr. Rivett-Carnac is thus described:—

"At a point about two miles and a half south of Dwara-Hath, and twelve miles north of the military station of Ranikhet in Kumaon, the bridle-road leading from the plains through Naini Tal and Ranikhet to Baijnath, and thence on to the celebrated shrine at Bidranath, is carried through a narrow gorge, at the mouth of which is a temple sacred to Mahadeo, where the pilgrims who follow this route generally halt for a short time, and where, from the position of the temple in the defile, the priest in charge can conveniently levy contributions on all passers-by. The temple will not be found marked on the one-inch-to-the-mile map of the Great Trigonometrical Survey, but it is locally known by the name of Chandeshwar."†

About two hundred yards south of the temple, toward the middle of the defile, rises a rock at an angle of forty-five degrees, presenting a surface upon which, in a space measuring fourteen feet in height by twelve in breadth, more than two hundred cups are sculptured. They vary from an inch and a half to six inches in diameter, and from half an inch to an inch in depth, and are arranged in groups composed of approximately parallel rows, as seen in Fig. 26, which is a copy of Mr. Rivett-Carnac's repre-

* Rivett-Carnac: Prehistoric Remains in Central India; p. 5, etc.

† Rivett-Carnac: Archæological Notes on Ancient Sculpturings on Rocks in Kumaon, India, similar to those found on Monoliths and Rocks in Europe, etc.; reprinted from the Journal of the Asiatic Society of Bengal; Calcutta, 1879, p. 1.

sentation of a portion of the Chandeshwar rock. The cups, it will be noticed, are mostly of the simple type, and only exceptionally surrounded by single rings or connected by grooves. Somewhat more elaborate combinations were seen by the explorer upon other portions of the same rock. "From the villagers and from the old priest at the temple hard by no information was to be obtained of the origin of these markings, beyond 'that they were so old that the oldest man in the village had no knowledge of who had made them, nor had they been made in the time of their fathers' fathers, but they were most probably the work of the giants or the goalas (herdsmen) in days gone by.'"*

It may not be superfluous to state in this place that "Mahadeo" (Mahadeva) is one of the many names given to Siva, the third in the Trimurti or Hindoo triad. Moor characterizes him in these words: "He is Time, the Sun; he is Fire, the destroyer, the generator. His consort, *Bhavani*, is the symbol of created nature, and in that character named *Praeriti*. As the deity presiding over generation, his type is the *Linga*, the origin probably of the *Phallic* emblem of *Egypt* and *Greece*. As the God of Justice, which character he shares with *Yama* and other deities, he rides a bull, the symbol of divine justice. He holds, as his commonest attribute, a trident, called *Trisula*, in this, and in some other points, resembling our *Neptune:* his consort also has a relationship to water, although *Vishnu* be generally the deity presiding over humidity. – – – As emblems of immortality, serpents are a common ornament with many deities; but *Mahadeve* seems most abundantly bedecked with them: bound in his hair, round his neck, wrists, waist, arms, and legs, as well as for rings, snakes are his constant attendants."†

Mahadeo is worshiped by the Hindoo sect called the Saivas under the form of a phallus, sometimes represented by an upright stone pillar, more or less modified by art, but often in the same shape, in conjunction with the Yoni, the female organ of generation, and the special emblem of Bhavani. These symbolic representations are seen in Hindoostan of all sizes, from a large, rudely-executed sculpture to a diminutive object of art; but they generally present a conventional shape, in which the uninitiated

* Rivett-Carnac: Archæological Notes, etc.; p. 3.
† Moor: The Hindu Pantheon; London, 1810, p. 36.

hardly would recognize what they are intended to recall; and it may be added that no obscene conceptions are mingled in the minds of the many thousands of Hindoos who venerate under this form the generative energy of nature. The great centre of Siva-worship in India is the city of Benares. After this digression, I insert Mr. Rivett-Carnac's description of the Chundeshwar temple:—

"On visiting the temple sacred to Mahadeo at the entrance to the gorge, I could not help being struck by the peculiar construction of many of its shrines as bearing a marked resemblance to these rock-markings. In addition to the principal shrine, placed within the temple itself, a massive little structure built up of large stones, many of which would appear to have been taken from Buddhist ruins so plentiful in the neighborhood of Dwara-Hath, I counted thirty-seven minor shrines within the walled inclosure by which the temple is surrounded. These consist mostly of a rough pedestal formed of loose stones surmounted by a Mahadeo and Yoni. The Yoni, in the largest of these shrines, was a solid block of stone, cut to the well-known 'jew's-harp' shape, the upright Mahadeo being slightly carved at the summit and base. Some half a dozen others were more or less solid and well made, according to the conventional construction of these symbols. In one case the stone which did service for the Yoni was the cushion-shaped finial of some Buddhist temple, the Mahadeo being represented by a carved head with high-raised cap, broken off from some neighboring ruin. The fragment had been inserted, cap downward, in the square hole by which the cushion had been fixed on to the top of the original structure."

I interrupt here the author's account in order to direct attention to Figures 27 and 28, the first of which, copied from Plate III of the pamphlet under notice, represents the section of a large stone Mahadeo and Yoni in the Chandeshwar temple; while Fig. 28 shows the same symbol in a more elaborate form, as seen by the author in a temple or shrine at Benares, and illustrates the "jew's-harp" shape to which he alludes. In this instance, by way of attribute, a serpent is coiled around the emblem of Mahadeo. The figure is taken from another pamphlet by Mr. Rivett-Carnac, relating to the snake symbol in India. Leaving aside the serpent, a ground-plan of

Fig. 28 would correspond very closely to Simpson's fifth type (Fig. 1 of this publication).

"The remaining shrines," he continues, "were of a much poorer type. But this last class was to me much the most interesting, as suggesting a possible connection between the rock-markings and Lingam worship. Rough sketches of these types will be found in Plate III, which accompanies this paper (here given as Figures 29, 30, and 31). The position and arrangement of these symbols and the veneration paid to them, some having been quite recently decked with small offerings of flowers, left no doubt that they equally with the larger and more solid shrines represented the Mahadeo and Yoni. But whereas in the first-noticed and better class the Mahadeo is represented by an upright stone, this other and poorer type is without the upright, and is apparently a conventional rendering or sketch of these symbols roughly cut out on the stone, the inner circle representing the Mahadeo, the outer circle the Yoni, the line or lines the gutter by which the libations and offerings are drained off from this as well as from the more elaborate class of Mahadeos. In the centre of the yard is a monolith Mahadeo of four feet and a half in height above the ground. It has no markings on it, but together with all its surroundings seems very old. The priest in charge of the temple held that most of the shrines were very old, and accounted for their large number by saying that the yard was the burial-place of men of great sanctity, some of whom had been brought from great distances for interment there, and that Mahadeos of a[illegible]laborate or poor class were placed over the tombs according to the means [illegible] the deceased's friends."*

The resemblance of the sculptures represented by Figures 29, 30, and 31 to a class of cuttings on boulders, rocks, and megalithic monuments in Europe cannot be denied; but this is a subject to which I shall revert in the sequel.

In the neighborhood of Chandeshwar the explorer noticed some temples or enclosures consisting of concentric stone walls of rude construction, open in one place, with the Mahadeos, represented by stone pillars, in the centre. The construction of the temples, he thinks, appears of some inter-

* Rivett-Carnac: Archæological Notes, etc.; pp. 3, 4, 5.

est when considered in connection with the rock-cuttings and shrines at Chamdeshwar, fifteen miles distant.*

Mr. Rivett-Carnac refers to a letter received in 1877 from a gentleman then in India, Mr. Campbell of Islay, who is much interested in the subject of Scottish rock-markings. Being at Ayodhya with a Hindoo who spoke good English, Mr. Campbell procured a fakir, and drew on the sand two concentric circles with a dot in the middle, asking what the figure meant. The fakir at once answered "Mahadeo." He then drew a similar figure with a radial line beginning in the centre, and received the same answer. The meaning of these figures, Mr. Campbell says, is familiarly known throughout India. At Delhi he learned from a friend that they are chalked on stones in Kangra (Punjab) by people marching in marriage-processions.† This fact is certainly significant, to say the least. Professor Desor, moreover, states, probably on the strength of private communications from Mr. Rivett-Carnac,‡ that Hindoo women carry, in pilgrimages, water from the Ganges to the mountains of the Punjab for the purpose of besprinkling with it these signs in the temples, where they invoke the divinity to bestow on them the favor of motherhood (page 34).

The final conclusions arrived at by Mr. Rivett-Carnac are summed up in the closing paragraph of his article on the snake symbol in India, written subsequently to his investigations in Nagpoor and Kumaon.

"I may add in conclusion," he observes, "that no one who has been in this country and who has noticed the monolith Mahadeos of the Western Ghats of the Himalayas and other parts of India, can fail to be struck with the resemblance that the menhirs of Carnac in Brittany and its neighborhood bear to the Siva emblems of India. I visited these remarkable remains when at home last year, and was quite taken aback by their resemblance to well-known Indian types. The monoliths of Scotland covered with what I believe to be 'Mahadeo' symbols are of the same class. Added to this, in the recesses of the Pyrenees, the people whose language suggests their descent from the tribes who erected the tumuli and menhirs, not only in this neighborhood, but also in other parts of Europe, still preserve tra-

* Rivett-Carnac: Archæological Notes, etc.; p. 5. † Ibid., p. 15.

‡ Professor Desor alludes to a correspondence with Mr Rivett-Carnac (Correspondenz-Blatt der Deutschen Anthropologischen Gesellschaft, 1877, S. 127).

ditions connected with these monoliths, and have actually retained some traces of what I will call Siva-worship* With this evidence, added to the points noticed in my papers on the Junapani barrows and the Kumaon markings, the connection between the marks in India and Europe may then, I hope, be considered tolerably complete."†

It should be mentioned that cupped boulders of gneissoid porphyry were discovered by Dr. Verchère on the banks of the Indus, in Cashmere, prior to Mr. Rivett-Carnac's explorations. Yet the first-named traveler, not knowing the character of cup-cuttings, was inclined to ascribe the artificial cavities to the action of glaciers. "This supposition," says Professor Desor, "appears to us totally inadmissible. The action of glaciers doubtless tends to modify the rocks upon which they move. They polish them and leave upon them characteristic furrows and striæ. Though we have ourselves devoted long years to the study of glaciers, we have never noticed that they produce cavities like basins or cups. It must therefore be conceded that these latter are the work of man. M. Verchère doubtless would have felt less scruple in admitting this origin, if he had been acquainted with the frequent occurrence of cups on erratic blocks in Europe" (page 36).

At the close of his essay Professor Desor, availing himself of the remarkable results obtained by Mr. Rivett-Carnac, sets forth the inferences he draws from the occurrence of cups and other archaic figures upon stones and rocks in countries as far distant from each other as India and Ireland. He ascribes the practice of executing such sculptures to people of the Aryan stock, who, he thinks, transferred this peculiar custom from their Asiatic homes to the countries of Europe. He connects with this immigration the

* The author refers to certain superstitious practices in connection with sacred stones, but lately or even still in vogue among the people in the Pyrenees, as stated by Messrs. Piette and Sacaze in the article quoted in my account of cup-stones in France. Speaking of a boulder, called *Le Caillhaou d'Arriba-Pardin*, they say:—

"Autrefois, il y a trente ans à peine, les jeunes gens de Poubeau allaient en procession, le soir du mardi-gras, faire sur cette pierre un grand feu de paille pour lequel chaque chef de maison fournissait une botte. Ils marchaient un à un, chacun tenant par derrière celui qui le précédait, et s'avançaient dans une attitude et avec des gestes à la fois burlesques et obscènes."

With reference to a menhir in the same district the following statement is made:—

"Encore aujourd'hui, lorsque les habitants de Bourg-d'Oueil vont de ce côté, plus d'une jeune femme va baiser le menhir en cachette."—*Piette et Sacaze: Les Monuments de la Montagne d'Espiaup* (*Pyrénées*); Matériaux, 1878, p. 257–58.

† Rivett-Carnac: Rough Notes on the Snake Symbol in India, etc.; reprinted from the Journal of the Asiatic Society of Bengal; Calcutta, 1879, p. 14.

erection of megalithic structures in those countries,* and believes, in short, that the neolithic period dates in Europe from the arrival of those Asiatics, who supplanted there the troglodytic tribes (probably Mongolian), of which the Laps are the last remnant in Europe. The Aryan new-comers, he believes, brought with them several species of domestic animals and of cereals, the remains of which are found abundantly in the Swiss lacustrine settlements of earliest date, and likewise the celts of jadeite and nephrite discovered in the dolmens of Brittany and in lake-dwellings, and consisting of materials not found in Europe, but by no means rare in the East.

"It would remain to us," he says, "to investigate by what routes these colonists from Asia reached Europe; whether they followed the same track or came in successive waves, as it were, advancing in different directions. This is a vast and arduous task, which cannot be entered upon in a rapid sketch like the present one, but which, perhaps, we shall make one day the subject of a special treatise" (page 43).

Reserving my observations on the theories advanced by Professor Desor and other archæologists for a subsequent part of this treatise, I close my brief account of primitive sculptures in the Old World and pass over to a consideration of analogous lapidarian work in the Western Hemisphere.

* "It should be remembered," he says, "that, according to the majority of archæologists, the megalithic monuments of Europe belong to the age of polished stone, considering that arms and utensils almost exclusively of stone have been found in the large dolmens of Brittany, and that among the fine celts they have furnished, several are made of jadeite and other kinds of stone peculiar to the East. Copper beads, it is true, have been taken from several dolmens in the South of France, and Messrs. Piette and Sacaze, moreover, have not long ago discovered in the cromlechs of the Pyrenees bronze bracelets with designs recalling those seen on the ornaments of the later bronze age; but hence it does not follow that the metal was introduced in Europe simultaneously with the megalithic structures. The latter may be of anterior date, and their use may have been continued after the introduction of bronze, and perhaps even longer."—*Pierres à Écuelles*, p. 40.

PART II.

PRIMITIVE LAPIDARIAN SCULPTURES IN AMERICA.

NORTH AMERICA.

Before entering upon the subject indicated in the above heading, I have to allude, for the sake of gradual demonstration, to the so-called hammer-stones, a well-known class of aboriginal relics found in considerable number throughout the United States. They are generally roundish or oval pebbles of a somewhat compressed or flattened form, presenting in their side view the outline of a more or less elongated ellipse. Their only artificial alteration consists in two small pits or cavities, so placed to form the centres of the opposite broader sides. In these cavities the workman is supposed to have placed the thumb and middle finger of the right hand, while the fore-finger pressed against the upper circumference of the stone. The material of these implements is usually quartzite, graywacke, or some other kind of compact sandstone.

As similar stones occur in Europe, speculations upon their use are not wanting, and Professor Nilsson, in particular, has tried to prove they had been employed in chipping tools and weapons of flint.† I will admit that they may have been used, in Europe as well as in America, for fashioning rough implements and for flaking off pieces of flint, etc., which were eventually to be brought into definite shapes; but they are by far too clumsy and possess too much roundness on all sides to have been the tools for fabricating arrow-heads and other delicate articles of flint. How would it be possible, for instance, to produce a stemmed dart with long

† Nilsson: The Primitive Inhabitants of Scandinavia; translated by Sir John Lubbock; London, 1868, p. 10, etc.

barbs by means of such a hammer-stone? The art of making stone arrow-heads, moreover, is no longer a mystery, at least not in the United States, where several methods still are employed by certain western tribes for fashioning them. They probably were mostly chipped into their final shape by *pressure* with tools of horn or bone, a number of which, obtained from still existing tribes, can be seen in the United States National Museum. The fine neolithic flint objects of Northern Europe, such as barbed and stemmed arrow and spear-heads, daggers, crescent-shaped implements, etc., doubtless were produced by similar methods.

Whether the *bruised* pitted stones were originally designed for hammers, or whether, in view of the diverse purposes which implements sometimes have to serve in the hands of uncivilized man, their use as hammers was a secondary one, are questions upon which I will not enlarge in this place.* It is certain, however, that a large number of the pitted stones, usually called hammer-stones in the United States, are perfectly intact at their circumferences, and consequently cannot have served as imagined. Of the many pitted stones in the National Museum, sixty—derived from New York, Pennsylvania, Ohio, Illinois, Tennessee, Kentucky, Louisiana, and California—are now on exhibition, and of these only twelve show the marks of hammering. There is a single pit either on each of the opposite broad sides or only on one side of the stones now considered, and their cavities, differing in size and depth, are not ground, but apparently produced, sometimes quite clumsily, by means of a tool of flint or other hard stone. May not such stones have been used by the aborigines for cracking upon them, by means of other stones, the different kinds of hard-shelled fruits so abundant in North America? The cavities mostly are of sufficient depth to hold any kind of nut in place. This kind of work would chiefly have devolved upon women and children (particularly girls), and hence it would not be difficult to account for the large number of these stones.† And

* The real North American hammer-stones, I am now inclined to believe, are pebbles or fragments of quartzite or flinty materials, sometimes modified by art and much battered by use. They tell their own story, as it were. Exactly similar stones are found in Europe. Mr. Evans figures two of them on page 223 of his well-known work on the stone implements, etc., of Great Britain.

† That the method here indicated was in vogue among the prehistoric people of Europe is almost demonstrated by Sir Charles Lyell's description of a log-cabin, discovered in 1833 by Captain Mudge, R. N., in Drumkellin bog, in Donegal, Ireland, at a depth of fourteen feet from the surface. It was twelve feet square and nine feet high, being divided into two stories, each four feet high. The planking

further, an intact flattish stone, used with its broad side as a hammer for beating upon the end of a flint tool—an operation probably often performed in savage life—would gradually receive at the point of contact the impression of the harder flint. Hence a number of pitted stones may owe their cavities to such a mode of application.

Fig. 32 represents a stone of the class under notice, which was found near Franklin, Williamson County, Tennessee, and belongs to the series exhibited in the National Museum. It is a somewhat flattish pebble of oval shape, about two inches in thickness, and showing only on one side a small cavity, worked out very carelessly, and just large enough to receive an object of the size of a nut. The material is a clayey sandstone.

Sometimes these stones exhibit two cavities close together, as though it had been intended to crack with one blow two nuts placed in these pits. Such a stone is represented by Fig. 33. The original belongs to a series of pitted stones which were sent to me, many years ago, by my friend, Mr. J. M. M. Gernerd, of Muncy, Lycoming County, Pennsylvania, and had been collected by him in that neighborhood, more especially near the banks of the Susquehanna River. This specimen, a graywacke pebble not exceeding an inch and one-quarter in thickness, shows on both sides two shallow contiguous cavities. When the first white settlers penetrated to that part of the Susquehanna Valley, they found on or near the present site of Muncy a village of the Minsi or Munsey Indians, the Wolf clan of the great Lenni-Lenape or Delaware nation; and the name "Muncy," indeed, perpetuates the designation of that clan. There is still a tradition, I am informed by Mr. Gernerd, that they were in the habit of gathering large supplies of shell-bark hickory-nuts, which formerly grew plentifully in the neighborhood.

