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REVIEW OF THE EVIDENCE RELATING TO AURIFEROUS GRAVEL MAN IN CALIFORNIA.

BY

WILLIAM H. HOLMES.

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(WITH PLATES I–XVI).

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REVIEW OF THE EVIDENCE RELATING TO AURIFEROUS GRAVEL MAN IN CALIFORNIA.[1]

By William H. Holmes.

First Paper.

INTRODUCTORY.

During recent years much has been said and written regarding the antiquity of man in America, and as opportunity has presented I have engaged in the discussion of the subject, endeavoring to determine the exact value of the evidence brought forward by the various observers. By far the strongest body of data tending to establish the existence of a man of great antiquity is that emanating from the gold belt of California and first brought together by Prof. James D. Whitney, State geologist of California, and published in his notable work on the auriferous gravels.[2] There is considerable literature embodying original observations outside of this volume, the most important contribution being a paper by Dr. George F. Becker, published in the Bulletin of the Geological Society of America for 1891.[3]

For a long time I have entertained the idea of visiting the Pacific slope for the purpose of becoming personally acquainted with the region furnishing the evidence and with the people, so far as the hand of time has spared them, familiar with the golden era of California. I hoped at least to see enough to enable me to make up my

[1] Reprinted from American Anthropologist, January and October, 1899. The writer intended again to visit California and continue the investigation begun in 1899, but as the opportunity has not arisen, the preliminary paper is here republished with careful revision and with such new matter as happens to be at hand. An attitude apparently antagonistic to the evidence as it stood was taken, for the reason, first, that the negative side had never been systematically presented, and, second, because the possible nucleus of reliable data was evidently obscured by a mass of worthless testimony that required careful sifting. If renewed interest in the investigation of this important subject has been awakened, the main object of the original writing is accomplished.

[2] J. D. Whitney, The Auriferous Gravels of the Sierra Nevada of California, Cambridge, 1879, Vol. VI, No. 1 (1st part).

[3] Other articles are Skertchley, S. B. J., On the Occurrence of Stone Mortars in the ancient (Pliocene?) River gravels of Butte County, California. Journal Anth. Inst., May, 1888. Blake, W. P., The Pliocene Skull of California and the stone implements of Table Mountain. Journal of Geology, October and November, 1899, p. 631.

own mind as to the value of the evidence, and it seemed within the range of possibility that something decisive in the way of new evidence, or of side lights on the old, might develop—something that would open the way to a final settlement of the great questions at issue.

In September, 1898, I received instructions from the Secretary of the Smithsonian Institution to visit California for the purpose of making collections and of prosecuting anthropological investigations along such lines as might promise to be of value to the National Museum. It was arranged that the work should be conducted under the auspices of the Director of the Bureau of American Ethnology. A short time before setting out I learned that Prof. W J McGee was contemplating a trip to the Southwest a little later in the season, and I succeeded in inducing him to join me for a short time in the auriferous gravel region; I thus had the advantage of conjoint work with him in a section of superlative interest geologically, archæologically, and scenically, and one that has been made classic in science by Whitney and in song by Bret Harte.

HISTORY OF DISCOVERIES.

The auriferous, or gold-bearing, gravels, with which we are especially concerned, are scattered over a vast area in central California, extending from the high sierra on the east down the far-reaching ridges and canyons to the lowlands of the coastal belt, and from the Yuba on the north to the Merced on the south, an area equal in extent, perhaps, to that of the State of Connecticut.

The great gold discoveries began with the influx of miners in 1849 and during the two or three succeeding decades the gravel deposits were dug over to an extent without parallel in the history of mining operations. They were first attacked by pick and pan, then sluicing was introduced, and later hydraulic operations were conducted on a grand scale. Tunnel mining was also extensively carried on, and the mountains were pierced by countless shafts, sometimes so close together and so profound that it seemed almost that the mountains might collapse. This work had not continued long when reports began to be circulated, gradually reaching the ears of the outer world, that relics of man were found in these gravels, and controversies arose in which the religious press took an active part, combating the idea that traces of man could be found in formations that antedated the days of Adam, as these gravels evidently did. Mr. C. D. Voy, of Oakland, Dr. Perez Snell, of Sonora, and others collected various relics reported to have come from the gravels and secured some data relating to their origin; but the matter was never brought to a focus until Professor Whitney became interested in the discoveries and in the early sixties began with his assistants to visit the district and to collect and collate the scattered but remarkable observations.

WHITNEY'S RESEARCHES AND CONCLUSIONS.