It should be borne in mind that nuts played a conspicuous part in the household of the North American Indians. The first adventurers of the

consisted of oak, split with wedges of stone, and the roof was flat. A stone celt and a flint arrow-head found in the interior of this primitive building furnish additional proofs of its remote antiquity. "On the floor of the dwelling," observes Captain Mudge, "lay a slab of freestone, three feet long and fourteen inches thick, in the centre of which was a small pit, three-quarters of an inch deep, which had been chiseled out. This is presumed to have been used for holding nuts to be cracked by means of one of the round shingle-stones, also found there, which had served as a hammer. Some entire hazel-nuts and a great quantity of broken shells were strewed about the floor."—*Lyell: Antiquity of Man*; London and Philadelphia, 1873, p. 32.

Latin race who came in contact with them (Cabeça de Vaca, the anonymous Knight of Elvas, Biedma), and many authors of more modern times, mention these fruits as an important article of food of the aboriginal inhabitants. It can be imagined that they consumed a large quantity in a raw state; but they also prepared from them an oily, milk-like liquid, which they used as an ingredient in the preparation of other food. Full details in regard to this subject have been published by Colonel Charles C. Jones in his work on the antiquities of the Southern Indians, to which I would refer those specially interested in the subject.*

He there also draws for the first time attention to a class of utensils which he designates as "nut-stones," and to which he ascribes, as the name implies, the same mode of employment which I feel inclined to claim for the pitted stones just described. Colonel Jones found the relics called nut-stones by him in considerable number in Middle and Upper Georgia, but most abundantly on the site of an old Indian village near the confluence of the Great Kiokee Creek and the Savannah River (Columbia County). More than thirty were there seen by him within the space of a few acres. He thus describes them:—

"They consist of irregular masses of compact sandstone or soapstone, weighing from two to ten pounds, in whose surfaces occur circular depressions, from an inch to an inch and a half in diameter, and from one-quarter to three-quarters of an inch in depth. Upon the broadest and flattest sides these depressions, from three to five in number, are located close together. To produce them the harder stones had been pecked and the softer gouged. Not only on one side do they appear, but frequently on both sides, and often in the ends, so that the stone, when set up in the earth on any one of its faces, would always present one or more of these cup-shaped cavities ready for use. Their cavities are so located that one, two, three, four, five, and sometimes more nuts could be cracked at a single blow delivered by means of the circular flat crushing-stones so common and so often found in direct connection with the rude articles now under consideration. The cups are just large enough to hold a hickory-nut or a walnut in proper position, so that, when struck, its pieces would be prevented from being widely scat-

* Jones (Charles C.): Antiquities of the Southern Indians; New York, 1873, p. 315, etc.

tered. Particularly do the soapstones indicate the impressions left by the convex surfaces of the harder nuts. Upon some of them the depressions seem to have been caused simply by repeatedly cracking the nuts upon the same spot, so that in time a concavity was produced corresponding to the half of the spherical or spheroidal nut. Such is the most natural explanation we can offer with regard to the use of these stones."*

It should be added that Colonel Jones found in some instances the sites where he collected the stones even now overshadowed by hickory and walnut-trees. I had frequent occasion to examine the specimens of this class brought together by him, and I never doubted for a moment the correctness of his view as to the use of these utensils.

A nut-stone of coarse-grained sandstone, found in the neighborhood of Loudon, Loudon County, Tennessee, and preserved in the National Museum, is represented by Fig. 34. It shows on the figured surface ten irregular conical depressions, four of which are considerably larger than the rest. The lower side is provided with eight unequal cavities of the same character.

The cavities in the North American stone utensils thus far described are produced, as stated, in a manner betokening but little care. I now pass over to another class of objects, which bear in their general appearance much resemblance to the first-mentioned stones (typified by Fig. 32), but which, to judge from the character of their cavities, were designed for a totally different purpose. They are pebbles, or more or less flattish fragments, exhibiting either on one of the broad surfaces or on both, a regular cup-shaped cavity from an inch to an inch and a half in diameter, which has almost invariably been produced by means of a rotating grinding tool.

Fig. 35 shows the character of a specimen of this class in the National Museum. It is a somewhat flattish dioritic pebble, two inches and a half thick, which exhibits on the figured surface a circular cup-shaped cavity, measuring an inch and a half in diameter and nine-sixteenths of an inch in depth. There is a similar cavity on the opposite side of the stone. This specimen was found near Groveport, Franklin County, Ohio.

* Jones (Charles C.): Antiquities of the Southern Indians; pp. 315, 318.

In Fig. 36 I give the representation of another stone of this type, derived from the neighborhood of Portsmouth, Ohio, and likewise preserved in the National Museum. It is a pebble of fine-grained sandstone, almost quadrilateral in shape, about an inch and a half thick, and provided on each side with a rather shallow depression. Both cavities are covered with red paint, which seems to have penetrated into the stone. Several other specimens in the archæological collection of the National Museum are characterized by the same peculiarity, and hence it may be assumed that the stones under notice are cups in which the aborigines rubbed or dissolved the colors used in face-painting and for other purposes. Indeed, paint-mortars of stone, not much differing from the utensils in question, are still employed by remote western tribes.

I must now proceed to consider another very remarkable class of North American relics, namely, stones of larger size, upon which *several* cup-like cavities are worked out. The material of these stones is almost exclusively sandstone, and they occur mostly in the shape of flat fragments without definite contours. The cups are either on one of the flat sides or on both, and their number on a surface varies, as far as I have observed, from two to ten. They are irregularly distributed, being placed close together or more or less apart from each other. In general they measure an inch and a half in diameter, but sometimes less. The cavities are produced by grinding, and usually approach a semi-spherical form; occasionally, however, they are somewhat conical or funnel-shaped. Their inner surfaces exhibit different degrees of smoothness, being often, in consequence of weathering, rather rough, like the remaining surface of the stone. These cup-stones bear some resemblance to those found in certain lacustrine stations of Switzerland; but they seem to differ in appearance and destination from the English cupped stones described by Mr. Greenwell.

A cup-stone in the National Museum, derived from Summit County, Ohio, and weighing eleven pounds, is represented by Fig. 37. The level surface shows nine cups, of which six are perfect, and three, placed near the broken sides, more or less incomplete. The stone, it will be seen, is a fragment, and may originally have been provided with more than nine cavities. There are now eleven of these cup-stones in the National Museum,

five of which have been found in Pennsylvania, Tennessee, Kentucky, and Illinois, while the remaining six are derived from Ohio, which State, I believe, has furnished the majority of the known specimens.

An Ohio cup-stone in the National Museum deserves particular mention, on account of one of its cavities being covered with red paint, which cannot be removed by moistening. It is the only case of this kind noticed by me, and the use of the cavity as a paint-cup in this instance may be accidental. I therefore will not venture to express the opinion that all North American cup-stones of the type represented by Fig. 37 are to be considered as utensils designed to hold colors. Yet the possibility of this mode of application cannot be denied, considering that the Indian inhabitants of the East and of the Mississippi Valley employed different kinds of paints, each of which had to be made ready for use in a separate receptacle. Small paint-cups of earthenware, joined together, and certainly reminding one by their arrangement of the cavities in the stones under notice, are in use among the Zuñi Indians of New Mexico. Several specimens were obtained by Mr. James Stevenson in 1879, during his expedition to New Mexico and Arizona, undertaken under the auspices of the Bureau of Ethnology. Fig. 38 represents one of the articles in question. It consists of four united cups of an inch and a half in diameter and about an inch in depth.* The paints still adhering to the inner surfaces of these cups are red, white, yellow, and blue. There is but little difference between the dimensions of the cups and the cavities of the cup-stones just described.

Mr. Stevenson obtained on the same occasion from Indians of the Pueblo of Tesuque, New Mexico, a small mortar and pestle, both of stone, which were used by them in the preparation of paint. This simple apparatus, represented by Fig. 39, hardly would attract particular attention, if it were not for a cup-shaped cavity excavated on one side of the pestle, and perfectly corresponding in shape and size with the artificial depressions of the cup-stones. The cavity served to receive a portion of the liquid paint prepared in the mortar. Such at least was the account given to Mr. Stevenson by the Tesuque Indians. They probably poured into the cavity a

* The number of cups in the specimens obtained by Mr. Stevenson varies between two and five.

small quantity of the fluid pigment, in order to use it freed from the particles of coloring mineral substance remaining in the mortar.*

These two illustrations of the use of paint-cups among Indians of our time certainly afford no direct evidence that the cup-stones in question were made to serve in a similar manner, though they certainly heighten the probability of such an application.

The first notice of an American cup-stone, I believe, is contained in "The Ancient Monuments of the Mississippi Valley," by Squier and Davis, the well-known work published in 1848 as the first volume of Smithsonian Contributions to Knowledge. On page 206 (Fig. 92) a sandstone block, said to have been found in one of the mounds of Ohio, is figured. The block, weighing between thirty and forty pounds, exhibited on its surface a number of cups of different sizes, resembling, as the authors state, in all respects those in work-blocks of coppersmiths, in which plates of metal are hammered to give them convexity. Hence it appeared to them probable that the block had been used in the manufacture of such concavo-convex discs of native copper as are sometimes met with in the mounds of the Mississippi Valley. While living in New York, I had often occasion to see a fragment of this block in the collection of Dr. E. H. Davis, and a careful examination of the relic made it evident to me that the cavities had not been used as Messrs. Squier and Davis supposed. By the sale of the Davis collection, which comprised the bulk of the mound-relics obtained by the two explorers, to the late Mr. William Blackmore, the fragment in question was transferred to the Blackmore Museum, in Salisbury, England, and Mr. E. T. Stevens has since described it as follows:—

"The oblong fragment in the Blackmore collection measures six inches by eight, and has upon it three perfect detached cups, two cups which are confluent, portions of three finished cups, one half finished, and several which have been commenced. It may be well to remark that these 'cups' are *oval*, there being a difference in the two diameters of about one-eighth of an inch. They measure in their greater diameter about one inch and a half, and are about seven-eighths of an inch in depth. Judging from the

* In painting pottery, etc., they apply the color with a brush stripped from the leaves of the yucca plant.

engraving in the 'Ancient Monuments of the Mississippi Valley,' the cups upon the original mass were not all of the same size. One corner of the fragment indicates that it has been exposed to the action of fire. Squier and Davis have suggested that these cups were used in hammering plates of copper into the convex form needed for making bosses. The circumstances that two of the cups are confluent, that the surface of the block has not been smoothed, and that there is no evidence of bruising from hammering, all militate against the idea that this block was used, or was even intended to be used, as an anvil."*

Of late years Colonel Charles Whittlesey has devoted special attention to cup-stones. According to his statement, they occur quite frequently in Northern Ohio, more particularly in the valley of the Cuyahoga River; but he informs me by letter that, to his knowledge, none have been obtained from the numerous mounds of Ohio. He brings the cup-stones in connection with the spinning process of the natives, supposing the cavities had served as sockets in which spindles were made to revolve, and hence he calls the stones "spindle-socket-stones."† I must confess that I cannot share Colonel Whittlesey's opinion, in view of the absence of spindle-whorls in those parts of the United States where cup-stones thus far have been found. If spindle-whorls had been in use among the former inhabitants of this country, it is very probable that, in conformity with their well-known taste, they would have made them of stone or clay, and in that case they would be as abundant in the eastern half of the United States as they are in Europe, where the practice of spinning by means of this simple contrivance dates as far back as the neolithic period.‡ Adair, it is true, in describing the mode of weaving in vogue among the Southern Indians (Muskokis, etc.), speaks of an apparatus which *may* have been a spindle. "Formerly," he observes, "the Indians made very handsome carpets. They have a wild hemp that grows about six feet high, in open, rich, level lands, and which usually ripens in July. It is plenty on our frontier settlements. When it is fit for use, they pull, steep, peel, and beat it; and the old women

* Stevens: Flint Chips; London, 1870, p. 486.

† Whittlesey: Ancient Earth Forts of the Cuyahoga Valley, Ohio; Cleveland, 1871, p. 33.

‡ It may be supposed that wherever spindle-whorls were employed in prehistoric times, each woman and girl possessed at least one of these utensils.

spin it off the distaffs with wooden machines, having some clay on the middle of them to hasten the motion. When the coarse thread is prepared, they put it into a frame about six feet square, and instead of a shuttle they thrust through the thread with a long cane, having a large string through the web, which they shift at every second course of the thread. When they have thus finished their arduous labour, they paint each side of the carpet with such figures of various colours as their fruitful imaginations devise, particularly the images of those birds and beasts they are acquainted with, and likewise of themselves, acting in their social and martial stations."* Had the contrivances, called "machines" by Adair, been real spindles, he probably would have recognized them as such, as he undoubtedly had witnessed their use in Great Britain, which country he left during the first half of the eighteenth century, and where spinning with distaff and spindle has not yet entirely fallen into disuse in our time.

Certain Indian tribes in remote western districts, the Navajos and Pueblo Indians, for instance, use at the present time spindles for spinning the cotton and sheeps' wool employed in the manufacture of blankets and other textile articles. Their whorls are discs of wood, stone, bone, horn, and burned clay. The archæological collection of the United States National Museum contains no North American object of stone or clay, found north of Mexico, in which I can recognize a spindle-whorl. In Mexico, it is well known, spindles were in general use, and the whorls (*malacatl*) are among the common objects seen in collections of Aztec antiquities. They are represented in the National Museum by many specimens, all made of terra-cotta, and in some instances tastefully ornamented, like the originals of Figures 40 and 41, which were obtained by the late Colonel Brantz Mayer at Tezcuco, and presented to the Smithsonian Institution in 1862. The Mexican method of spinning is illustrated by designs in the Mendoza Codex, published by Lord Kingsborough.

It doubtless will be a matter of great interest to archæologists, both in this country and in Europe, to learn that large cupped blocks, fully resembling those of the Old World, have of late years been observed in the

* Adair: The History of the American Indians; London, 1775, p. 422.—The remains of textile fabrics having been found in mounds of this country, it follows that some sort of weaving was practised here in times long past.

United States. As yet a few only are known, but ere long, I am confident, the existence of others will be ascertained. Whenever investigators have their attention drawn to a new class of antiquities, they endeavor to find them, and are usually successful in their efforts.

Fig. 42 shows the appearance of a cupped block preserved in the building of the Society of Natural History in Cincinnati, to which association it was presented by the discoverer, Dr. H. H. Hill, a resident of that city. His letters and a communication from Professor J. Mickelborough, also of Cincinnati, enable me to give the following account:—

The block was found by Dr. Hill during an archæological excursion, in May, 1874, a mile and a half above Ironton, Lawrence County, Ohio, near the bank of the Ohio. It was, indeed, washed by the water of that river, and covered with débris that had fallen from the upper portion of the bank, from which latter circumstance Dr. Hill concluded it had also rolled from this higher level to the lower margin of the river-bank. Having bought the block from the owner of the land, he had it removed from its position and conveyed by steamboat to Cincinnati, where it arrived in June, 1874. In the same year he presented it to the Cincinnati Society of Natural History. The block or boulder, which consists of coarse-grained dark-gray sandstone, is three feet long, two feet and seven inches wide, and a foot and a half high, and measures eight feet seven inches in circumference. It weighs between a thousand and twelve hundred pounds. According to Dr. Hill, the surface of the stone shows one hundred and sixteen cups, either rounded or conical in shape.* Professor Mickelborough mentions one hundred and twenty cups, which he describes as being circular in outline, and apparently produced by attrition with some blunt implement. The average diameter of the cups is an inch and a half, and their depth about half an inch; but some are five-eighths of an inch deep, and others again more shallow. The inside of the cups, he says, is rather smooth, yet not as

* For photographs after which the illustration was executed, I am indebted to Dr. Hill and Judge M. F. Force, of Cincinnati. I had the stone drawn on wood in lead-pencil, and before handing over the block to the wood-engraver, I sent a photograph of the drawing to Judge Force for comparison with the original. He replied (January 16, 1881) as follows: "I think this does very well as a representation of the cup-stone. Of course, there is an exaggerated distinctness in the cups—that is, the shadow in the hollows is not so distinct, at least in our sunlight, as it is in the picture."—I hope the slightly exaggerated distinctness of the cups, alluded to by Judge Force, will be deemed allowable, the more so as the boulder was exposed to the action of water, and formerly doubtless exhibited more distinct cups

smooth as the cavities of another smaller specimen in the collection of the Society of Natural History. In one cup, he further observes, is a central depression about one-fourth of an inch in depth and of equal diameter. This central pit seems to have been made by means of some sharp-pointed instrument. But for this peculiarity the cup resembles the others excavated on the block. To judge from Dr. Hill's description, the feature just alluded to is not confined to a single cup, but is likewise noticed in others.

On one side of the block, says Professor Mickelborough, are some grooves four or five inches long, and likewise of artificial origin. They have the appearance of being worn down by rubbing continuously in one direction. The diameter of the grooves is equal to that of the cups, insomuch that a cylindrical stone applied in the direction of its longitudinal axis would have produced the grooves, and its end, by rotation, the cup-shaped cavities.

The correspondents who have furnished me with the material for this description offer no definite opinions as to the use of this remarkable cup-stone. Dr. Hill can think of no practical purpose to which the cups might have been applied by those who excavated them, unless they served "as means for imparting information to their friends." Similar views, as will be seen, have been advanced in Europe with reference to the large cup-stones in that part of the world.

Dr. Hill speaks of two much larger sandstone boulders, one with twenty-nine and the other with thirty-seven cups, which he saw near the bank of the Ohio, a few miles below Manchester, in Adams County, Ohio. No further particulars as to their appearance are given; but Dr. Hill intends to examine them again. He thinks it very difficult to remove them.

In October, 1878, the Rev. John J. McCook, of Hartford, Connecticut, addressed to the Smithsonian Institution a letter in which he describes a cupped granite boulder of large size, lying on the edge of the cliff not far from his cottage at Niantic, in New London County, Connecticut. A scale-drawing of the boulder, here reproduced in half-size, and without any artistic embellishment, as Fig. 43, accompanied his account, of which I give the following extract almost in his own words.