Professor Whitney found that the gold-bearing gravel deposits were, in the main, very old; that their formation began at least in Middle Tertiary time and continued down to the end of the Pliocene period, and, in fact, in varying degree down to the present time. Examining the evidence with the utmost care, he found it impossible to avoid the conclusion that many of the relics of man and his arts came from those portions of the gravels that could with reasonable certainty be assigned to the Pliocene; that these finds were associated with the remains of extinct species of animals and plants; that they represented a race of ordinary physical characters, though having a culture of the lowest range compatible with the human status. He pointed out that a prominent feature of the evidence was its coherency; coming from a multitude of independent sources and from widely distributed localities, it all pointed in one direction. There was no suggestion of the manufacture of evidence and no apparent motive for deception. The observations were all those of miners, but a "long chain of circumstantial evidence is frequently more convincing than a single statement of an [expert] eyewitness."[1] Since Whitney's time the evidence has been strengthened by Becker, and especially by his statement that Mr. Clarence King, director of the Survey of the Fortieth Parallel, found part of a stone pestle in the firmly compacted tufaceous deposits under the lava cap of Tuolumne table mountain and removed it from the matrix with his own hands.

It is impossible not to be deeply impressed by the amount and consistent nature of the evidence presented; yet such is the magnitude of the proposition to be sustained that even this testimony seems inadequate, and we seek by reexamination and renewed research to determine its exact strength and true significance.

AGE OF THE AURIFEROUS GRAVELS.

The substantial correctness of the geologic determinations of Whitney has recently been made fully apparent by researches of the able geologists of the United States Geological Survey. It was expected by many students of the subject that the relic-bearing gravels would in time prove to be younger than Whitney believed; that they would be found to correspond in age with the Glacial period—possibly with the closing episodes of that period as determined in the Eastern States—and others were confident that they would prove to be even post-Glacial; but instead of this, Becker, Lindgrin, Turner, and Diller have extended the gravel-forming epoch to cover the Miocene and probably the greater part of the Eocene, thus making comparisons with the close of the Glacial period hardly more reasonable than the attempt to include the whole group of phenomena within the period of Biblical record.

[1] Auriferous Gravels, p. 260.

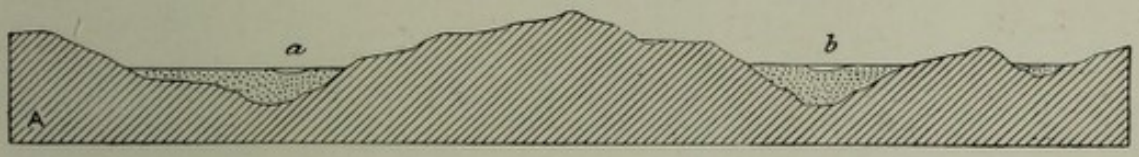
To say that they were ten times or a hundred times older than the Glacial period, as represented by the greatest extension of the ice in Ohio and Delaware valleys, would probably not be doing justice to a lapse of time that can be expressed only in several geologic periods.

As many readers may not be familiar with the geologic relations of the auriferous gravels, and hence find themselves unable to form definite notions of the great lapse of time and the vast transformations of nature with which we have to deal, it may be well to present briefly the main features of the later geologic history of the region. The accompanying sections, with appended data, will serve to tell the story so fully that a few words only will be necessary to make it understood. In early Tertiary times the prototypes of the modern rivers ran out from the sierra and down through the foothills to the sea pretty much as they do to-day. The valleys were not so deep as now, as indicated in 1 and 4, Plate I, but the streams had strong currents and rapidly scored down the gold-bearing formations which they traversed, filling their channels with coarse, waterworn débris to the depth of hundreds of feet and depositing the freed gold along their beds. This second phase of progress is indicated in 2, Plate I. It is from these gravels that some of the finds of human relics are reported, and it is therefore affirmed that along the banks of these ancient rivers the first human beings of which science has a trace lived and pursued their varied avocations.

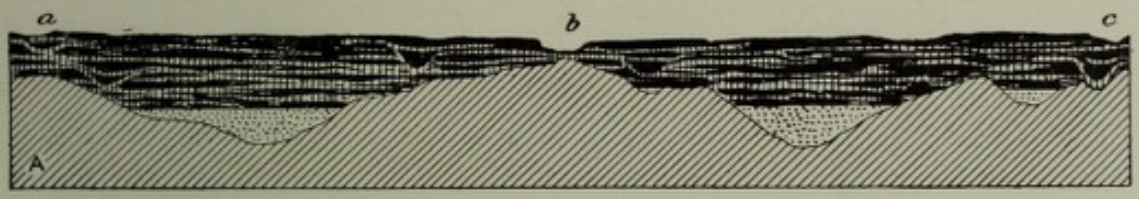
But there came over this region a momentous change. A period of great volcanic activity set in, and streams of lava and rivers of mud descended from the sierra, filling up the valleys; new channels were eroded, to be filled in their turn, one system of drainage succeeding another for a prolonged period, at the close of which the deepest valleys were filled to the brim with the deposits, as shown in 3, Plate I; and when the flows of basalt—the final products of vulcanism—ceased, the waters of the high sierra began the work of laying out the drainage system that has come down to the present time.