When Mr. McCook became cognizant of the existence of the block, it had been only five years in its present position. For several generations it had formed part of the foundation of a wall, and when the wall was removed, it was found almost imbedded in the soil. At that time he did not notice the peculiar markings upon it; but from the location of the moss which covers all below the dotted line *a b c* in the sketch, and is entirely absent upon what is now the upper surface, he concluded that the stone was overset in the removal. Not far from this boulder are several others, one of them weighing many tons, and nicely poised upon the very edge of the rocky cliff. Yet he searched in vain for any marks upon them, bearing the slightest resemblance to those upon the subject of his sketch. His attention was first drawn to these peculiar marks five or six years ago, while visiting the neighboring beach, the path leading there passing close by the cupped boulder. His first theory in regard to them was, that they might be the work of the Niantic Indians, a small tribe, extinct since 1870, to whom all the land in the immediate neighborhood of Niantic once belonged. But from the beginning he was at a loss to understand for what purpose they could have made these cup-shaped cavities. He thought they were too small to have served as mortars, and too symmetrical in their arrangement to have been used for grinding down the ends of pestles. In the meantime, however, Mr. McCook read in the "Journal de Genève" a review of some publications on cup-stones, and hence it occurred to him that the boulder under notice "might be one of that system of marked stones which are found all over the world, and are thought to have some relation to the religious life of primitive man."

The cups belonging to the central group, II, III, IV, and V, are strikingly regular and smooth. Nr. I is much less regular, and Nr. VI is so shallow and irregular that Mr. McCook discovered it only on close examination, and, indeed, is doubtful whether it deserves to be indicated as belonging to the same class with the rest. The dimensions of the cups are as follows:—

I.	Diameter, $2\frac{5}{8}$ inches.	Depth, $\frac{9}{16}$ inch.
II.	Diameter, $3\frac{1}{8}$ inches.	Depth, $\frac{9}{16}$ inch.
III.	Diameter, $3\frac{1}{8}$ inches.	Depth, $\frac{13}{16}$ inch.

IV. Diameter, $3\frac{1}{8}$ inches. Depth, $\frac{13}{16}$ inch.
V. Diameter, $2\frac{5}{8}$ inches. Depth, $\frac{9}{16}$ inch.
VI. Diameter, $1\frac{13}{16} \times 2\frac{7}{8}$ inches. Depth, $\frac{1}{4}$ inch.

The centre of III is a trifle out of the line between the centres of II and IV.

Of the lines or grooves upon the side of the boulder, the irregular curved one may simply mark the boundary of erosion caused by the elements, and the straight ones may be nothing but common striæ. The stone is a hard granite of tolerably fine texture. Its present upper surface is clean and smooth, and entirely free from moss. The portion of the side below the dotted line in the sketch and the present under-surface, as far as Mr. McCook could ascertain without turning the stone quite over, are covered with moss. The boulder measures nearly six feet and a half in its greatest dimension.

So far Mr. McCook. It becomes evident by his description that the cavities on the Niantic boulder are somewhat different from those on the Cincinnati block, and possibly may have been designed for another purpose. Rounded stones with single cavities not larger and deeper than those described by Mr. McCook are not rare in the United States, and were evidently used as mortars; and larger cavities which have served for the same purpose are excavated on rocks *in situ* in certain parts of this country, as I shall have occasion to state more in detail hereafter. However, not having seen the Niantic boulder, I will refrain from expressing with any degree of positiveness an opinion at variance with Mr. McCook's view.

For the present my information with regard to large cupped stones or boulders in the United States goes no further. The discovery of others is a mere question of time. They will be found when properly looked for.

As early as 1805, Captain William Dupaix, charged by the King of Spain with an exploration of the antiquities of Mexico, saw not far from Orizaba what has been thought to be a cup-stone. Many years afterward a duplicate of his report and copies of the designs made by his artist, Castañeda, were published in Lord Kingsborough's "Mexican Antiquities" (Volumes IV, V, and VI, 1830–'31). A few years later, in 1834, the work entitled "Antiquités Mexicaines" (by Alexandre Lenoir) was published at Paris.

It embodies Captain Dupaix's original report with illustrations made directly after Castañeda's drawings. Both publications give a representation of the stone in question; but these designs are so unlike each other that it is impossible to form a correct idea of its character. Fig. 44 is a copy of Lord Kingsborough's illustration.* The figure shows fourteen well-defined cup-shaped cavities, perfectly resembling those on the stones heretofore described. In the later work--"Antiquités Mexicaines"—which might be supposed to be the more reliable one, the stone is figured on a larger scale,† but bears only in outline a resemblance to Kingsborough's illustration. Instead of distinct cups it merely shows a number of irregular cavities, totally different from the cups indicated on Kingsborough's plate. Hence there remains a doubt as to the real appearance of the stone, which will not be removed before it has been examined again by some explorer. I translate the description of the stone, as given by Dupaix in "Antiquités Mexicaines":—

"From this place (Orizaba) we proceeded toward the bridge across the river Blanco, sixteen leagues southeast of the city, in order to examine a rock called *Teololinga*. It is spherical in shape, very hard, of a bluish-black color, and emits no fire when struck with a steel. It has been skillfully placed in the midst of an extensive savanna. It measures about twenty-two feet and a half in circumference and a little more than six feet in diameter. This stone, poised upon its axis by those who formerly fashioned it, has the peculiarity that, when touched only with the little finger, it moves and continues to vibrate for some time; while it remains apparently motionless when a greater force is applied. On its surface are seen some circular holes (*trous circulaires*) of little depth, which can hold water in seasons of rain. It appears to have served in olden times as a boundary or land-mark (*de borne ou de limite*), for there is another one at a distance of two leagues from it."‡

* Vol. IV, The Monuments of New Spain, by M. Dupaix, Part I, Plate IV, Fig. 10.

† Atlas, Première Partie, Planche VIII.

‡ Antiquités Mexicaines; Relation de la Première Expédition du Capitaine Dupaix en 1805, Vol. I, p. 7.—For the sake of comparison I copy here the less complete description published by Lord Kingsborough:—"From hence (Orizaba) we went to the bridge of the river Blanco, about forty-eight miles south-east of Orizaba, in search of a large stone called Teololinga. This stone is spherical in its form, very hard (though it will not emit fire when struck by the steel), and of a dark-blue colour. It has evidently been wrought into its present shape, and placed in the middle of a spacious plain, by the ancient

I am not aware that other stones of analogous character have been noticed in Mexico; nor have I thus far obtained precise information as to the occurrence of cupped stones or boulders in parts of the American continent which are situated south of Mexico.*

In connection with North American cup-stones should be mentioned boulders or rocks with an artificial cavity, or with cavities, serving for the trituration of grain, and thus forming what might be called stationary mortars. Their occurrence extends over a large portion of North America; but there is considerable difference in the character of the cavities, as the following statements will show.

Colonel Jones saw in the middle and upper parts of Georgia "large boulders—some of them waist-high—permanent in their location, whose tops had been hollowed out for mortars. These cavities were circular in form, and capable of holding a half peck or more. They may be regarded as public property, and afford proof of the stability of the agricultural population by which they were used."† In historical times, however, the southern tribes to whom Colonel Jones refers are known to have generally used wooden mortars for pounding maize. Adair alludes to their use and describes the method of hollowing them out by means of fire.‡ Hunter notices the wooden mortars of the Indians among whom he lived; but "in addition," he says, "each village has one or two large stone mortars for pounding corn: they are placed in a central situation, are public property, and are used in rotation by the different families."§

inhabitants of the country. It is so artfully balanced upon its axis as to revolve at the slightest touch of the finger; but if a greater force be used it will stand without the least apparent motion. Its surface contains some holes capable of holding a small quantity of water. It appears to have anciently served as a land-mark. There is another of these stones to the east, about six miles distant."—Vol. VI, *The Monuments of New Spain, by M. Dupaix*, p. 425.

*I quote, however, from the "Matériaux" (1867, p. 398) the following note, addressed to M. Gabriel de Mortillet by Professor P. Strobel, and dated Buenos Ayres, May 26, 1866:—

"Après les articles de Morlot, Aymard Simonin et Bouvet, sur les pierres à écuelles et à bassins, il ne sera pas sans intérêt pour vous d'apprendre qu'on en trouve de semblables dans la Sierra de San Luis. On y voit de très-nombreux bassins creusés dans la roche, de diverses dimensions. Ils ont servi aux Indiens pour écraser et broyer les fruits et les graines, et peut-être même, à une époque moins ancienne, pour triturer le minerai aurifère de ces montagnes. Il existe aussi des pierres à bassins dans les montagnes de Mendoza, datant de l'époque des Incas. Ces divers bassins ont pu servir à trois usages bien différents: réligieux, gastronomique et métallurgique."

†Jones (Charles C.): Antiquities of the Southern Indians; p. 313.

‡Adair: The History of the American Indians; p. 416.

§Hunter: Manners and Customs of Several Indian Tribes located west of the Mississippi; Philadelphia, 1823, p. 269.

A boulder formerly used as a mortar is thus described by Professor Samuel Aughey, of the University of Nebraska:—"Four miles northwest of Nebraska City, on the farm of Hon. J. F. Kinney, is a granitic boulder as large as a small house, on whose top smooth holes have been worn by the Indians in grinding or pounding corn. This boulder is imbedded in a Loess deposit, through which it extends from the Drift below."* Upon inquiry by letter, I learned from Professor Aughey that the most conspicuous of the cavities measures fourteen inches in diameter and six in depth Its inside, he says, is worn as smooth as glass. The other cavities on this boulder are shallow and faint compared to this one.

In the Sierra Waco, in the extreme northwestern corner of Texas, about thirty miles east of El Paso, State of Chihuahua, Mexico, the Hon. John R. Bartlett noticed "an overhanging rock extending for some distance, the whole surface of which is covered with rude paintings and sculptures, representing men, animals, birds, snakes, and fantastic figures.— — — On the shelving portion of the place in question are several circular holes in the solid granite, from twelve to fifteen inches deep, which the Indians have made and used as mortars for pounding their corn in; similar ones being found all over the country where the aborigines have had their habitations."† Afterward, while proceeding in Chihuahua from Correlitos to El Paso, Mr. Bartlett saw a smooth rock covering about half an acre, to the right of the road. In this rock he counted twenty-six cavities within a few feet of each other. They were from twelve to eighteen inches deep and about six in diameter, and had been dug out to serve as mortars.‡ In a letter addressed to me he adds:—"I remember that there was at that place a great quantity of flint chippings, broken arrow and spear-heads, fragments of pottery, etc., showing that the Indians had spent much time here in making their stone implements."

I am indebted to Mr. Stephen Bowers, at present residing in Clinton, Wisconsin, for the following account of rocks with mortar-cavities seen by him in California. He says:—

"These are not unfrequently met with in Santa Barbara County, Cali-

*Aughey: Sketches of the Physical Geography and Geology of Nebraska; Omaha, Nebraska, 1880, p. 256.

†Bartlett: Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, etc.; New York, 1854, Vol. I, p. 170.

‡ *Ibid.*, Vol. II, p. 370.

fornia. I have also seen them in Napa Valley, fifty miles north of San Francisco; indeed, I deem it safe to say they may be found in nearly every portion of California, especially on and near the old village sites once inhabited by the less nomadic tribes.

"But the most remarkable of these excavations I discovered on the summit of the Santa Inez range of mountains, in Santa Barbara County, about one mile west of the stage-road-crossing, and at an elevation of 2,500 feet above the sea-level. Here is an open space of nearly level land, several acres in extent, where springs of cool sweet water rise, and, uniting, send a sparkling rivulet down the mountain-side. Elevations, covered with timber, form this into an amphitheater, while mountain-peaks rise in every direction. In this romantic spot the aborigines founded a village, which must have been occupied for a great length of time. Although the place is now enclosed as a field, and the site of the old village has been ploughed and tilled by white men, yet the circular depressions indicating the dwelling-places of the Indians are plainly seen. Marine shells, brought from the ocean, six or seven miles distant, are scattered over the entire surface of the old village site, with bones and other kitchen débris. Near this village site is a sort of natural grotto in the solid rock, covered with rude paintings of a very interesting character, which probably record the more important events in the lives of the villagers.

"Within the confines of the old town are two large boulders of sandstone, into which conical excavations have been made, and used as mortars for triturating grain, acorns, etc.; also cup-shaped depressions, the purpose of which is not clear to my mind. The largest of these boulders (Fig. 45) is twenty-five feet in length, by about ten feet in width, and shows twenty-five excavations, measuring from six to twenty-six inches in diameter at the top, and from five to sixteen inches in depth. The average width of these mortar-cavities is a little over thirteen inches, and the depth something more than eleven inches. The smallest is six inches in diameter and five inches deep, while the largest is twenty-six inches in diameter and sixteen inches in depth. In one instance a wide groove is cut between two of these excavations, one being probably used for pulverizing the grain, and the other as a receptacle for the meal. In another instance two of the cavities are

worn until they meet. With one exception, these mortar-shaped excavations are circular, and nearly as perfect, usually, as if laid out with dividers. The exception is an oblong excavation, the greater axis measuring seventeen inches, the shorter about eight inches.

"The boulder has doubtless been used for this purpose a great length of time, indicating the comparative stability of the tribe once living here. I was unable to find the pestles which were used in these mortars. It was the practice of the Santa Barbara Indians to bury pestles and other objects with the dead, and I presume there was no exception in this case.

"The smaller boulder measures about eleven feet by nine and a half on the surface, rising to the height of six feet above the earth. It contains eleven depressions, two or three of which seem to have been used as mortars; but the others, which are quite shallow, probably served some other purpose.

"In the cañons and on the foot-hills along the Santa Inez range, I have frequently met with boulders containing from one to three or four mortar-excavations."

It appears to me that some of the boulders and rocks called *pierres à bassins* by French, and *Muldensteine* by German archæologists, may be considered as stationary mortars. Their resemblance to undoubted American mortars of this kind at least would lead me to that conclusion. M. Morlot, for instance, describes such a block near the new road passing over Mount Simplon (Canton of Valais). It has the shape of a rough column or a trunk of a tree, is one meter and five centimeters high, and ninety centimeters in diameter. In the centre of its upper surface is a cavity of twenty-one centimeters diameter and nine centimeters depth. There are three smaller cavities on the same surface.* The height of the block and the dimensions of the cavity certainly favor my view. Though I could furnish many similar examples, I confine myself to the one just given, not wishing to enlarge on a question which must be decided by European archæologists.

* Morlot: Pierres à Écuelles; Matériaux, 1866, p. [illegible].—This periodical contains several articles relating to stones with cavities, which apparently have served as mortars.—

In reading Dr. L. Zapf's article "Die Muldensteine des Fichtelgebirges" in "Beiträge zur Anthropologie und Urgeschichte Bayerns" (Bd. III, S. 39), I could not help thinking that the cavities described by him might be, in part at least, the mortars in which the prehistoric people of that region pounded fruits or cereals.

I can perceive, however, that their nomenclature in regard to stones bearing cups and larger cavities is not sufficiently precise. The terms *pierres à écuelles* and *pierres à bassins* are indiscriminately used, whereas, in my opinion, a proper distinction between the two classes of cavities indicated by them might with advantage be made.

Since my attention was directed to the subject treated in these pages, I have examined many representations of figures sculptured or painted on rocks in the United States, in order to ascertain whether there occur among them any designs analogous to those of the Old World. While engaged in this investigation, I received from Dr. Charles H. Stubbs, of Wakefield, Lancaster County, Pennsylvania, lithographic representations of a sculptured rock, called Bald Friar Rock, in the Susquehanna River, not far from its embogement into the Chesapeake Bay.* I discovered by means of the lithographs that several figures on that rock recall certain types of the lapidarian sculptures of Great Britain, and mentioned the fact to the Secretary of the Smithsonian Institution, Professor Spencer F. Baird, who thereupon instructed Mr. F. G. Galbraith, of Lancaster County, Pennsylvania, to examine the locality and to make drawings of the figures in question.† His report and several communications from Dr. Stubbs are embodied in the following account:—

Bald Friar Rock is situated in the Lower Susquehanna, in Cecil County, Maryland, and is about three-eighths of a mile distant from Bald Friar, a station of the Columbia and Port Deposit Railroad. The rock stands nearer the eastern than the western bank of the Susquehanna—here three-quarters of a mile wide—and its distance from the mouth of the river is nearly twelve miles. It rises from a small island to a height of eight feet and a few inches above low-water level, and can be reached by land at very low water. According to Mr. Galbraith's measurement, the rock was originally seventy-one feet long and ten feet wide; but only sixteen feet of its eastern and seventeen of its western portion remain, the

* The same plates illustrate now the "Second Geological Survey of Pennsylvania" (Geology of Lancaster County, Harrisburg, 1880).

† Acknowledgments are also due to Dr. L. R. Kirk, of Rising Sun, Cecil County, Maryland, for a very good drawing of Bald Friar Rock, sent by him to the Smithsonian Institution. It was of great use as a medium of comparison.

centre—thirty-eight feet—having been blasted away many years ago, and the stone used in the construction of a shad-fishery. By this process many carvings were destroyed, traces of which Mr. Galbraith discovered upon fragments of rock scattered over the upper end of the island. The rock evidently was entirely covered with sculpturings. A large portion of its northeastern end is becoming detached from the main body, and will in the course of a few years topple over into the river, for which reason Mr. Galbraith was particularly anxious to trace all the carvings on it. To judge from a detached sculptured piece sent by Mr. Galbraith to the Smithsonian Institution, the rock is of a chloritic character, and consequently not very hard, insomuch that the sculpturing of the figures by means of pecking or punching with stone implements was not a very difficult task. All who have examined the sculptures agree as to their very ancient appearance. They are of a heterogeneous and peculiar character, and in many respects unlike any rock-cuttings of which I have seen representations. There is, for instance, a curious combination of straight and curved lines, forming a labyrinthic figure, which cannot be compared to any known object. In another group, shown in Fig. 46, cup-shaped depressions, from three-eighths to three-fourths of an inch in depth, are mingled with curiously-formed lines, the whole producing a semblance to characters, which the makers certainly did not intend to represent. Rows of four, five or more parallel, or nearly parallel, lines are not unfrequent, and in one instance a design appears which has been compared to a gridiron. Several of the figures resemble a plant with a median stem and lateral branches. The most conspicuous of these carvings happens to be on the slab forwarded to the Smithsonian Institution by Mr. Galbraith, and is here represented as Fig. 47. It measures two feet in length and fifteen inches and a half in its largest width. The central stem of the carving terminates in a figure in which a lively imagination might discover a fruit or flower. The incised lines forming the design are shallow, not exceeding one-fourth or three-eighths of an inch in depth, on an average an inch wide, and betoken just such skill in sculpture as might be expected from a primitive people that had only tools of stone at its command.