Since that remote day the region has been elevated to greater heights; the Merced, the Stanislaus, the Tuolumne, the American, the Yuba, and other streams have cut their channels by the slow processes of erosion down to profound depths and now run their courses in valleys 2,000 feet deep and many miles in width—gorges so profound, precipitous, and vast that it is a day's journey to cross them even where the hand of the enterprising gold hunter has ventured to blaze the tedious way. The striking character of the present profile is shown in 4, Plate I, by reference to which it may be seen that the cutting of the present valleys to such great depths has left the old stream beds with their deposits of gravel, their treasures of gold, and (it is alleged) their relics of humanity high up toward the mountain summits (*e*). In these elevated districts the miners seek and find the gravel outcrops and follow them far into and even through the ridges, the meanderings

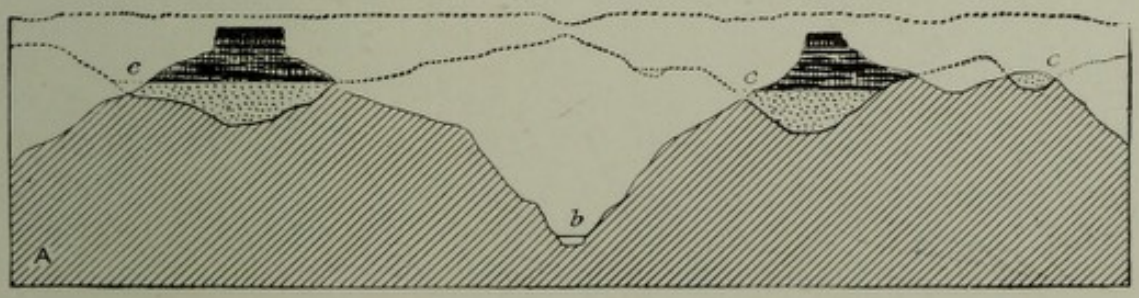
1.—Section showing conditions in early Tertiary times. *A*, Auriferous slates; *a*, *b*, stream beds.



2.—Conditions at close of great gravel-forming period and before volcanic activity began. *A*, Auriferous slates; *a*, *b*, river beds clogged with auriferous gravels.



3.—Conditions at close of volcanic period; valleys filled up and mountains buried with eruptive formations. *A*, Auriferous slates; *a*, *b*, *c*, river channels.



4.—Conditions to-day. Rivers in channels 2,000 feet deep. Remnants of volcanic deposits and old river gravels capping mountain summits, *c*, *c*. Old profiles shown by dotted lines.

TRANSVERSE SECTIONS OF RIVER CHANNELS, AURIFEROUS GRAVEL REGION, REPRESENTING THE PROFILES AS THEY ARE SUPPOSED TO HAVE APPEARED AT FOUR WIDELY SEPARATED PERIODS.

being so clearly defined that the courses of many of the Tertiary streams have been traced and laid down on the maps and the old river systems practically restored.

Those who get little idea of the lapse of time not expressed in years must fail to comprehend what vast ages are suggested to the geologist by the terms Eocene, Miocene, Pliocene, Pleistocene, and Recent, but the magnitude of the events involved—the entire obliteration of the old topography and the carving out of a new California, including such gorges as the Yosemite and the still more sublime Hetch-Hetchy—will readily be appreciated, and must make a deep impression on every mind and lead to hesitation in accepting the propositions that man matured before these events were initiated and that he has witnessed and survived their consummation. (See Plate XVI.)

CATEGORIES OF GRAVEL FINDS.

Having reached satisfactory and apparently final conclusions respecting the age of the auriferous gravels themselves, it is in order to examine the various groups of associated phenomena with which archeologists must concern themselves. There are four categories of data to be considered.

A. The animal remains (lower orders).
B. The plant remains.
C. The remains of man.
D. The remains of human handiwork.

A. The animal remains found in the gravels in fossil state represent a large number of species, chiefly mammals, identified by Dr. Joseph Leidy. Whitney enumerates the following forms: Mastodon, elephant, rhinoceros, horse, camel, tapir, ox, llama, deer, wolf, and dog. These are all of extinct species, and although some may have existed down to Post-Pliocene time, as indicated by Dr. Becker,[1] they fall as a group naturally within the Neocene (Miocene-Pliocene) age.

B. The fossil plants of the gravels secured in Whitney's time were studied by Dr. Leo Lesquereux, and by this eminent authority were called Pliocene, although he found many forms that could with equal justice be assigned to the Miocene. Extensive collections obtained in more recent years have been identified by Ward and Knowlton, and it is agreed that on the whole they represent early rather than late Neocene forms; that they are clearly of Middle Tertiary age. According to Professor Knowlton, there is not one species which can undoubtedly be identified with living forms.[2]

C. Human remains reported from the gravels are not plentiful, and all that appear to have been preserved are an imperfect human cranium,

[1] George F. Becker, Antiquities from under Tuolumne Table Mountain in California. Bull. Geol. Soc. of America, Vol. II, p. 189.

[2] Lindgren and Knowlton, Age of the auriferous gravels. Journal of Geology, Vol. IV, No. 8, p. 905.

known as the "Calaveras skull," and a few unimportant fragments of another skull. Fragments of skulls and various bones of the body have been reported from the old gravels in a number of localities. These remains, and especially the Calaveras skull, indicate a man not differing materially from the California Indian of to-day, although said by Whitney to present some characteristics of the Eskimo.

D. The remains of human handiwork to be considered are, on the other hand, quite numerous. Many hundreds of specimens have been reported from the gravels, and are believed, in a general way, to belong to the Neocene deposits. According to the finders, many of them were intimately associated with the remains of fossil animals and plants, and some appear to be from gravels that antedate the volcanic era.

INCONGRUITIES IN THE EVIDENCE.

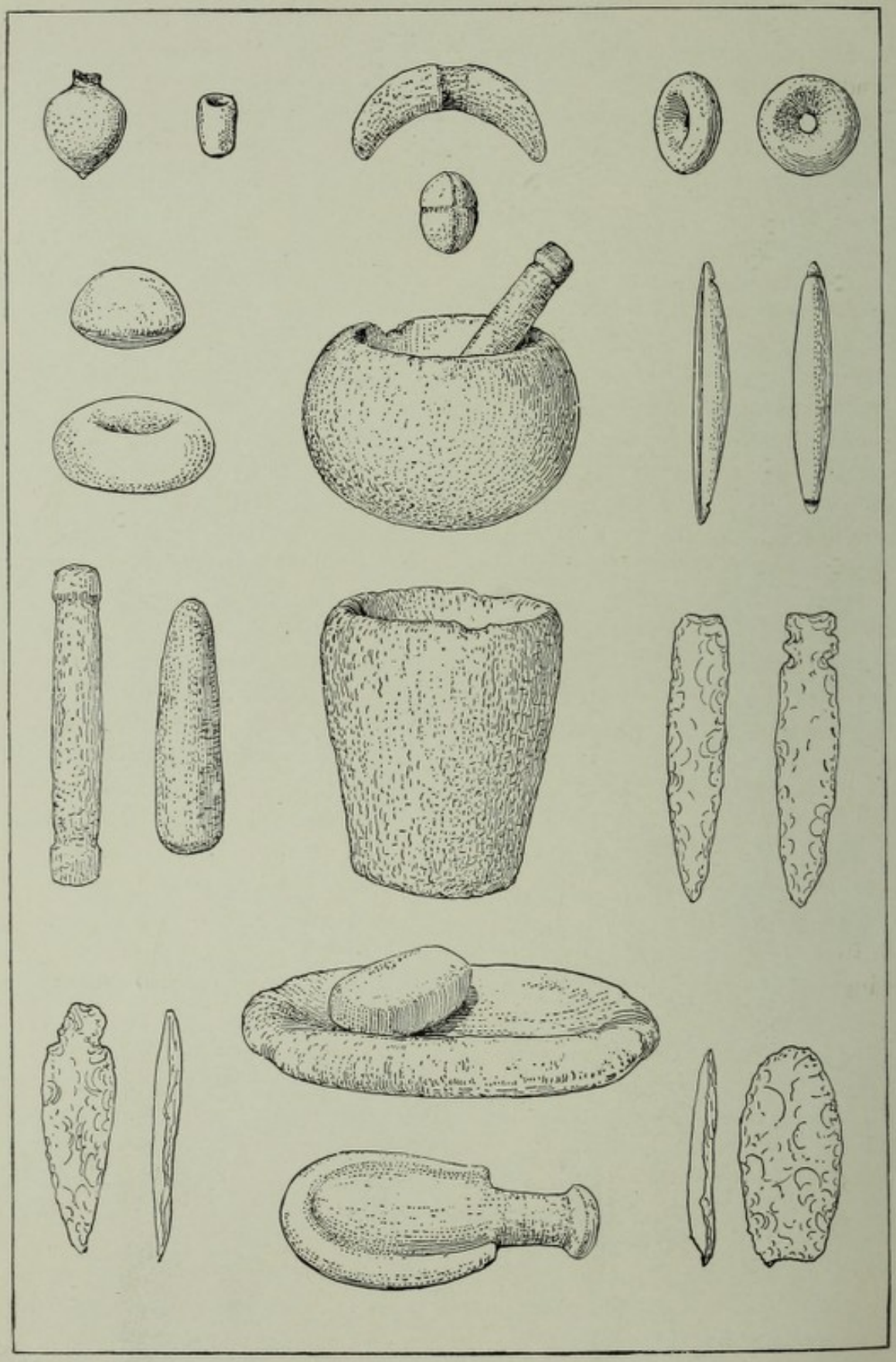
In comparing these four groups of remains we observe that the fossil animals belong without exception to extinct species, that the plants are likewise extinct, and that all of both groups take their place naturally within the limits of the Neocene. When, however, we examine the human remains, we are met by the striking fact that they do not represent an extinct form, or even a well-marked variety of *H. sapiens*, but a people practically identical with ourselves; and it therefore takes a great stretch of the imagination to conceive that this man could have formed part of a fauna every other mammalian member of which has succumbed during the uncounted centuries of succeeding geologic periods.