The northeastern end of the rock, the one in danger of falling one day

into the river, is represented by Fig. 48, after a photograph kindly loaned to me by Dr. Stubbs.* It shows four figures somewhat resembling human faces, and four concentric rings with a cup-shaped depression in the middle. These circles appear foreshortened in the sketch, but are correctly represented in Fig. 49, in one-twelfth of the real size. This type, as has been seen, occurs frequently among the primitive lapidarian sculptures of Europe; but hardly any ethnic significance can be ascribed to the presence of the same design on Bald Friar Rock. It is a form which, on account of its simpleness and regularity, doubtless suggested itself to nations who never came in contact with each other, and who employed it either as an ornament or for some symbolical purpose.† Of far greater interest, on the other hand, are Figures 50 and 51, carefully copied by Mr. Galbraith from the rock in the Susquehanna River. Both consist of concentric rings, the outer of which has an appendage in the shape of a long straight groove, a feature which assimilates these carvings in a high degree to types of the Old World heretofore described, more especially to Figures 29, 30, and 31, which represent Mahadeos in the Chandeshwar temple. Upon examination, it will be found that the resemblance is very great—indeed so striking, that an enthusiastic theorist might feel tempted to claim a kinship between the Asiatic Mahadeo-worshipers and those who sculptured the figures in question on Bald Friar Rock. Yet, notwithstanding the similarity the latter bear to the Chandeshwar sculptures, they may have been intended to express a totally different idea. We must wait for more convincing disclosures.

* For the sake of greater distinctness, I had the carved figures executed in black. On the upper part of the rock are seen a few single cups.

† Concentric circles, sculptured as well as painted on rocks, were frequently seen by Major Powell and his assistants in Utah, Arizona, and New Mexico. Many of them are known to have been executed by the aborigines of those districts. Further on it will be seen that they are perhaps even now painted on rocks in the district of the Klamaths in Oregon, and were formerly carved on boulders in Central America. In 1879 the Smithsonian Institution received from Mr. W. W. Hays photographs of paintings on a rock in San Luis Obispo County, California. They consist of figures of a most complicated character, among which several concentric circles appear. The colors, as Mr. Hays states in an accompanying letter, are red, white, and black. The locality is mentioned in Bancroft's "Native Races" (Vol. IV, p. 691). Indeed, concentric circles seem to be ubiquitous. The late Professor C. F. Hartt observed them, associated with a variety of other figures, in different parts of Brazil, as shown by his account in the "American Naturalist," May, 1871.

Among the Ojibways concentric circles constituted, according to Schoolcraft, the symbol of time (Vol. I, p. 409; Plate 58, Fig. 67).

A similar figure, consisting of two concentric circles with a straight line running out from the larger circle, occurs, among other carvings, on one of the many sculptured boulders seen by Mr. Bartlett in the valley of the Gila River, in Arizona. His representation of this boulder is here copied as Fig. 52. "I found hundreds of these boulders," he says, "covered with rude figures of men, animals, and other objects of grotesque forms, all pecked in with a sharp instrument. Many of them, however, were so much defaced by long exposure to the weather, and by subsequent markings, that it was impossible to make them out. Among these rocks I found several which contained sculptures on the lower side, in such a position that it would be impossible to cut them where they then lay. Some of them weighed many tons, and it would have required immense labor to place them there, and that too without an apparent object. The natural inference was, that they had fallen down from the summit of the mountain after the sculptures were made on them.* A few only seemed recent; the others bore the marks of great antiquity.

"Like most of the rude Indian sculptures or markings which I have seen, I do not think these possess any historic value, as many suppose. Where an ingenious Indian, for the want of other employment, cuts a rude figure of a man or an animal on a rock in some prominent place which his people make it a practice to resort to, others, with the example before them, endeavor to compete with their brother artist, and show their skill by similar peckings. One draws an animal such as he sees; another makes one according to his own fancy; and a third amuses himself with devising grotesque or unmeaning figures of other sorts. Hence we find these sculptured rocks in prominent places."

Referring to the special assemblage to which the block here figured belongs, he observes:—

"After crossing a plain for about five miles, we reached the object of our search, which consisted of a pile of large boulders, heaped up some forty or fifty feet above the plain, and standing entirely alone. Such of these rocks as present smooth sides are covered with sculptures, rudely pecked in, of animals and men, as well as of various figures, apparently

*The boulders were lying at the base of a bluff.

without meaning. There are hundreds of them so ornamented, showing that the place has long been the resort of the Indians for this purpose; for there seems to be nothing else to attract them here. Many of the inscriptions, like those before described, bear the stamp of great age; others having been made over them repeatedly, render it impossible to trace out either the early or the later markings.———I do not attempt any explanation of these rude figures, but must leave the reader to exercise his own ingenuity in finding out their meaning, if any."*

Mr. Bartlett presents delineations of eleven of these blocks, thus enabling the reader to become acquainted with the character of the sculptures upon them. I hardly can imagine that the latter should be absolutely without some meaning, though they may not express anything like a definite record. I lay no great stress on the presence of a Mahadeo-like carving on the boulder represented by Fig. 52; but I thought it proper to draw attention to it.

A similar motive induces me to present in Fig. 53 the design of a portion of a group carved on a cliff in the San Pete Valley, at the city of Manti, Utah. A line drawn horizontally through the middle of the parallel lines connecting the concentric circles would divide the figure into two halves, each bearing a close resemblance to Professor Simpson's fifth type in Fig. 1 of this treatise. A copy of the group in question was made and published by the ill-fated Lieutenant J. W. Gunnison, who also informs us that the Mormon leaders made this aboriginal inscription subservient to their religious hocus-pocus by giving the following translation of it: "I, Mahanti, the second King of the Lamanites, in five valleys in the mountains, make this record in the twelve-hundredth year since we came out of Jerusalem—And I have three sons gone to the south country to live by hunting antelope and deer."† Truly, *mundus vult decipi!* Schoolcraft attempts (Vol. III, p. 494) something like an interpretation, which appears to me fanciful and unsatisfactory.

* Bartlett: Personal Narrative, etc.; Vol. II, pp. 195, 206.

† Gunnison: The Mormons or Latter-Day Saints, etc.; Philadelphia, 1853, p. 63.—The illustration is taken from Bancroft's "Native Races" (Vol. IV, p. 717). I have changed, however, in accordance with Lieutenant Gunnison's design, the position of the grotesque human figure to the left of the concentric circles.

Among the Klamath Indians in Oregon, it seems, the practice of painting figures on rocks has not yet entirely gone into disuse. Through the mediation of Mr. Albert S. Gatschet I received from Dr. James S. Denison, physician at the Klamath Agency, Lake County, Oregon, a communication relative to the subject. According to my correspondent, there are in that neighborhood many rocks bearing painted figures; but his description refers specially to a single rock, called *Ktá-i Tupákshi* (standing rock), situated about fifty yards north of Sprague River, and one hundred and fifty yards from the junction of Sprague and Williamson Rivers. It is about ten feet high, fourteen feet long, and twelve or fourteen feet deep. The accompanying Figures 54, 55, 56, and 57, all drawn in one-twelfth of the natural size, after Dr. Denison's copies, illustrate the character of the paintings seen on the smooth southern surface of this rock. The most frequent designs are single or concentric circles, like Fig. 54, which consists of a dark-red circle surrounded by a white one, the centre being formed by a red round spot. Fig. 55, painted in dark-red and white colors, exhibits a somewhat Mahadeo-like shape; the straight appendage of the circle is provided on each side with short projecting lines, alternately red and white, and almost producing the effect of the so-called herring-bone ornament. Figures 56 and 57, executed in dark-red color, are other characteristic designs seen on the rock in question. The colors, which, as my informant thinks, are rubbed on with grease, appear quite distinct on the dark surface of the rock.

"I have conversed," he says, "with all the leading men and women of the tribe about these pictures and others in the neighborhood; but none of them know, so they say, when and how they were made. It is, however, the generally-received opinion that *K'mákamtsh*, the Creator*, painted them himself when he made this country. The oldest people say that they were there when they were young, and that the oldest people told them that they were there when *they* were young, and so on. There are many rocks with pictures on them all over this country. These places are all sacred, and there are many legends concerning them. Children are taught not to injure or deface the pictures. My own opinion is, that these pictures have no more definite meaning than those made by children without any design;

* "The Old Man of Our Forefathers," according to Mr. A. S. Gatschet.

that they last perhaps for ages unimpaired; but that, when they do get dim, there is always some enterprising doctor ready to brighten them up, and, perhaps, to execute new designs. One can see blotches on the rocks which are very dim, but look as though they had been figures. The pictures are not critically examined by the Indians, and as no one sees the man making them, it is easy to claim that they have always existed; for Indians, like whites, have no objection to pious frauds and lies. They are such liars that it is hard work to find out even the legends concerning the places. They either change them to make them like something they have heard of as being mentioned in the Bible, or leave out a part, insomuch that one can hardly find two who relate the same story in the same way."

Such are Dr. Denison's remarks, complimentary neither to Indians nor to whites. He then gives a Klamath tradition relating to K'múkamtsh, which I deem it unnecessary to insert, as it has no reference to the rock-paintings just described.

CENTRAL AMERICA.

Lastly, I will draw attention to the curious rock-sculptures which Dr. Berthold Seemann, the distinguished botanist, examined in Chiriqui, in the State of Panama, United States of Colombia, and in which he discovers a great resemblance to those of Northumberland, Scotland, and other parts of Great Britain. After some preliminary remarks, of no particular interest to the reader who has thus far followed me, he continues:—

"It is, therefore, all the more singular that, thousands of miles away, in a remote corner of tropical America, we should find the concentric rings and several other characters typically identical with those engraved on the British rocks. I discovered them near the town of David, in Chiriqui, in the spring of 1848, and read a paper on the subject before the Archæological Institute, shortly after my return to London in 1851. A brief account of it was given in my 'Narrative of the Voyage of H. M. S. Herald' (Vol. I, p. 312, London, 1853), but the drawings illustrating them were unfortunately

omitted, the publisher objecting to them on account of the expense; but some of them were afterward placed by me at the disposal of Mr. Bollaert, and published by that gentleman in his 'Antiquities, etc., of South America, (London, 1860), whilst others have been, it is feared, entirely lost, especially those which would have established the identity of the British and Chiriqui inscriptions beyond doubt *in the minds of others*. For my own part, I was so much struck with the general resemblance, not to say identity, of the two, that when the plates of Mr. Tate's work were first shown to me, and I was quite ignorant to what country they related, I fully believed them to represent Chiriqui rock-inscriptions. Even from the drawings I still retain of a Chiriqui rock I am able to pick out some of the most typical characters found on the British rocks, as the accompanying diagrams—here Fig. 58—will show.*

"The characters in Chiriqui are, like those of Great Britain, incised on large stones, the surface of which has not previously undergone any smoothing process. The incised stones occur in a district of Veraguas (Chiriqui or Alanje), which is now thinly inhabited, but which, judging from the numerous tombs, was once densely peopled by a nation which became known to Columbus in his fourth voyage of discovery, manufactured some elegantly-shaped pottery, wore ornaments made of gold of a low standard, called *quanin*, and buried their dead in stone cists, accompanied by their weapons, ornaments, pottery, and other household articles.†

* The explanations accompanying Fig. 58 are likewise Dr. Seemann's.

† Dr. Seemann adds here the following note: 'This very same people, supposed to have been the Dorachos or Dorazques, had also made considerable progress in sculpturing columns, and placing on them raised characters. Several of these columns, about ten to twelve feet long, were knocking about the streets of David, the capital of Alanje, or Chiriqui, during my visit in 1848, and numbers are said to occur in other places. Raised characters require, of course, more artistic skill than incised ones, and hence denote a higher degree of civilization. If, therefore, the people who readily engraved their thoughts on the *piedra pintal*, and other stones of which it is the type, are assumed to have been the same as those who expressed them in raised characters on the columns of which I saw specimens at David, a long period must have elapsed before tools could be brought to such perfection as to allow the employment of inscriptions in relief. But there is no identity of, or even distant resemblance between, the incised and raised characters, and we need, therefore, not trouble ourselves any further about this point. The identity of the two being abandoned, it may just be worth while to consider the possibility of their being executed by contemporaries. In highly civilized countries, such as ancient India, Egypt, and modern Europe, different modes of expressing thought have been and are practised; but the most advanced people who ever inhabited Chiriqui had not attained so high a degree of civilization as would justify us in assuming that they resorted to two entirely different systems of recording their ideas. It is, therefore, scarcely possible to escape the conclusion that the incised characters were by a different, less civilized, and more ancient race than the characters in relief.'

"From information received during my two visits to Chiriqui, and from what has been published since I first drew attention to this subject, I am led to believe that there are a great many inscribed rocks in that district. But I myself have seen only one, the now famous *piedra pintal* (*i. e.* painted stone), which is found on a plain at Caldera, a few leagues from the town of David. It is fifteen feet high, nearly fifty feet in circumference, and rather flat on the top. Every part, especially the eastern side, is covered with incised characters about an inch or half an inch deep. The first figure on the left-hand side represents a radiant sun, followed by a series of heads, or what appear to be heads, all with some variation. It is these heads, particularly the appendages (perhaps intended for hair?), which show a certain resemblance to one of the most curious characters found on the British rocks (2*b* in Fig. 58), and calling to mind the so-called 'Ogham characters.' These 'heads' are succeeded by scorpion-like, or branched, and other fantastic figures. The top of the stone, and the other sides, are covered with a great number of concentric rings and ovals, crossed by lines. It is especially these which bear so striking a resemblance to the Northumbrian characters.

"Symmetry being the first aim of barbarous nations in their attempt at ornamentation, I have always rejected the idea that these figures are intended for mere ornament, and have taken them to be symbols full of meaning, and recording ideas held to be of vital importance to the people who used them, and whose very name has become a matter of doubt. However, to speculate on their meaning must be labor thrown away, until we shall have become acquainted with all the inscriptions, of which those on the *piedra pintal* are specimens.

"At present we can hardly say more than that there is a remarkable family likeness, if nothing more, between the ancient British and Chiriqui inscriptions,—a relationship entirely unsuspected by me until Mr. Tate's remarkable work fell into my hands. Could an *identity* between these rocks, so widely separated geographically, be established, we should be in a position to indulge in legitimate speculation. We should have to concede—I say it without hesitation—that, in prehistoric times, an intercourse existed between the British Islands and Central America; that this inter-

course could not be maintained by the small crafts which so rude a civilization could send across the wide Atlantic Ocean; that a land communication was absolutely necessary to ensure such an intercourse; that it could not have been carried on by way of Asia without leaving numerous traces behind; that no such traces have been found; and that, consequently, it must have taken place when the Island of Atlantis—in the hands of modern science no longer an Egyptian myth—was so intimately connecting Europe and America; that the woods, which then covered Europe, were identical in character with those *still existing* in the southern parts of North America. But before science can concede conclusions of these, or similar, speculations, we want more facts, which, it is hoped, may be forthcoming now that it has been shown what great interest attaches to them."*

Leaving aside Dr. Seemann's far-reaching speculations, I must confess that I cannot share his enthusiasm in the matter of the Chiriqui rock-sculpture described by him. Being in possession of Mr. Bollaert's work which contains Dr. Seemann's representation of the *piedra pintal*, I was enabled to compare the sculptures on the latter with those figured by Messrs. Tate and Simpson. That there is a general resemblance between the Northumbrian and Scottish and the Chiriqui sculptures cannot be denied; but I can discover no figures on the *piedra pintal* which are *identical* in shape with European lapidarian sculptures, excepting concentric circles and a few carvings resembling wheels with four spokes. Simple devices like these, when found in different countries, are no proof of the ethnic affinity of those who executed them, but may rather be considered as the result of independent invention. It requires a far greater analogy in details to establish an absolute identity.

However, it would be interesting to know the character of other Chiriqui rock-sculptures, which, according to Dr. Seemann, are quite frequent in that district.

* Pim and Seemann: Dottings on the Roadside, in Panama, Nicaragua, and Mosquito; London, 1869, p. 27, etc.

PART III.

VIEWS CONCERNING THE SIGNIFICANCE OF CUP-SHAPED AND OTHER PRIMITIVE SCULPTURES.

In a preceding section of this essay I have described the cupped granite boulder, called the Balder Stone, near Falköping, Sweden. As stated, it was first brought into notice by Professor Nilsson, who thinks it served in the worship of Baal as a sacrificial altar, the cup-shaped cavities of which were designed to receive the blood of victims. The cups on the Willfara slab (Fig. 23), he believes, were excavated for the same purpose. We have also seen that he ascribes the introduction of bronze in the North of Europe to Baal-worshiping Phœnicians, who, according to his view, had established factories or settlements in those parts, for the purpose of trading with the natives. He considers the sculptured concentric circles in general as emblematic of sun (or Baal)-worship, drawing at the same time attention to their similarity to ornaments seen on weapons and other objects of the bronze age and even of the early iron age. In order to show by what mode of reasoning Professor Nilsson was led to these conclusions, it will be necessary to devote some space to a consideration of his remarkable work on the bronze age, in which his views are laid down. Yet, if I were to give a résumé of its contents, and comments thereon, I would enter upon a task most ably performed by Sir John Lubbock, and I therefore quote his concise observations in full:—

"Professor Nilsson's arguments," he says, "may be reduced to seven, namely, the small size of the sword-handles, bracelets, etc.; the character of the ornaments on the bronze implements; the engravings in bronze-age tumuli; the worship of Baal; certain peculiar methods of reaping and fishing; and the use of war-chariots.

"The implements and ornaments of bronze certainly appear to have belonged to a race with smaller hands than those of the present European nations; the ornaments on them are also peculiar, and have, in Professor Nilsson's opinion, a symbolic meaning. Although the great stones in tumuli attributed to the bronze age are very seldom ornamented, or even hewn into shape, still there are some few exceptions; one of these being the remarkable monument near Kivik in Christianstad. From the general character of the engravings Professor Nilsson has no hesitation in referring this tumulus to the bronze age, and on two of the stones are representations of human figures, which may fairly be said to have a Phœnician or Egyptian appearance.

"On another of the stones an obelisk is represented, which Professor Nilsson regards as symbolical of the sun-god;* and it is certainly remarkable that in an ancient ruin in Malta, characterized by other decorations of the bronze-age types, a somewhat similar obelisk was discovered; we know also that in many countries Baal, the god of the Phœnicians, was worshiped under the form of a conical stone.

"Nor is this, by any means, the only case in which Professor Nilsson finds traces of Baal-worship in Scandinavia. Indeed, the festival of Baal, or Balder, was, he tells us, celebrated on Midsummer's-night in Scania, and far up in Norway, almost to the Loffoden Islands, until within the last fifty years. A wood fire was made upon a hill or mountain, and the people of the neighborhood gathered together, in order, like Baal's prophets of old, to dance round it, shouting and singing. This Midsummer's-night fire has even retained in some parts the ancient name of 'Baldersbal', or Balder's fire. Leopold von Buch long ago suggested that this custom could not have originated in a country where at Midsummer the sun is never lost sight of, and where, consequently, the smoke only, not the fire, is visible. A similar custom also prevailed until lately in some parts of our islands. Baal has given his name to many Scandinavian localities, as, for instance, the Baltic, the Great and Little Belt, Belteberga, Baleshaugen, Balestranden, etc.