On examining the art remains it is found that they also seem out of place in Tertiary times, that they present a decidedly modern aspect. Of the fifteen or twenty varieties reported from the gravels by Whitney and others, all appear to be of recent types. They are practically identical with the stone implements used by the native tribes of California to-day or in the recent past. If these forms are really of Tertiary origin, we have here one of the greatest marvels yet encountered by science; and perhaps if Professor Whitney had fully appreciated the story of human evolution as it is understood to-day, he would have hesitated to announce the conclusions formulated, notwithstanding the imposing array of testimony with which he was confronted. To suppose that man could have remained unchanged physically; to suppose that he could have remained unchanged mentally, socially, industrially, and esthetically for a million years, roughly speaking (and all of this is implied by the evidence furnished), seems, in the present state of our knowledge, hardly less than admitting a miracle.

Professor Whitney believed the implements found were just such as might be expected of a Tertiary man, and observes:

"It has been always the same kind of implements which have been exhibited to us, namely, the coarsest and least finished which one would suppose could be made and still be implements."[1]

[1] Auriferous gravels, p. 279.



GROUP OF IMPLEMENTS AND UTENSILS SAID TO HAVE BEEN DERIVED FROM THE AURIFEROUS GRAVELS.

The figures included in the plate are copied from hasty sketches and do not assume to be exact. They serve, however, to indicate the character and range of the finds. Photographic reproductions of some of the objects are given in succeeding plates.

But on examination we find that they are really of advanced types, and comprise the following varieties: Mortars (several forms), pestles (numerous forms), platters (dishes, metates), mullers (rubbing stones), hammer stones, ladles, plummet stones, rings of stone, pitted disks, shuttle-shaped stones, grooved pebbles (hammer heads, sinkers), crescent stones, spearheads, arrowheads, knives, and broad blades, to which may be added stone beads and wampum.

The series of sketches presented in Pl. II will serve to indicate the wide range of form covered by these objects, and the photographic illustrations given in Pls. III to XI will convey a definite idea of the character of some of them. The substantial identity of these implements with the familiar relics of our Californian tribes is thus made apparent. The assertion that man shaped and used this group of artifacts in Tertiary times and continued to use them without change, without improvement or retrogression, down through the ages, through complete transformations of land and sea and the extinction of all known living things, should be supported by proof more conclusive than anything yet adduced.

Again, the supposition that the ancient people disappeared as a result of nature's mutations, leaving their bones and handiwork in the stream beds of the Neocene period, and that another people, springing up or appearing on the same spot in recent years, has duplicated each and every character, activity, and art form, is hardly to be entertained.

Another consideration is interesting in this connection. Should we feel compelled to concede the existence of a race of advanced stone-age culture, such as that suggested by the group of artifacts presented, it would necessitate the further concession that the origin of the race is to be looked for in a still earlier period, for the best experience of anthropologists goes to show that early steps in culture are hesitating and slow, that the various stages which, in the normal order of cultured progress, precede the era of polished stone, must have been of very great length; and should we adopt the conclusion of Whitney that no considerable advance in culture took place in California between Tertiary times and the present, and take this as a reasonable index of the rate of progress, we should have to look for the cradle of the race somewhere in the remote ages of the Mesozoic.

It may further be noted that the biologist, accustomed to regard animate nature from the point of view of the theory of evolution, will find it difficult to accept conclusions that would place the perfected man, the highest type of the highest class of animal life, the mammalia, too near the beginning of a series that ought in the natural order of things to show definite indications of progressive change.

EXAMINATION OF THE IMPLEMENTS PRESERVED.

Turning now to the objects of art described by Whitney and others and preserved in the museum of the University of California and else-

where (Pls. III to XI), we inquire more fully into their character and appearance. Whitney has said that the gravels were deposited by streams having violent currents, that the bones of animals were torn asunder and scattered, and that all objects were necessarily more or less worn; but it is observed that not one of the art objects attributed to the gravels shows the least sign of rough usage or wear; the marks they display of the tools employed in their manufacture or of the implements associated with them in use are as fresh as in the implements and utensils found on modern Indian sites. This fact is so significant that it can not be passed over without reasonable consideration.