"The ornamentation characteristic of the bronze age is, in the opinion of Professor Nilsson, decidedly Semitic rather than Indo-European. He

* See Fig. 24 of this publication.

lays considerable stress on two curious vase-carriages, one found in Sweden and the other in Mecklenburg, which certainly appear to have been very like the 'vases' made for Solomon's temple, and described in the first Book of Kings. Finally, he believes that the use of war-chariots, the practice of reaping close to the ear, and a certain method of fishing, are all evidences of Phœnician intercourse.

"Professor Nilsson is so great an authority, as an archæologist his labors have contributed so much to place the science on a sound basis, that his opinions are deserving of the most careful consideration. Nor can they fairly be judged by the very short abstract which has been given above, as many of his arguments must be followed in detail before they can be properly appreciated. That the Phœnicians have left their traces in Norway is, however, in my opinion, all that can fairly be deduced from the facts on which he relies, even if we attribute to them all the significance claimed for them by him. Further evidence is required before it would be safe to connect them with the bronze age. As regards the smallness of the hands, we must remember that Hindoos share this peculiarity with Egyptians. This character is therefore not less reconcilable with an Indo-European than with a Phœnician origin of the bronze-age civilization.

"There are three strong objections to the theory so ably advocated by Professor Nilsson. The first is the character of the ornamentation on the bronze weapons and implements. This almost always consists of geometrical figures, and we rarely, if ever, find upon them representations of animals or plants; while on the ornamented shields, etc., described by Homer, as well as in the decoration of Solomon's temple, animals and plants were abundantly represented. Secondly, the burial-customs of the Phœnicians differed altogether from those of the bronze age, and although it may be said that those who attribute the presence of bronze in Northern and Western Europe to Phœnician commerce, do not necessarily, on that account, assume that the population of those countries became Phœnician, still in this case the hypothesis explains the presence of bronze, but not the bronze age, of which the use of bronze, though the most striking, is by no means the only characteristic. Thirdly, the Phœnicians, as far as we know them, were well acquainted with the use of iron; in Homer we

find the warriors already armed with iron weapons,* and the tools used in preparing the materials for Solomon's temple were of this metal It is very remarkable that scarcely any traces of ancient commerce have been found in Cornwall, and it is much to be regretted that our museums possess so few specimens of Phœnician art. When these wants shall have been supplied, as we may hope that ere long they will be, there is no doubt that much light will be thrown on the subject."†

Professor Nilsson, I may add, finds distinct traces of the Phœnicians in Ireland, which country he visited in 1860, with a view to examine its antiquities. He ascribes to that enterprising people the cairns of Dowth and New Grange, the chambers of which show sculptured figures (zigzags, wheels with four spokes, etc.) resembling those on the slabs of the Kivik monument. He lays particular stress on the fact that the custom of lighting a Midsummer's-night fire, and of dancing around or jumping through it, was still in vogue among the Irish until within a recent period. This ceremony, called *Balstein* by the people, has been abolished through the efforts of the clergy, who were desirous of putting an end to the excesses arising from the practice.‡ The structures of Avebury and Stonehenge, in Wiltshire, England, I may further state, are considered by Professor Nilsson as tem-

* There is repeatedly reference made to iron in the Homeric poems (Il. IV, 482; V, 722; XXIII, 826, etc.), and even the hardening of iron by immersion in water is alluded to (Od. IX, 391). Iron is also mentioned by Homer in connection with more precious metals, a circumstance indicative of the value in which it was held. Thus, bronze, gold, and "much-worked" iron—*χαλκόν τε χρυσόν τε, πολύμητόν τε σίδηρον*—constituted the treasure of Ulysses (Od. XIV, 324). Yet spears, swords, and other weapons used during the Trojan war are described as being made of bronze.

Dr. Schliemann, however, has arrived at different results. In an address delivered at the Eleventh Annual Meeting of the German Anthropological Society, held at Berlin in August, 1880, he expresses himself as follows:—

"I wish it were in my power to prove that Homer was an eye-witness of the Trojan war. Unfortunately I cannot. In his time swords were in general use and iron was known; at Troy swords were as yet totally unknown, and the people had no knowledge of iron. The civilization described by him postdates several centuries that which was brought to light by my excavations. Homer gives us the legend of Ilion's tragic fate as it was transmitted to him by former bards, and, in doing so, he clothes the tradition of the war and the destruction of Troy in the garb of his own time. Yet he was not without personal knowledge of the localities, as his descriptions of the Troas in general, and of the plain of Troy in particular, are in the main correct."—*Note by C. Rau.*

† Sir John Lubbock: Prehistoric Times; New York, 1872, p. 71, etc.

‡ Mr. Holden, of the well-known firm Harvey & Holden, of this city, told me that, in his boyhood, he used to assist in collecting the wood for these fires and in building them. I obtained similar information from other natives of Ireland. However, the custom of lighting fires on Saint John's eve also prevailed, and still survives to some extent, in Germany, France, and other parts of the European Continent.

ples erected by the Phœnicians, and dedicated to the worship of the sun-god.

Nilsson's Phœnician theory has been discussed at great length, and in a scholarly manner, by Professor Simpson, who is very far from sharing his views, and is even inclined to attribute a *Cimbrian* rather than a Phœnician origin to the Kivik sculptures, to which the Swedish archæologist so often refers in his argumentation.* In more recent writings relating to the introduction of bronze in Europe I have not met with allusions to Professor Nilsson's theory, which thus appears to have been abandoned at the present time.† Yet, though the author has failed to convince his fellow-laborers in the field of archæology of the correctness of his views, his work, nevertheless, possesses uncommon merit, on account of the vast amount of research embodied in it, and Miss Mestorf deserves great credit for having translated it into German—a language more generally understood than the Swedish of the original.

As a consequence of the foregoing, it would appear that the Swedish cupped stones were not sacrificial altars serving in the worship of a Phœnician deity; and grave doubts have been expressed by prominent authorities whether cupped boulders were at all used as altars, considering that the cups often occur on perpendicular or strongly-inclined surfaces, and thus could not have served as the receptacles of liquid substances.

In addition to the altar theory, cup and ring-cuttings have, as may be imagined, given rise to a variety of speculations as to the purpose for which they were made. Some of these views, recorded and commented on in Professor Simpson's work, may be presented in this place.

The Rev. Mr. Greenwell, Sir Gardner Wilkinson, Dr. Graves, and others, consider them as archaic maps or plans of old circular camps and cities in their neighborhood, telling possibly of their direction and character. "But I believe," says Simpson, "this idea has now been abandoned as untenable by some, if not by all, of the antiquaries who first suggested it."

"The carvings," Professor Simpson continues, "have been held by some as intended for dials, the light of the sun marking time upon them—or

* Simpson: Archaic Sculptures, etc.; p. 81, etc.

† Views similar to those of Professor Nilsson are expressed by Frédéric de Rougemont in "L'Âge du Bronze ou les Semites en Occident;" Paris, 1866.

upon a stick placed in their central cups—and its shadow corresponding with one of the central radial grooves; but they have been found in localities which neither sun nor shadow could reach, as in the dark interiors of stone sepulchres and underground houses. Others have regarded them as some form of gambling table; but they occur on perpendicular and slanting as well as flat rocks; and besides, if such were their use, they would scarcely have been employed to cover the ashes of the dead.

"I have heard them spoken of as rude representations of the sun and stars, and of other material and even corporeal objects of natural or Sabean worship; but all attempts to connect the peculiar configurations and relations which they show with any celestial or terrestrial matters have as yet confessedly failed. Nor have we the slightest particle of evidence in favor of any of the numerous additional conjectures which have been proposed—as that these British cup and ring-carvings are symbolic enumerations of families or tribes; or some variety of archaic writing; or emblems of the philosophical views of the Druids; or stone tables for Druidical sacrifices; or objects for the practice of magic and necromancy."

One of Professor Simpson's friends, Mr. Dickson, of Alnwick, in referring to incised stones in Northumberland, "has suggested that these carvings relate to the god Mithras (the name under which the sun was worshiped in Persia); that about the end of the second century the religion of Mithras had extended over all the western empire, and was the favorite religion of the Romans—a system of astrological theology; that in the sculptured Northumberland rocks the central cup signifies the sun, the concentric circles probably the orbits of the planets, and the radial straight groove the way through the sun. In consequence, Mr. Dickson holds these rock-sculptures to be the work of the Romans, and not Celtic—having been cut, he supposes, as emblems of their religion by Roman soldiers near old British camps, after they had driven out their native defenders. But if they were of Roman origin, they would surely be found in and around Roman stations, and not in and around British localities—in Roman graves, and not in old British kistvaens. The fact, however, is that they abound in localities which no Roman soldiers ever reached, as in Argyleshire, in Orkney, and in Ireland. And possibly even most of them

were cut before the mythic time when Romulus drew his first encircling furrow around the Palatine Mount, and founded that petty village, which was destined to become—within seven or eight short centuries—the Empress of the civilized world."

The idea that the markings should have any bearing on the worship of the reciprocal principles of nature is summarily dismissed by Professor Simpson in a short note on page 80 of his work. He says: "Two archæological friends of mine—both dignitaries of the Episcopal Church—have separately formed the idea that the lapidary cups and circles are emblems of old female Lingam worship, a supposition which appears to me totally without any anatomical or other foundation, and one altogether opposed by all we know of the specific class of symbols used in that worship, either in ancient or modern times."

This note is thus commented on by Mr. Rivett-Carnac: "I am sanguine that, if the late Sir J. Simpson had seen the sketches of what I have called the 'conventional symbols' on the shrines at Chandeshwar, and had been able to compare them with some of the types figured in his work, he might have been inclined to modify the opinion above extracted. The treatment of these symbols is purely conventional, they bear no anatomical resemblance to anything, they are unlike many of the large, well-known, and acknowledged representations of the Mahadeo and Yoni. Still they nevertheless represent the same idea. And here it may be noticed that the same argument of anatomical non-resemblance might be advanced in regard to the well-known representations, common throughout India, of the meaning of which to the initiated there is no doubt at all. To the uninitiated, however, the shapes convey nothing, and I have known cases of Europeans who have been many years in the country, who were quite unsuspicious of what 'that jew's-harp idol,' as they called it, was intended to represent. As the old priest at Chandeshwar said, 'Those who can afford it, put up a big Mahadeo; those who can't, put up these slabs.' And so also with us. The rich relations or friends of the Christian may put over his grave a solid, richly-carved stone cross. The grave of a poor man, if marked at all, has over it perhaps two pieces of wood nailed together in the shape of a cross, or a cross roughly cut on a piece of stone. The Christian church is built

in the form of a cross. In Pandukoli and many other spots the Mahadeo temples are built in the shape of the conventional symbols of that faith."* He then observes that the symbols of the Mahadeo and Yoni can be more conveniently indicated on stone by what may be called a ground-plan than by a section, and refers for illustration to designs accompanying his publication. It would be difficult to find fault with this refutation of Professor Simpson's assertion concerning the character of those symbolic representations.

Professor Simpson himself does not attempt to explain the special significance of the Scottish and English cup and ring-cuttings; but in view of their thoroughly homogeneous character, he considers them as expressive of some religious conception of those who made them—a conclusion hardly admitting of any doubt. On the other hand, he holds that the more complicated carved figures seen on megalithic structures in Ireland and Brittany are, in part at least, of an ornamental character; and this view seems to me equally correct. Indeed, some of the few illustrations of Irish and Breton carvings given in this publication (Figures 12 and 14) present an appearance calculated to corroborate Professor Simpson's opinion.

The learned Scottish author refers the cup and ring-carvings to a remote period of antiquity. "The very simplicity of the cup and circle forms", he says, "is one strong reason for our regarding these types of sculpture as the most archaic stone-carvings that have been left to us" (page 105). He draws particular attention to their precedence of letters and of traditions of any kind, and to the fact that they appear on megalithic monuments erected at a time when metal was not yet in use. Concerning this point he says: "At present I am not aware that within any of the sepulchres, whose stones are marked only with the incised ring and cup-cuttings, any kind or form of metallic tool or instrument has yet been found. Should further and more extended observation confirm this remark, then it will naturally follow that the *commencement* of these sculpturings must be thrown back to the so-called Stone period, or to an era anterior to the use of metals.———— I have no doubt, however, that at whatever time the simple cup and ring-sculptures were first begun to be cut, the practice of carving them—if it

*Rivett-Carnac: Archæological Notes, etc.; p. 11.

did not initiate in—was at least continued into, and indeed extended during the so-called Bronze era, and perhaps till a later period; for bronze tools and ornaments have occasionally been found in localities in Argyleshire, Northumberland, and elsewhere near to spots where the sculptures exist in unusual numbers; though none yet have been discovered, as far as I am aware, in immediate or direct connection with these carved stones or cists themselves" (pages 119, 120).

Professor Simpson's remarks concerning the race that first introduced the carving of the lapidarian cup and ring-sculptures are of great interest. The earliest really historical records of Britain, he observes, date from the time of Julius Cæsar's expeditions to the island, antedating the Christian era about half a century. At that period the population appears to have chiefly consisted of Celts, with an admixture of Belgian and probably of Ligurian elements. When Scotland was first invaded by the Romans (81 after Christ), the inhabitants made use of war-chariots, and, having already passed through the era of bronze weapons, fought in the battle of the Grampian Mountains, in which Agricola defeated the native forces under Galgacus, with huge blunt-pointed swords (*enormes gladii sine mucrone*),* which form of weapon, Simpson thinks, can only be supposed to have been made of iron.

The remarks following next in his work (page 125) are of such striking character that I cannot refrain from quoting them in full. He says:—

"We have no adequate data as yet to fix the date of advent to our shores of the Cymry and Gael, and to determine whether or not they brought along with them, at their first arrival, as some hold, a knowledge of the metallurgic arts. But much evidence has been gradually accumulating of late years to prove that there had existed some pre-Celtic races in Britain. Without venturing in the least to point out all, let me simply note two or three. A race of Megalithic Builders—if we may so call them—who have not left in their sepulchres, and therefore we infer did not possess, in their earlier era at least, any metal tools or weapons, seem to have either preceded the Celts, or to have formed our first Celtic or Aryan wave; and judging from the extent of their remains in massive chambered catacombs

*Tacitus: Vita Agricolæ, XXXVI.

and cromlechs, in numerous cyclopean forts, gigantic stone circles, etc., they must have held the country for a considerable length of time, and overspread the whole of it by the diffusion of their population. From their remains, as left in their tombs and elsewhere, we know that they employed weapons and tools of horn, wood, and *polished* stone; manufactured rude hand-made pottery; had ornaments of jet, bone, etc.; partially reared and used cereals, as indicated by their stone mullers and querns; and possessed the dog, ox, sheep, and other domestic quadrupeds. I do not stop to discuss the various questions whether these Megalithic Builders did or did not hollow out and use the archaic single-tree canoes found on our shores, rivers, and lakes;—whether they were the people that anciently whaled in the Firth of Forth with harpoons of deer-horn, when its upper waters were either much higher or its shores much lower than at present;—whether they or another race built the earliest stone-age crannoges or lake-habitations;—and again whether there was not an antecedent population of simple fishers and hunters, totally unacquainted with the rearing of corn and cattle, and who have bequeathed to archæology all their sparse and sole historic records in casual relics of their food, dress and weapons buried in heaps and mounds of kitchen-refuse, which they have incidentally accumulated and left upon our own and upon other northern and western coasts of Europe. Whether these formed one, or two, or more races, let me add, that long anterior to the Megalithic Builders there certainly existed in our island a tribe of inhabitants that dwelt, in part at least, in natural or artificial caves, where their bones and their contemporaneous relics have been found; who possessed implements and weapons of stone and flint, but rough, and *not* polished like those of the Megalithic Builders; who seemingly possessed no pottery; who—if we may judge from the want of rubbers and querns to grind corn-food—had little or no knowledge of agriculture; and who lived in those far-distant times when the colossal fossil elephant or mammoth, the woolly-haired rhinoceros, the gigantic cave-bear, the great hyæna, etc., were contemporaneous inhabitants with him of the soil of Britain; when the British lion was a veritable reality and not a heraldic myth; and when possibly England was still geologically united to the Continent, and the Thames was only a tributary of the Rhine.

I am not aware that we have yet sufficient evidence to consider as of the same family with these ancient Cave-men, or as of a race still anterior to them, the Flint-folk of the southern counties of England, whose *unpolished* flint hatchets—besides being found in great abundance on the banks of the Somme and Loire—have been discovered in various parts in the river-drifts of South England, and an excellent specimen of which, along with the bones of an elephant, was dug up, in the last century, from a gravel-pit near Gray's Inn Lane, in the centre of London itself."*

The question to which of these races of man the first sculpturings of cups and rings are to be referred, is one which, Professor Simpson thinks, cannot be positively answered in the present state of archæological knowledge. He wants further data as to their distribution in Europe and in other parts of the world. Admitting the fact that such carvings were executed by the "Megalithic Builders" of the age of *polished* stone, he thinks the practice may possibly have antedated the era of that race, and, further, expresses his belief in its continuance through the bronze period and even later times.†

Mr. Tate arrives at somewhat different conclusions. He infers from the wide distribution of the cup and circle-carvings over the British Islands "that at the period when they were made, the whole of Britain was peopled by tribes of one race, who were imbued with the same superstitions, and expressed them by the same symbols." He refers to the invariable association of these carvings with ancient British forts, oppida, villages and sepulchres as an evidence of all having been the work of the people who dwelt in these places, and were buried in these tombs. Though alluding to the existence of ante Celtic races in Britain, he thinks it may be inferred "that the old remains in Northumberland, the sculptures included, belong to the Celtic race, though they may tell the history of many centuries prior to the Christian era" The Northumbrian sculptures being executed on sandstone, he does not deny the possibility of their having been carved with stone instruments; yet he is of opinion that metal was known in the district when the sculptures were made, as bronze and copper objects occur

* This often-mentioned specimen, preserved in the British Museum, is figured on p. 592 of Evans's "Ancient Stone Implements, etc., of Great Britain."

† Simpson: Archaic Sculptures, etc.: p. 79–131.

in their neighborhood. In North Northumberland, indeed, considerable numbers of bronze celts have been discovered, and also bronze daggers, spear-heads and swords. Mr. Tate further refers to querns taken from some Northumbrian forts, and made of hard, untractable porphyry, which, he believes, could not have been fashioned by any stone tool, and he therefore argues that the Northumbrian sculptures generally were made by means of tools of metal, probably of bronze. Mr. Tate seems to underrate the efficiency of flint instruments, when applied to hard stones.*

Mr. Tate offers no definite view with regard to the meaning of these rock-sculptures, but considers them as symbolical—most probably of religious ideas. However, he seems to have a leaning toward the belief that they originated with the Druids, and were connected in different ways with the rites of that powerful priesthood. In support of this very cautiously advanced view he quotes passages from Pliny, Mela and Strabo.

*The question was practically solved during the International Anthropological Congress, held at Paris in the year 1867. There are in the Museum of Saint-Germain casts of the sculptured stone plates forming portions of the tumulus dolmen on the Island of Gavr' Inis, Brittany. These slabs, consisting of compact granite, exhibit, as we have seen, surfaces covered all over with intricate curved lines and other designs. The savants who were present considered it impossible to execute such sculptures without employing tools of steel or hardened bronze. But M. Alexandre Bertrand, the director of the museum, was of different opinion, and proceeded to make a trial. A piece of the same granite was worked with stone implements, and the experiment proved to be a perfect success. After a day's labor, a circle and a few lines were engraved. A chisel of polished flint used during the whole time was hardly injured; one of nephrite had become somewhat blunted, and a similar implement of greenstone still more. But the edge of a bronze axe used in the operation was instantly bent, and it became evident that those sculptures had not been executed with bronze, but with stone. This account is given by Professor Carl Vogt in one of a series of letters addressed, in 1867, from Paris to the Cologne Gazette. I have quoted it before this in the Smithsonian publication entitled "The Palenque Tablet in the United States National Museum."

A similar experiment, made at the suggestion of Professor Simpson, is thus described by him:—

"I have found experimentally that the rings and cups can be engraved deeply and without difficulty upon the Argyleshire schist, and even upon hard Aberdeen granite, with a flint celt and a wooden mallet. In the Edinburgh Antiquarian Museum there is a block of gray Aberdeen granite from Kintore, forming one of the sculptured stones of Scotland, and containing upon one side two crescents, etc. On the back of this hard granite Mr. Robert Paul, the doorkeeper of the Museum, tried for me the experiment I allude to, and cut, in two hours, two-thirds of a circle with a flint and a wooden mallet. The flint used was about three inches long, an inch in breadth, and about a quarter of an inch in thickness. The circle which he sculptured with it in the granite was seven inches in diameter; and the incision itself was nearly three quarters of an inch broad, above a quarter of an inch in depth, and very smooth on its cut surface. In hewing out the circle with the flint, its sharp tips from time to time broke off, but another sharp edge was always immediately obtained by merely turning it round.

"The result of this simple and decisive experiment seems to me to be important, as showing that if these archaic cuttings could be sculptured alike either by stone or by metallic tools, their mere character and form afford no evidence whatsoever that they were not carved till after the discovery and use of metallic implements. In other words, the experiment shows that they might have been produced before the introduction of metals—or during the Stone age."—*Archaic Sculptures, etc.*: p. 122.

"As the functions of the Druids were varied", he observes, "so might these sacred stones be used for several purposes. On them, as altars, sacrifices may have been slain to avert either personal or state calamities; some of the figures may be the hieroglyphics of the gods to whom they were dedicated; the philosophical views of the Druids may be symbolically represented in the circles combined with circles on the Routing Linn Stone,* which, situated in a wild district and probably in the midst of forests, would be such a place as the Druids would choose, wherein to teach their occult doctrines and practise their superstitious rites. Some of the groups of the concentric circles may show their idea of the motion of the heavenly bodies; and the radial lines might set forth the 'influence and ability of the immortal gods,' as extending through and beyond the orbits of the heavenly bodies; the plant-like figures might enable them to expound 'the nature of things,' as seen in vegetation; possibly the grooves passing from the centre of one system of circles to another might symbolize the passage of a soul from one state of being into another and a higher state. And in addition, I cannot but think that one of the chief uses of those sacred stones was for magic and necromancy. The religious and philosophical significancy of the figures would add to their impressiveness on the popular mind, when used for this purpose, and magnify the mysterious power of the Druid priest or magician when he cast a horoscope, or endeavored by incantations to avert personal or public calamities."

These passages, I repeat, contain Mr. Tate's suggestions as to what the significance of the sculptures possibly might be, being by no means intended to convey a matured opinion; and in order to show how far he is from considering the problem as solved, I quote here the concluding paragraph of his work:—

"Those who are not content unless every mystery is fully explained may feel dissatisfied, that after all the labor and research bestowed on the inscribed rocks, we cannot read them off as from a lettered book. Before, however, more definite results can be arrived at, further investigations must be made in other parts of the world. Two lines of research may yield information; one among the Laps in the far North, and the other, with

* Represented on Plate I of his work.

more hope of success, in the early home of the Aryan family. Something, however, has been achieved—materials for aiding in the fuller solution of the problem have been placed on record—an advanced starting-point made for future inquiries—and a description and representation preserved of marvelous sculptures, which time and the elements will eventually obliterate."*

Professor Desor devotes a considerable portion of his often-quoted pamphlet to a discussion of the probable meaning of the primitive rock-sculptures, more especially those of the simple cup type. In referring to M. de Bónstetten, who considers the cup-shaped cavities in general as the work of nature (weathering out of imbedded nodules, etc.), he admits that such an explanation may be applied in certain cases,† but that on the whole M. de Bonstetten's view appears totally untenable Professor Desor is not very favorable to the altar theory, advocated by Nilsson, Troyon and others, because the cups often appear on slanting and even vertical surfaces, and thus could not have served for holding the blood of victims, or libations of any kind. Nor does he agree with Mr. Westropp, who believes that the cups have no significance whatever, but were excavated by the prehistoric people with no other object in view but that of passing the time; and he likewise rejects the idea, expressed by others, that they are simply of a decorative character. Having, in addition, alluded to several other theories—most of them already brought to the reader's notice—Professor Desor observes as follows:—

"If the cups on our erratic blocks are not ornaments, boundary-marks, hieroglyphs, or simply the fancy-work of idle herdsmen—what else can they signify? We hold with Dr. Keller that they were chiefly made for the purpose of marking indelibly certain blocks designed to recall a circumstance or an event, the recollection of which was of a nature to be perpetuated.‡ It was doubtless left to oral tradition to explain their purport and to transmit it from generation to generation. Hence the stones thus marked were invested with a monumental character—using the term in its most primitive acceptation—like the menhirs and the blocks which the

* Tate: The Ancient Sculptured Rocks, etc.; p. 35–41.

† Professor Simpson noticed in several instances *natural* cup excavations.—*Archaic Sculptures, etc.*; p. 3.

‡ In applying the term *Denkstein* to the Ober-Farrenstädt cup-stone, Wagener expresses the same view. See page 24 of this publication.

patriarchs put up in commemoration of important events. They were the natural auxiliaries of traditions, without being their interpreters. This was more than sufficient to render them popular. It is not surprising that they were the objects of a certain veneration, which, indeed, has not yet ceased in our days in some parts of Europe, where they are denominated 'sacred stones' by the people."*

Mr. Rivett-Carnac's views in relation to the primitive sculptures of India have been given, in connection with his descriptive account, in a preceding part of this publication, and I need not revert to them for the present.

Though Professor Nilsson's theories are likewise known to the reader, I have to draw attention to his statements concerning the continuance of cup-cutting in comparatively modern times. He is of opinion that the first Christian missionaries who came to Sweden, found in certain parts of the country a population still sacrificing on cupped Baal altars. In order to wean the people in a gentle manner from this practice, he thinks, the priests first used the cupped boulders as holy-water stones, and afterward introduced *aspersoria* in the shape of cupped stone vessels in the churches. Indeed, he describes and figures several of these vessels belonging to Scanian churches in which, before the era of Protestantism, Catholic worship was performed. Fig. 59 represents one of the holy-water basins figured by Nilsson, which is still seen in a church at Strö, in the Bishopric of Lund. Its upper surface shows five cup-excavations, but is otherwise smooth. A transition from this simple to a somewhat more elaborate device is shown by Fig. 60, likewise copied from Nilsson's work, and representing a holy-water basin in a church at Oemarp, in Scania. Its slightly hollowed upper surface exhibits five excavations, namely, a cross in the centre and a cup in each corner.†

There is but little doubt that this Christian contrivance of employing holy-water basins with cup-excavations is the survival of a preceding heathenish practice; but it is more than questionable whether these Christian church-vessels were designed to perpetuate, as it were, the recollection of what Professor Nilsson considers as sacrificial altars. Taking it for granted that

* Desor: Pierres à Écuelles; p. 18 and *passim*
† Nilsson: Das Bronzealter: Nachtrag S. 4*

cup-cuttings were still made in Sweden when the work of converting the inhabitants from paganism was begun, it by no means follows that the original motive for cup-cutting then still actuated the people of that country. We must at least take into account the possibility of such mutations, the more so as examples are not wanting. In most countries of Europe and in China and Japan, for instance, popular superstition even now invests prehistoric stone implements, such as axes, celts and arrow-heads, with magic powers, though the remote ancestors of the believers certainly used such weapons and tools. What was originally an object employed in daily life, became in the course of time a charm.

Some curious superstitions in relation to cupped stones are still in vogue among the uneducated people of different European countries. As we have seen, they are called *elfstenar* in Sweden. "The elfs," says Miss Mestorf, "are the souls of the dead; they frequently dwell in or below stones, and stand in various relations to the living. If their quiet is disturbed, or their dwelling-place desecrated, or if due respect is not paid to them, they will revenge themselves by afflicting the perpetrators with diseases or other misfortunes. For this reason people take care to secure the favor of the 'little ones' by sacrifices, or to pacify them when offended. Their claims are very modest: a little butter or grease, a copper coin, a flower or a ribbon will satisfy them. If they have inflicted disease, some object worn by the sick person, such as a pin or a button, will reconcile them. A Swedish proprietor of an estate (in Uppland), who had caused an elfstone to be transported to his park, found a few days afterward small sacrificial gifts lying in the cups. In the Stockholm Museum are preserved rag-dolls, which had been found upon an elfstone."* These probably had been deposited by women who wished to become mothers. Thus we see the cup-stones in Sweden applied to the use of altars; their cups, however, instead of holding the blood of victims, as Nilsson conjectured, serve to receive the harmless gifts of a simple-minded peasantry.

The cup-stone question has of late frequently been discussed in the annual meetings of the German Anthropological Society as well as in the meetings of the Anthropological Society of Berlin. Messrs. Virchow, Desor,

* Correspondenz-Blatt der Deutschen Anthropologischen Gesellschaft, 1879, S. 4

Friedel, Mehlis, Schaaffhausen, and Voss being conspicuous among the participants in the debates. Much of what was said in these meetings bearing on the subject has been brought to the reader's notice, according to original sources; in addition, however, various communications relating to the occurrence of cup-excavations and furrows on the outside of the walls of churches were made on these occasions.

It appears that Dr. E. Veckenstedt, a member of the Berlin Anthropological Society, first pointed out the existence of these curious marks on a church at Cottbus, in the Province of Brandenburg, Prussia.* They were afterward noticed under similar circumstances at Guben, in the same province.† Mr. E. Friedel, Director of one of the Berlin museums (*Märkisches Provinzial-Museum*), becoming much interested in the subject, succeeded in discovering them on churches in many other places of that province (Spandau, Prenzlau, Angermünde, Strausberg, Fürstenwalde and Vetschau). He further found the marks on churches in Pomerania (Greifswald, Stralsund, Gützkow, Lassan, Anklam, Wolgast, Sagard, Altenkirchen, Bergen on the Island of Rügen; Gristow, Hanshagen and Neuenkirchen near Greifswald; Morgenitz and Mellenthin on the Island of Usedom; Stettin); and extending his researches beyond the boundaries of Germany, he found cup-marks on churches in Sweden (Malmö, Upsala, and Wexiö). Mr. Woldt noticed them in Berlin, and, according to Dr. Veckenstedt, they occur in Goslar (Hanover) and Brunswick. Dr. Voss saw them in Baireuth (Bavaria).‡ Mr. W. Schwartz sent to the Anthropological Society of Berlin a report concerning cups on churches in the Province of Posen;§ and Professor Virchow, finally, discovered himself these artificial excavations on the walls of ecclesiastic buildings in Switzerland (Thun and Berne) and in the valley of the Rhine.‖ Many additional discoveries of the kind are to be expected.

The Prussian churches on which these curious markings have been observed, appear to be mostly built of brick, and the excavations, of course, are made in that material. They are usually, though not always, found on

* Verhandlungen der Berliner Anthropologischen Gesellschaft; Sitzung vom 19. Juni 1875, S. 18.
† Ibid.; Sitzung vom 21. Juli 1877, S. 22.
‡ Ibid.; Sitzung vom 16. Februar 1878, S. 23.
§ Ibid., Sitzung vom 15. November 1879, S. 18.
‖ Ibid., Sitzung vom 18. October 1879, S. 36.

the southern side of the churches, near an entrance, and, as a rule, placed within the reach of a man's arm. The cups are smaller than most of those seen on blocks, measuring only from two to four centimeters in diameter, and are commonly distributed without apparent order. Sometimes they are partly executed on the mortar between the bricks, a fact demonstrating beyond doubt that they were made after the erection of the churches. Such a case is well shown in Fig. 61, representing a portion of the portal of the *Marienkirche* (Saint Mary's Church) at Greifswald, in Pomerania.* The two uppermost cups, it will be seen, are partly excavated in the mortar. The lowest course shows two furrows. In some instances such markings have been observed on stone-built churches.

It appears more than probable that the practice of thus marking the outside of these buildings indicates the continuation of a pagan custom, though in these cases the cups may not have the significance of those seen on boulders and megalithic monuments. I already have expressed a similar doubt while speaking of the cupped holy-water basins. The motives which induced people in comparatively modern times to mark churches with cups and furrows are not yet known. The theory that they are the work of children will not explain the wide extent and uniformity of the practice, though mischievous urchins may have amused themselves now and then by adding to the number of markings.† They evidently are not bullet-marks, as has been suggested: in fact, none of the views thus far advanced to account for their presence appears to me satisfactory. The cups on churches in Germany seem to have been thought to possess healing qualities. Fever-sick people blew, as it were, the disease into the cavities. According to other accounts, the patients swallowed the powder produced in grinding out the cups. The latter practice has not yet become obsolete in France; for Professor Desor learned from M. Falsan that in the church of Voanas, near Bourg, Department of the Ain, a large stone, called *La Pierre de Saint-Loup*, is preserved, into which the sick and impotent grind holes, and drink the pulverized matter, which, as they believe, cures the fever and renews

* The illustration is taken from an article by Miss Mestorf, published in "Matériaux", 1878, p. 277. I have reversed the position of the illustration, supposing that it was wrongly inserted in the French periodical. It accompanied originally one of Mr. Friedel's publications.

† Verhandlungen der Berliner Anthropologischen Gesellschaft; Sitzung vom 16. Februar 1878, S. 25.

the vital strength. Another stone, known as *La Pierre de Saint-Clement*, in the village of Nanney, in the above-named department, is used for the same purpose. In the Swiss Canton of Valais, Professor Desor further states, ailing persons drill into the stones of a certain chapel, and swallow the dust thus obtained.* Mr. Friedel learned from a citizen of Greifswald that the cups were still resorted to in his time for charming away the fever. The *Bischofs-Stein*, near Niemegk, mentioned on page 24 of this publication, Mr. Friedel observes, is still visited by patients and quack doctors who rub it with grease, in order to bring about cures. In a few instances, it seems, the inside of cups on German churches was found to exhibit traces of grease. The same gentleman has drawn attention to the anointing of stones practised for religious purposes by the ancient Jews. He refers to Genesis XXVIII, 18: "And Jacob rose up early in the morning, and took the stone that he had put for his pillows, and set it up for a pillar, and poured oil upon the top of it"; and to Zechariah III, 9: "For behold the stone that I have laid before Joshua; upon one stone shall be seven eyes; behold, I will engrave the graving thereof, saith the Lord of hosts, and I will remove the iniquity of that land in one day." These "eyes" were anointed with oil.† Such customs, however, may have sprung up independently among different nations.

There are some curious popular traditions connected with the cup-excavations and grooves on churches in Germany. Thus, the grooves on the cathedral at Brunswick pass for the claw-marks of the lion said to have followed Duke Henry of Saxony and Bavaria, surnamed "the Lion," from Palestine to Germany. This lion, the legend says, made the marks in a fit of rage, being unable to enter the church in which his master was praying ‡ In Posen a tradition refers the cups to the souls of the damned, who, during their life-time, never had visited churches. They ground out the cavities during the night, and left them as tokens of their despair at not being allowed access to the closed churches.§ There are other similar

* Correspondenz-Blatt der Deutschen Anthropologischen Gesellschaft, 1878, S. 156.

† Verhandlungen der Berliner Anthropologischen Gesellschaft; Sitzung vom 16. Februar 1878, S. 24.

‡ Ibid., Sitzung vom 19. Juni 1875, S. 18.

§ Ibid., Sitzung vom 15. November 1879, S. 19.

stories told, to which I will not allude, as they have no scientific value whatever, but simply show the current of popular fancy.

It is to be hoped that the efforts of European savants—more especially of those of Germany, who show so much interest in the matter—will ultimately result in clearing up the mystery that still shrouds the origin and meaning of cup-excavations and grooves on ecclesiastic structures.

I have to allude once more to Mr. Rivett-Carnac's remarkable discoveries in India, and to the views thereon based by him. No one who has examined his publications in connection with those of Simpson and Tate can help admitting the striking resemblance between the cup and ring-cuttings of India and Great Britain. Indeed, his theory that the primitive rock and stone-sculptures of those countries were executed by people akin in race, following similar customs, and observing similar forms of worship, deserves the highest attention. Yet, after all, we deal here for the present with a speculation and not with an established fact. The necessary evidences, based upon the discovery of cup and ring-carvings in various countries of the Old World, where thus far they have not been shown to exist, are at present wanting. If they should come to light in the course of time, we may be allowed to construct the ethnological chain which is still imperfect.

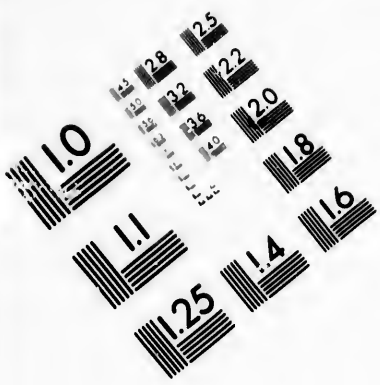
Professor Desor's Aryan theory, as given in a preceding part of this publication, appears to me truly captivating, although the difficulties just alluded to have, of course, also to be overcome in this case. In fact, Mr. Rivett-Carnac and Professor Desor are aiming at similar results. The last-named gentleman's view, formulated with great distinctness, would tend to establish a kind of archæological harmony, by reducing, as it were, a number of factors, hitherto not properly connected, to a single principle. Leaving aside for a moment the question touching megalithic monuments and primitive sculptures, how well would this theory explain the gap existing between pakeolithic and neolithic implements, and likewise the introduction of domestic animals so characteristic of the era of polished stone. The opinion that the Aryans were still in the stone age at the period of their dispersion probably will gain more and more ground; but the question concerning the original home of this people, the existence of which was traced in a manner somewhat analogous to that by which

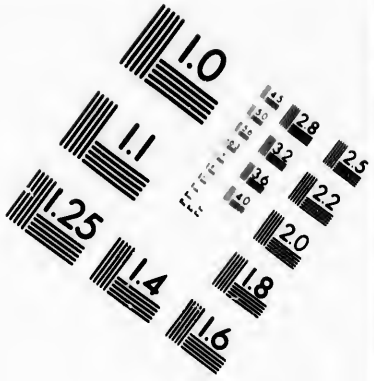
Leverrier discovered the planet Neptune, is still an open one. It should also be considered that, though the Mahadeo-worshiping Saivas are (as I judge) more or less modified Aryans, the Khasias of Bengal, who are prominently mentioned as the modern builders of megalithic structures, belong to a totally different race. "It is at all events worthy of remark," says Miss Buckland, "that those who now in India build cromlechs, erect pillars and circles of stones, and construct miniature kistvaens, are not the dominant Aryan race, but the dark-skinned aborigines, descendants of the pre-Aryan occupiers of the soil, and that in every country westward, wherein these monuments are found, they are traditionally associated with a long-forgotten race. It is remarkable, too, that some are assigned to giants and some to dwarfs."* Similar traditions, it will be remembered, are recorded by Mr. Rivett-Carnac.