Glancing again at the numerous implements, utensils, and ornaments attributed to the auriferous gravels, we may inquire, What materials are represented? There are several varieties of stone, including granite, andesite, rhyolite, slate, obsidian, etc. Andesite, however, prevails, and at least one-half of the objects are of this material. As most of these rocks in their original distribution are confined to somewhat limited portions of the geological column, some early and others late, it is proposed to inquire whether any of the specimens are of materials later in origin than the strata in which they are said to have been found. Full data are not yet at hand for a satisfactory discussion of this point; but it may be mentioned that andesite specimens are reported from horizons extending all the way from the earliest to the most recent gravels, yet so far as our geologists have gone this rock is not found in the formations of the particular region until toward the latter half of the Neocene. The objects being generally large, it is not to be supposed for a moment that they could have been brought from a distance. Again, obsidian is known only as a late product, having its origin in the most recent flows of the Sierra, yet we have obsidian implements reported from the gravels of various districts, and in one case, at least, from deposits that must belong very near the initial stages of eruptive activity. This interesting line of research remains to be followed up until definite results are reached; this, however, can not be profitably done until the geology of the region is more exhaustively studied.

The various objects attributed to the gravels by Voy and others and now preserved in the museum of the University of California were examined at my request by Mr. F. L. Ransome, of the United States Geological Survey, for the purpose of determining the material. The result is, of course, only tentative, but Mr. Ransome is thoroughly familiar with the formations of the auriferous region, and his determinations are as satisfactory as can be made without cutting the specimens and making slides for microscopic examination. The list furnished is as follows:

1. Lobed mortar. Fine-grained mica hornblende diorite; probably dyke.
2. Mortar and pestle. Mortar, diorite. A common peripheral facies of granodiorite when occurring in intrusive masses in foothills of the Sierra. Pestle is not so clear, but is apparently a fine-grained dioritic dyke rock.