After all that has been said concerning the significance of the cup and ring-sculptures in the Old World, I hardly venture to offer an opinion of my own. However, it appears to me that the close connection between cups and rings has not been sufficiently considered. It certainly appears that both belong to *one* system of primitive sculpture, of which the former seem to be the earlier expression; and if, indeed, the combined cups and rings are what Mr. Rivett-Carnac thinks them to be, a kindred purport should be assigned to those cup-excavations which occur without circles and radial grooves on rocks and stones in Europe and Asia. I cannot see how these two kinds of sculpture can be separated from each other, unless by supposing that the primary application of the cups was simply of a practical nature, and that afterward, owing to the force of habit, they were made to enter into the composition of more elaborate carvings of an entirely different character. This, however, is rather doubtful.

Turning to America, we find the difficulty of approaching anything like a solution of the problem still greater, considering that here as yet the number of discovered cup-stones is by far too small to permit the merest attempt at generalization. As to the smaller North American cup-stones, I have expressed, though in a guarded manner, my opinions concerning their

* Buckland (Miss A. W.): Notes on some Cornish and Irish Pre-historic Monuments in: Journal of the Anthropological Institute of Great Britain and Ireland: November, 1879.





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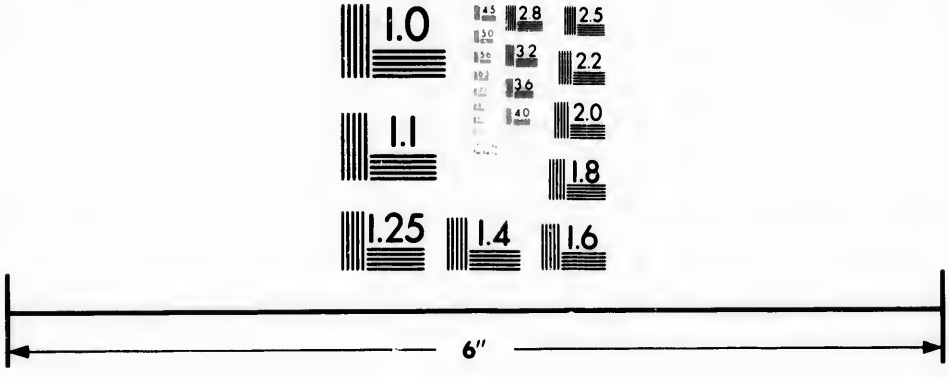

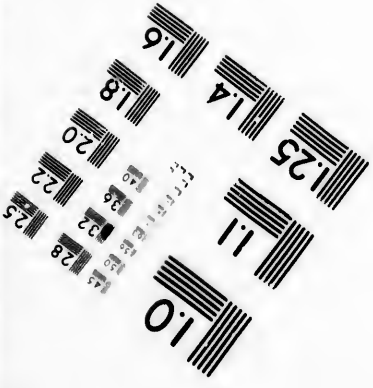

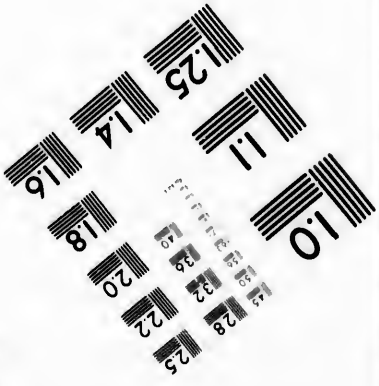

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probable application—opinions which I am ready to abandon, as soon as more satisfactory explanations are brought forward. Regarding the larger North American cupped stones, more especially that belonging to the Cincinnati Society of Natural History, I am unable for the present to offer the slightest elucidation.

The question naturally arises, whether the practice of excavating cups in rocks was introduced in America by immigrants from abroad, or whether it sprang up spontaneously in the New World. Being a believer in the Darwinian doctrine of evolution, I consider man as a foreign element in America. My reasons for that belief need not be given in this place: they are known to all who follow in the wake of the great English naturalist. I am further of opinion that the present American continent received its population at a very remote period, when, perhaps, the distribution of land and sea was different from what it is now. The earliest immigrants may have been so low in the scale of human development that they yet lacked the faculty of expressing themselves in articulate language.* However, it can hardly be supposed that the peopling of America took place at a certain time and was discontinued afterward: on the contrary, there are reasons which render a continued connection with distant parts, more especially with Asia, highly probable. The innate tendency which leads man independently in different parts of the world to the same or similar inventions and conceptions, provided that there is a sufficient similarity in the external conditions of existence, will account for many customs and practices of the aboriginal American; but it fails to explain, for instance, the highly artificial and complicated system of reckoning time, which was in vogue among the Toltecs, Mexicans and Yucatecs, and was almost identical with the system still applied in Thibet and Tartary. It hardly can be imagined that a method so intricate and peculiar in its principle could have originated in different parts of the world, and hence one is almost driven to believe in later connections between the inhabitants of Asia and America.†

* In what other way can we account for the totally diverse characteristics of the numerous linguistic families of America?

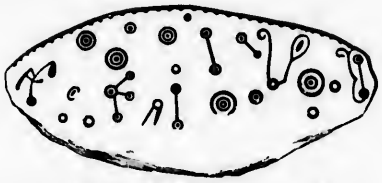
† Those desirous of more precise information on the subject will find it in Humboldt's "Vues des Cordillères" (Paris, 1810, p. 125–194), or in the translation of that work, known as "Humboldt's Researches" (London, 1814, Vol. I, p. 276–409), and in Tylor's "Anahuac" (London, 1831, p. 241, etc.).

The cups on the Cincinnati boulder are perfectly similar to those on many stones in the Old World, and it is probable that they owe their origin to the same motives. If these motives arose from some religious conception, we might feel inclined to trace the origin of American cup-cutting to Asia. But if, on the other hand, the cups were designed for a practical purpose, the custom of excavating them may have sprung up in America as well as elsewhere.

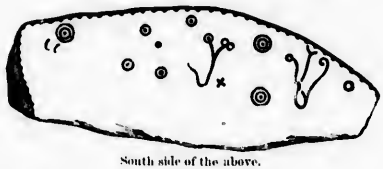
My task is now finished. It was my chief object to draw attention to a very curious class of North American antiquities as yet but little known, and thus to bring them within the range of a closer observation, which possibly may lead to a better understanding of their meaning. As stated on the title-page, I have tried, moreover, to present the subject under discussion in its entirety—a mode of treatment which, I hope, will not be deemed an objectionable feature of this publication.

SUPPLEMENTARY NOTE.

While treating in these pages of primitive American sculptures bearing some analogy to those observed in the Old World, I omitted to mention the incised rock in Forsyth County, Georgia, briefly described and figured by Colonel Charles C. Jones on pages 64 and 65 of the "Journal of the Anthropological Institute of New York" (Vol. I, New York, 1871–'72). The subjoined illustrations are those published by Colonel Jones, who kindly loaned me the wood-cuts.



North side of sculptured rock in Forsyth County, Georgia.



South side of the above.

Here follows his description:—

"In Forsyth County, Georgia, is a carved or incised boulder of fine-grained granite, about nine feet long, four feet six inches high, and three feet broad at its widest point. The figures are cut in the boulder from one-half to three-quarters of an inch deep.

"As yet no interpretation of these figures has been offered, nor is it known by whom or for what purpose they were made; but it is generally believed they were the work of the Cherokees. On the eastern end of the boulder, running vertically, is a line of dots, like drill-holes, eighteen in number, connected by an incised line."

The character of the sculptures being shown by the illustrations, I need not add any further remarks.

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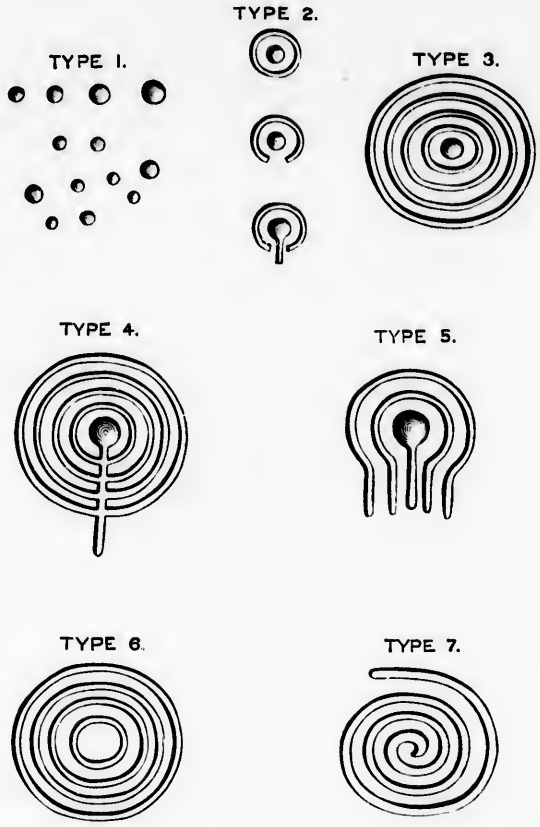


FIG. 1.—Common types of European cup and ring-cuttings.

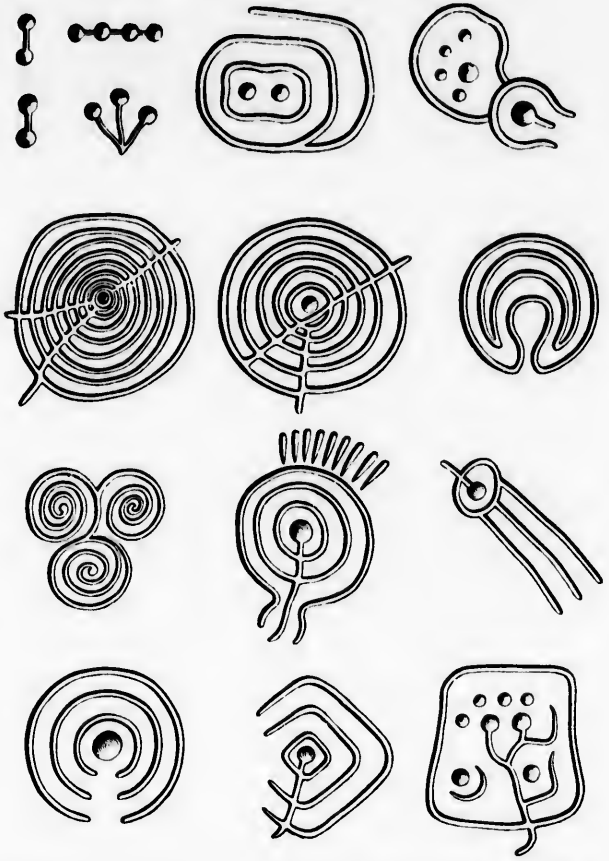
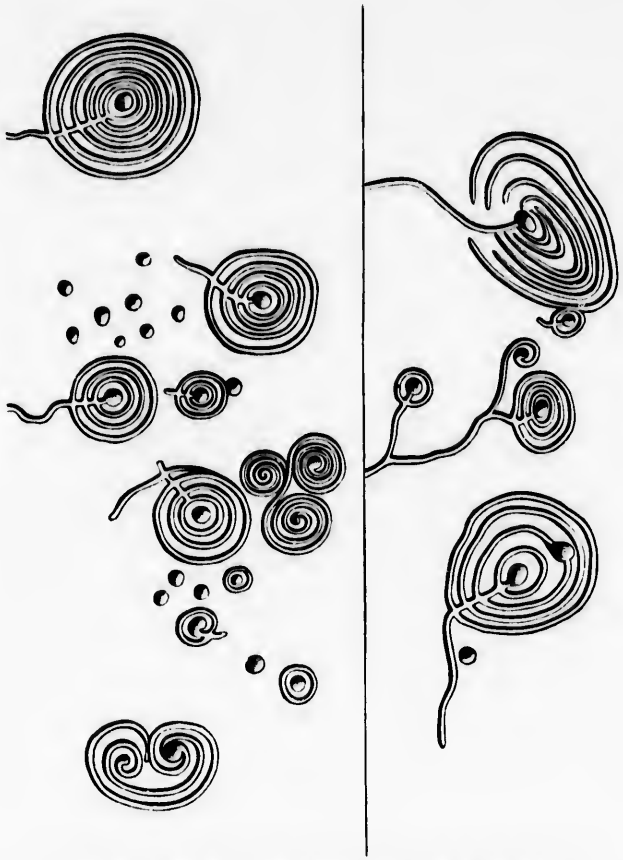


FIG. 2.—Chief deviations from the general types of European cup and ring-cuttings.



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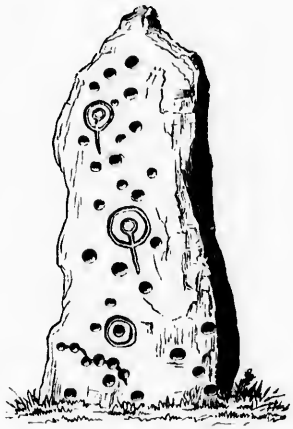


FIG. 4.—Cup and ring-cuttings on a menhir at Ballymenach, Argyleshire, Scotland.

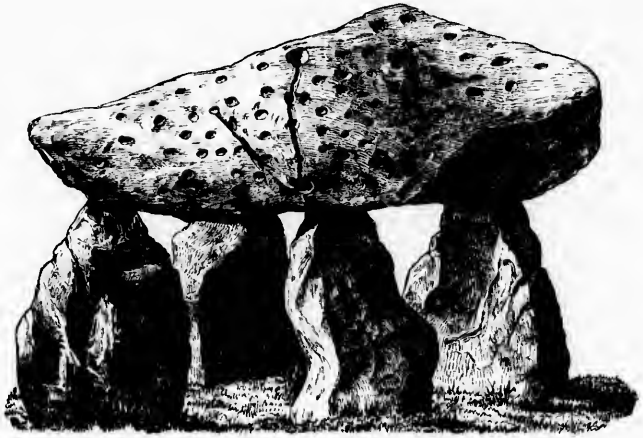


FIG. 5.—Dolmen with cup-marked cap-stone, near Clynnog Fawr, Caernarvonshire, Wales.

FIG. 6.—Kistvæn surrounded by blocks, one of which is cup-marked. Outlands, Isle of Man.

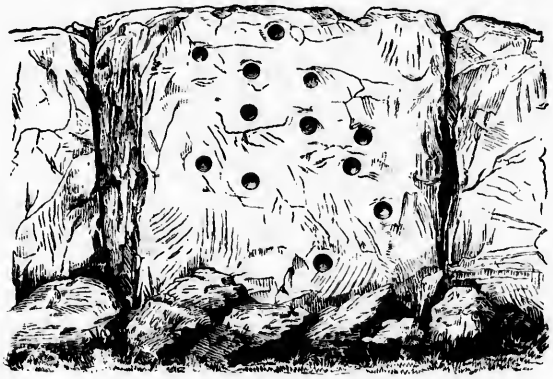


FIG. 7.—Cupped stone in a chambered tumulus at Clava, Inverness-shire, Scotland.

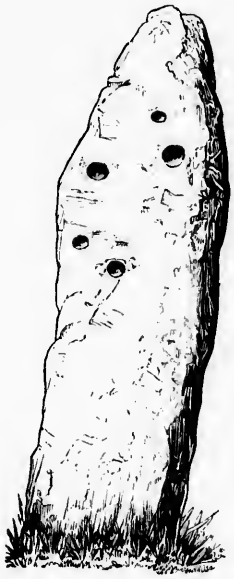


Fig. 8.—Cupped monolith near Dunbar, East-Lothian, Scotland.

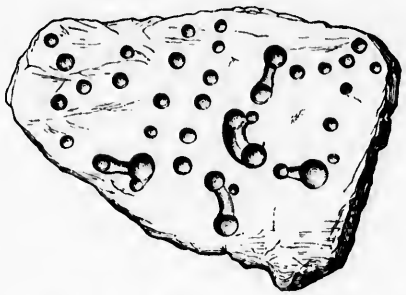


FIG. 9.—Large cup-stone near Balvraid, Inverness-shire, Scotland.

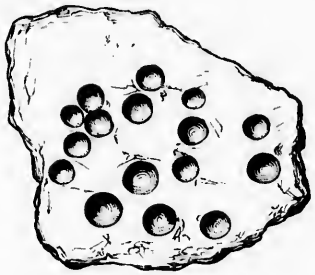


FIG. 10.—Cupped stone found at Laws, Forfarshire, Scotland.

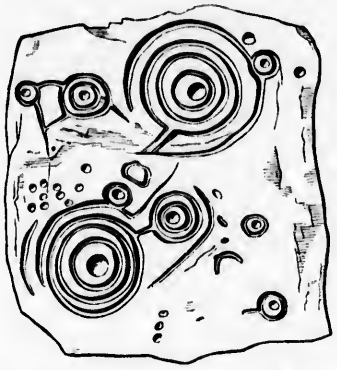


Fig. 11.—Stone with cup and ring-cuttings. County of Kerry, Ireland.

Fig. 12.—Incised stone in the tumulus at Lough Crew, Ireland.

FIG. 13.—Carving of a celt in a planned handle on the roof of a dolmen near Locmariaker, Brittany.

FIG. 14.—Incised chamber-stones in the tumulus of Gavr' Inis, Brittany.

FIG. 15.—"La Boule de Gargantua," a cupped boulder near Belley, Ain, France.

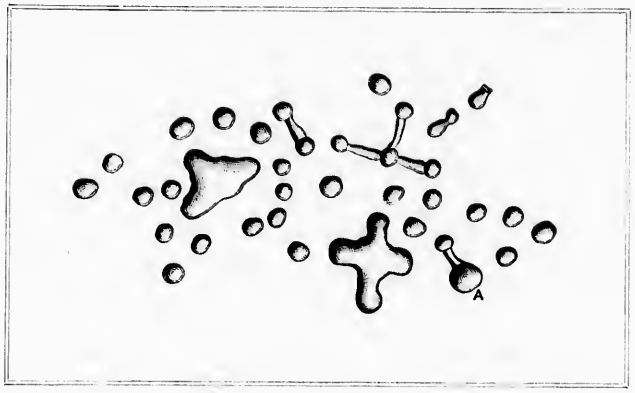


FIG. 16.—Cup-cuttings on a rock near Chirac, Lozère, France.