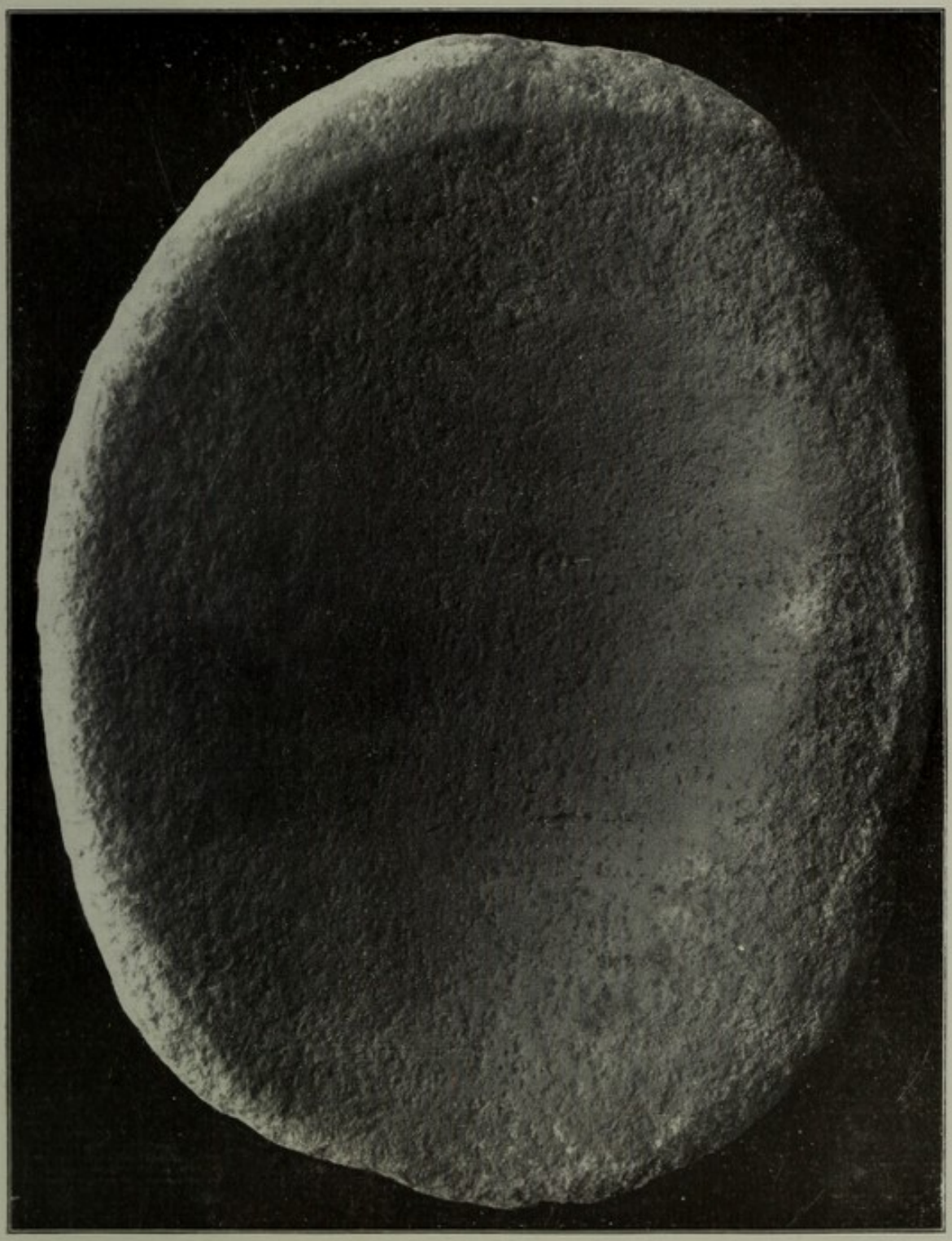
3. Mortar. Appears to be a fine-grained dioritic dyke rock, but is too dirty and stained to be satisfactorily examined.
4. Pestle. Fine-grained rock, apparently a crystalline schist.
4. Mortar. Gray hornblende andesite, a common facies in Neocene breccias.
5. Mortar. Fine-grained hornblende andesite.
6. Mortar. Apparently a hornblende andesite, though of somewhat unusual type. Porphyritic hornblende is not conspicuous. Apparently phenocrysts of plagioclase and hornblende in gray glassy base.
7. Cylindrical mortar. Hornblende andesite.
9. Mortar and pestle. Mortar is pinkish hornblende andesite. Pestle is amphibolite schist. Shows fibrous structure and apparently remnants of augite.
10. Mortar. Diorite porphyry. Probably dyke rock.
12. Mortar. Pinkish hornblende andesite.
13. Dish or mealing stone. Gray hornblende andesite.
14. Dish or mealing stone. Appears to be fine-grained syenite, but possibly a diorite. Almost certainly a dyke rock.
15. Dish or mealing stone. A fine-grained pinkish rock containing talc (or some equally soft mineral) and a silvery mica.
16. Mortar and pestle. Mortar, hornblende andesite. Pestle, a porphyritic rock, species not recognizable. Not an andesite.
16. Boat-shaped stone. Compact banded rock, apparently from metamorphic Calaveras formation.
16a. Boat-shaped stone. Amphibolite schist.
16b. Boat-shaped stone. Compact rock of doubtful nature.
17. Large bead. Rusted hornblende andesite (?).
18. Mortar. Hornblende andesite (?). Badly weathered.
19. Crescent-shaped stone. Very fine grained. Apparently an altered dyke rock.
20 Cylindrical mortar, 9 inches high. Rather soft talcose rock; probably altered dyke rock.
20a. Small mortar. Diorite with segregation patch. Dyke, or periphery of granodiorite mass in foothills.
21. Mortar. Diorite porphyry. May come from periphery of granodiorite mass or from a dyke. Contains a dark segregation patch.
21a. Grooved pebble. Fine-grained gray hornblende andesite.
21b. Grooved pebble. Fine-grained gray hornblende diorite. Dyke rock.
21c. Grooved pebble. Fine-grained diorite. Dyke rock.
23. Mortar. Gray hornblende andesite.
—. Round stone (found in 1863 at Gold Springs Gulch, Tuolumne County, in auriferous gravel of Pliocene age). Fine-grained diorite. Dyke rock.

Pls. III to XI are devoted to the illustration of a number of these objects. The photographs used, with one exception, were lent for the purpose by Dr. R. E. C. Stearns, of Los Angeles, Cal., the original Voy collection numbers being given, as also in the preceding list. The objects referred to in the above list form but a small fraction of the multitude of relics reported from the gravels.

In presenting these objects the original statements that they were found in definite relations with Tertiary strata and Tertiary mammalian remains are allowed to stand, but it should be understood that the view of the problems involved taken in this paper requires that such statements should as yet be followed by an interrogation. This interrogation does not raise a question as to the veracity of the finders, but serves to express the fear that in some way errors of observation or record have been made.

EXPLANATION OF PLATE III.

Dish or mealing plate found in 1862, associated with other stone relics and with fossil bones of the mastodon and other extinct mammals, in the auriferous gravels of Gold Springs Gulch, Tuolumne County, Cal. It is said to have been buried beneath 20 feet of calcareous tufa, but its exact relation with the associated gravels is not recorded. Longitudinal diameter, 18½ inches; transverse diameter, 13 inches; full depth, 3½ inches; depth of basin, about 2 inches. Inner surface well polished from use, and margins and under side worked and worn moderately smooth. Material, gray hornblende andesite. Referred to by Whitney in Auriferous Gravels, page 263. Two similar specimens are reported from gravel deposits near Georgetown, Placer County. This specimen is identical in every way with the mealing platters of the California tribes of to-day. No. 13, Voy collection.