FIG. 17.—Cupped block near Mont-la-Ville, Canton of Vaud, Switzerland.

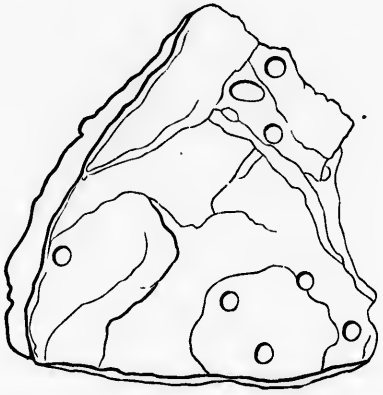


FIG. 18.—Fac-simile representation of a cupped rock near Ober-Farrenstädt, Prussian Saxony.

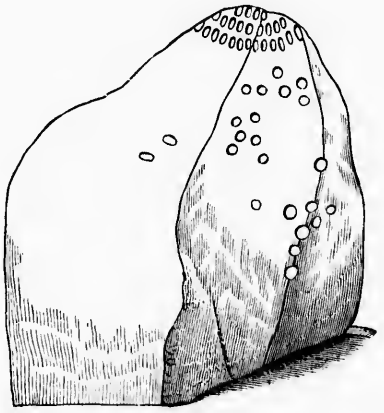


FIG. 19.—Fac-simile representation of a cupped rock near Meissen, Saxony.

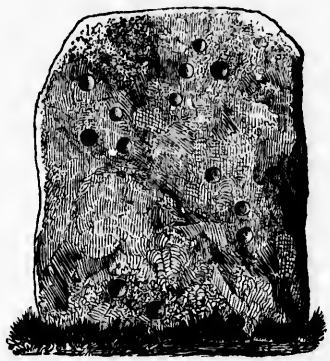


Fig. 20.—Cupped backside of a runic stone at Ravnkilde, Jütland, Denmark.

Fig. 21.—Tracings of ships and wheels on the roof-stone of a funeral chamber near Herrestrup, Seeland, Denmark.

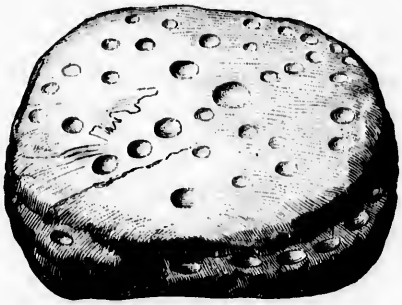


FIG. 22.—The "Balder Stone" near Falköping, Sweden.

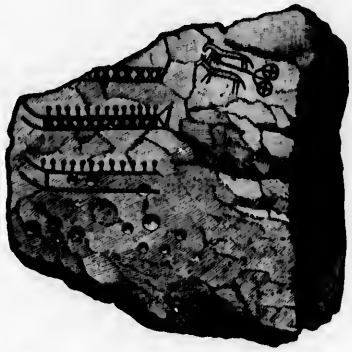


FIG. 23.—Stone slab showing cups and engraved designs. From a tumulus in Scania, Sweden.

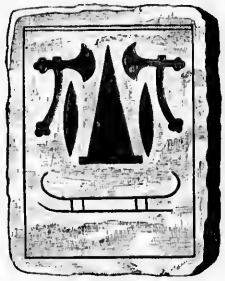


FIG. 24.– One of the engraved slabs of the Kivik monument, Scania, Sweden.

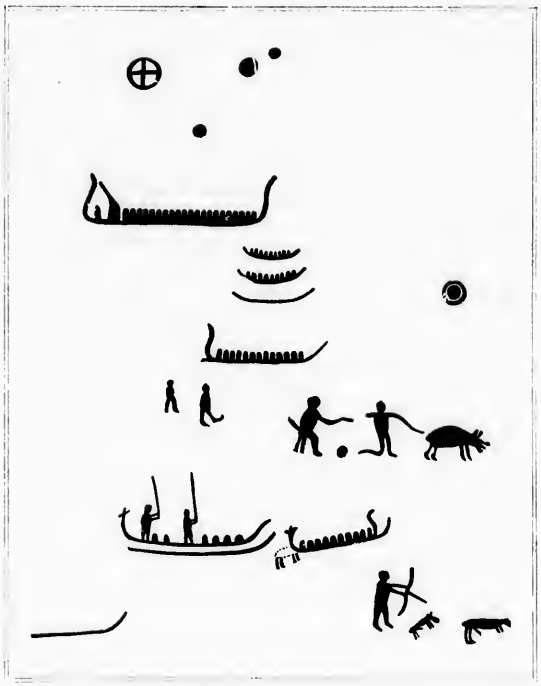


FIG. 25.—Rock-sculptures in Quille Härad, Län of Bohus, Sweden.

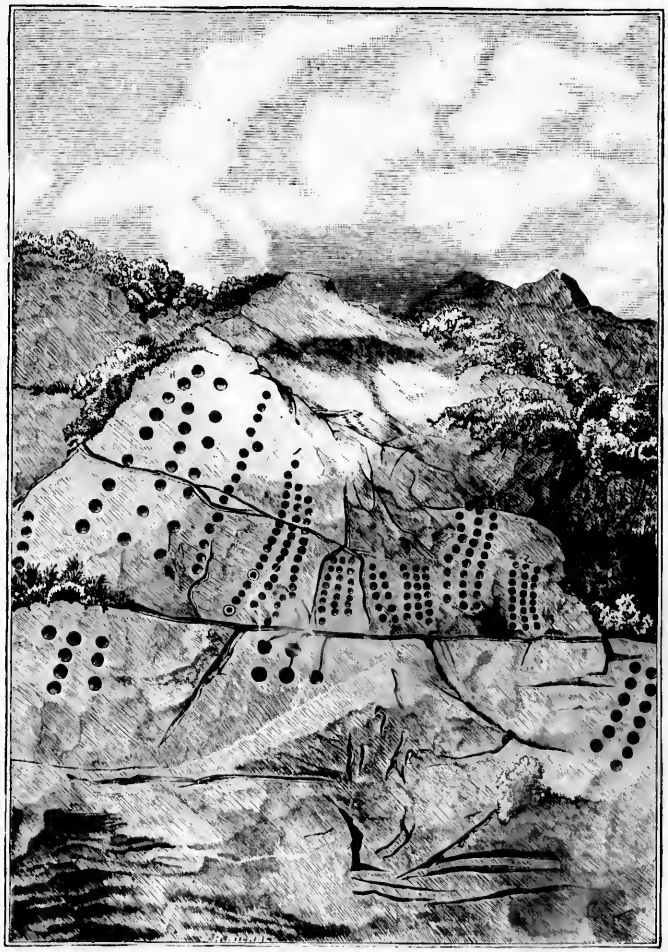


Fig. 26.—Cup and ring-cuttings at Chandeshwar, India.

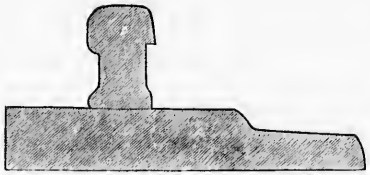


FIG. 27.—Section of a stone Mahadeo in the temple of Chandeshwar, India.

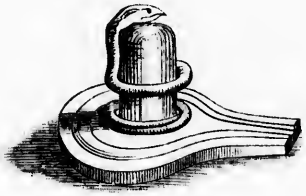


FIG. 28.—Mahadeo in a shrine at Benares, India.

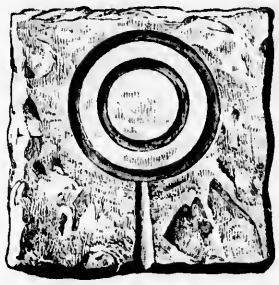


Fig. 29.

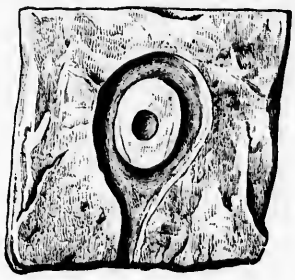


Fig. 30.

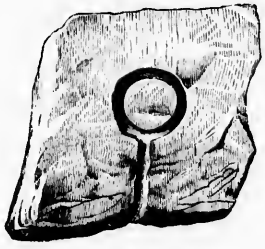
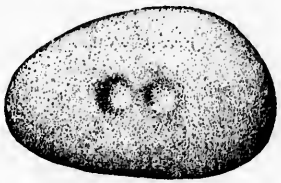


Fig. 31.

Figs. 29, 30, and 31.—Mahadeo symbols engraved on stone slabs in the temple of Chandeshwar, India.

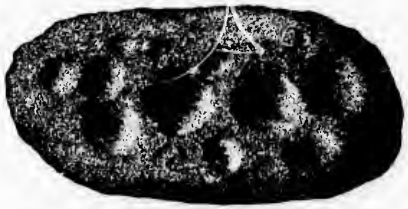
½

FIG. 32.—Pitted stone found near Franklin, Williamson County, Tennessee (Mus. No. 19953).



½

FIG. 33.—Pitted stone from Muncy, Lycoming County, Pennsylvania.

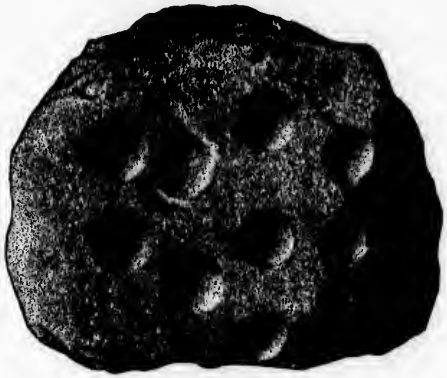


½

FIG. 34.—Nut-stone from the neighborhood of London, London County, Tennessee (Mus. No. 216[illegible]).

FIG. 35.—Cupped stone found near Groveport, Franklin County, Ohio (Mus. No. 7743).

FIG. 36.—Cupped stone from the neighborhood of Portsmouth, Ohio (Mus. No. 19594).



$\frac{1}{3}$

FIG. 37.—Cupped stone from Summit County, Ohio (MUS. No. 28018).

FIG. 38.—Earthenware paint-cups used by the Zuñis, New Mexico. (Mus. No. 40446).

FIG. 39.—Stone mortar and pestle with a cup-shaped cavity. From the Tesuque Indians, New Mexico (Mus. No. 42340).

Fig. 40.

Fig. 41.

Figs. 40 and 41.—Terra cotta spindle-whorls from Tezcuco, Mexico (Mus. Nos. 786 and 787).

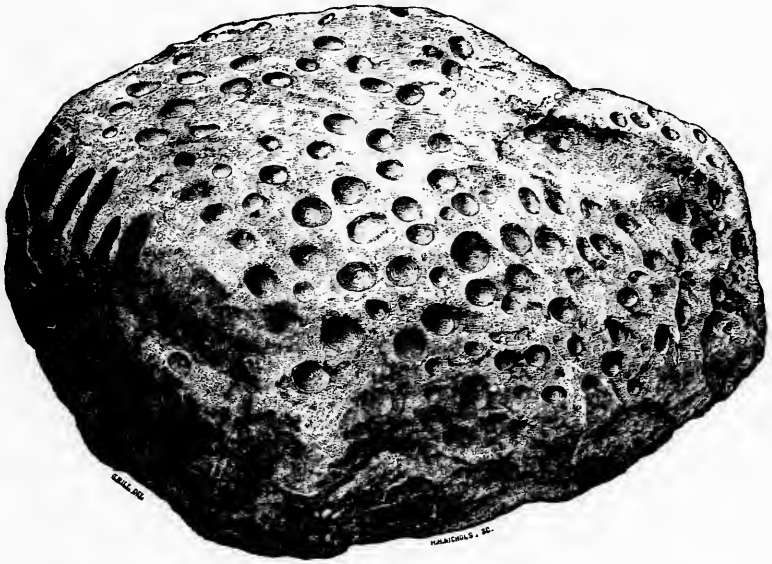
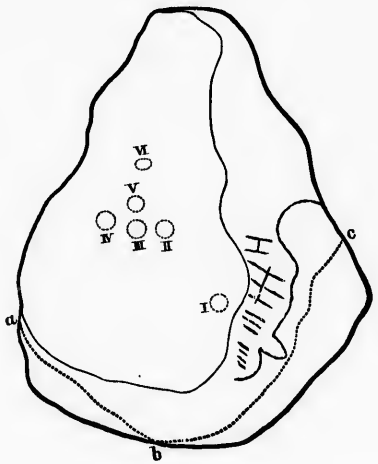


FIG. 42.—Cupped sandstone block, discovered in Lawrence County, Ohio; now in Cincinnati.



Scale: 1 inch = 2 feet.

FIG. 43.—Cupped granite boulder at Niantic, New London County, Connecticut.

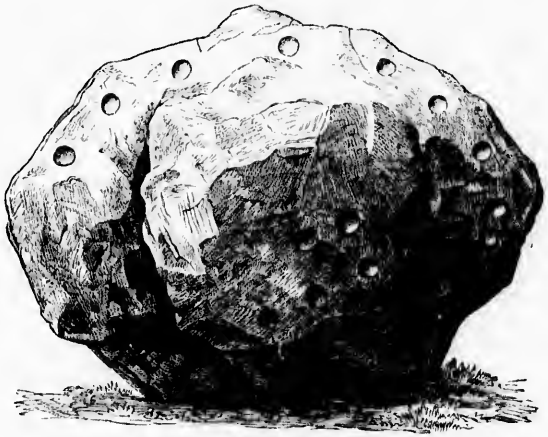


FIG. 44.—Cupped (?) rock in the neighborhood of Orizaba, Mexico.

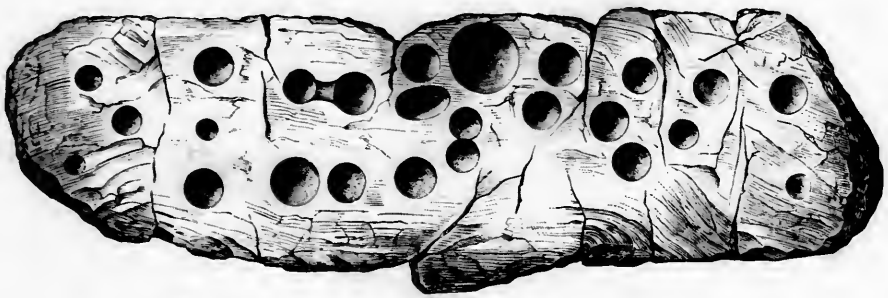


FIG. 45.—Large boulder with mortar-cavities. Santa Barbara County, California.

1/7

FIG. 46.—Sculptures on Bald Friar Rock, in the Susquehanna River, Maryland.

1/2

FIG. 47.—Sculptured slab from Bald Friar Rock (Mus. No. 39010).

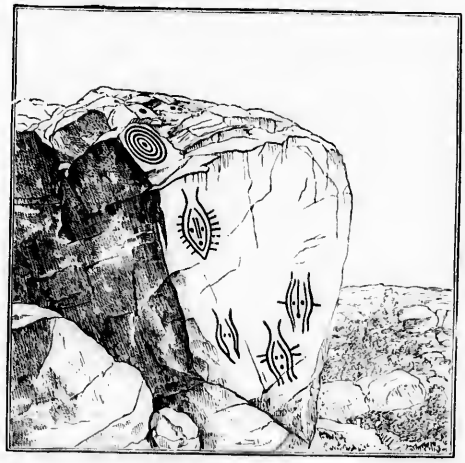


FIG. 48.—Northeastern end of Bald Friar Rock.

FIG. 49. FIG. 50. FIG. 51.

FIGS. 49, 50, and 51 ($\frac{1}{12}$).—Sculptures on Bald Friar Rock.

Fig. 52.—Sculptured boulder in the Gila Valley, Arizona.

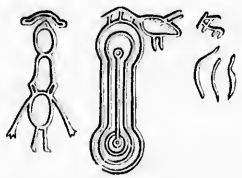


Fig. 53.—Rock-carving in the San Pete Valley, Utah.

Fig. 54.

Fig. 55.

Fig. 56.

Fig. 57.

Figs. 54, 55, 56, and 57 ($\frac{1}{4}$).—Rock-paintings in Lake County, Oregon.

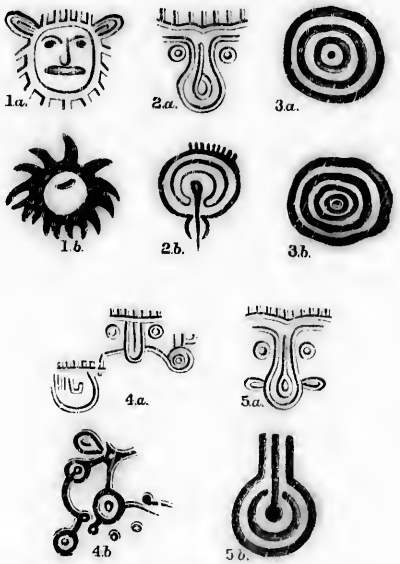


FIG. 58.—Rock-sculptures near David, Chiriqui, and Northumbrian types.

No. 1 represents two radiant suns—*a* the American, *b* the British character: in Chiriqui this character has been found but once, nor does it occur oftener among the published British figures.

No. 2. *a* the American. *b* the corresponding British figure, showing several grooves radiating from an outer arch, and bearing some resemblance to what is termed the "Ogham characters" by British antiquaries.

No. 3. *a* the American, *b* the corresponding British figure, showing the completely closed concentric circles.

No. 4. *a* the American, *b* the corresponding British figure, showing how the various characters (symbols) are connected by lines.

No. 5. *a* the American. *b* the corresponding British figure, showing the groove or outlet of the circle.

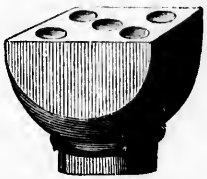


FIG. 59.—Holy-water stone in a church at Strö, in Scania, Swedon.

FIG. 60.—Holy-water stone in a church at Oennarp, Scania.

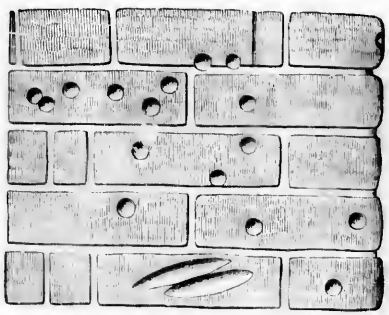


FIG. 61.—Cups and furrows on the wall of Saint Mary's Church, at Greifswald. Pomerania.