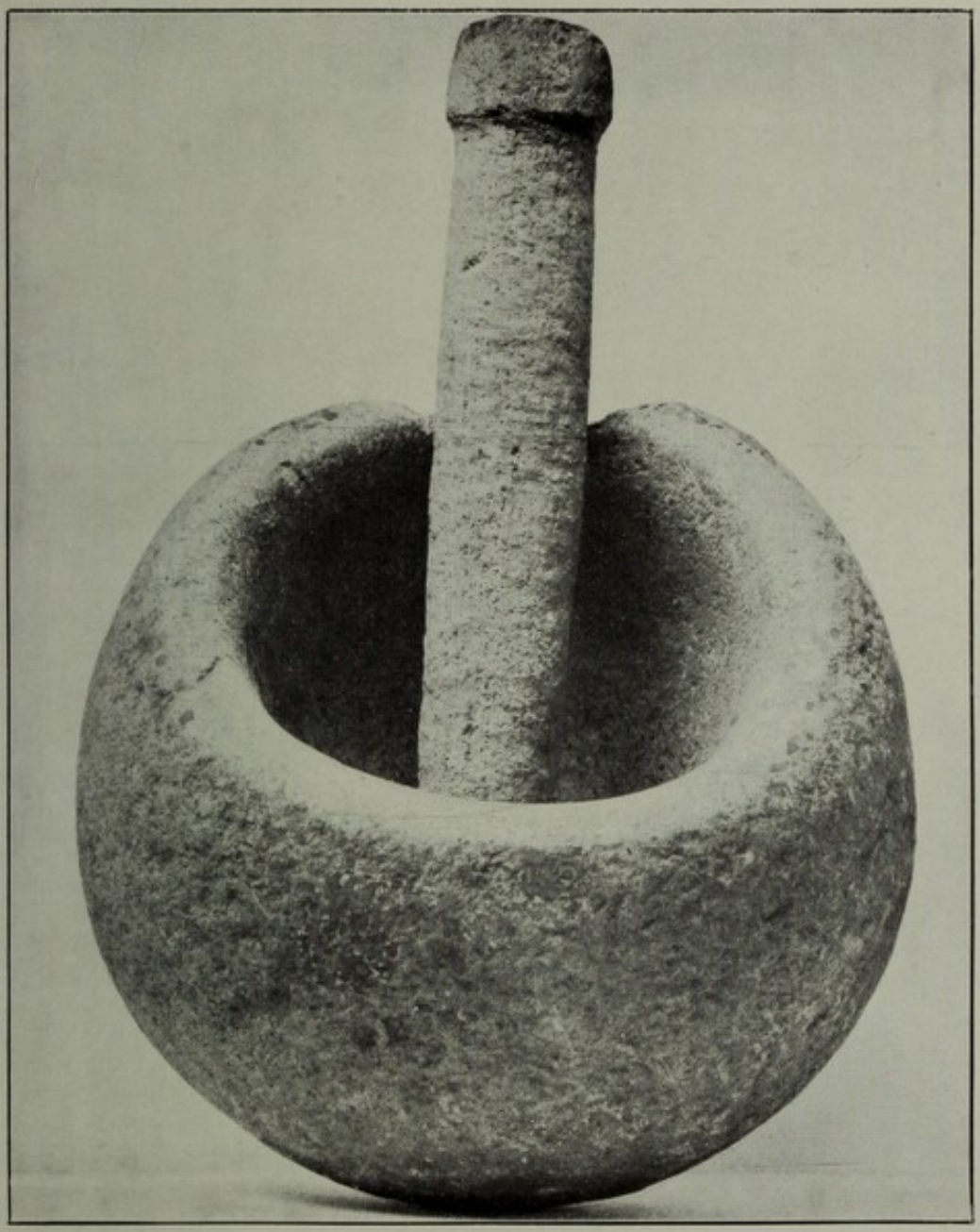


MEALING PLATE FROM GRAVELS IN GOLD SPRING GULCH (ONE-THIRD ACTUAL SIZE).

EXPLANATION OF PLATE IV.

Globular mortar, with cylindrical pestle, found in 1861, with other stone relics and the bones of fossil mammals in auriferous gravel, about 16 feet beneath the surface at Kincaid Flat, Tuolumne County, Cal. The shape of the mortar is symmetrical, and the surface well smoothed by pecking and use. Diameter, 10 inches; height, 7½ inches; depth of basin, 5½ inches. Material, pinkish hornblende andesite. Referred to by Whitney, p. 263. No. 9, Voy collection.

The pestle has enlargements at both ends and is not quite symmetrical in shape, and the surface shows the marks of the shaping tool quite distinctly, save at the ends, which are worn by use. Length, 11 inches; diameter of middle portion, 1½ inches; of larger end, 2 inches.



GLOBULAR MORTAR AND CYLINDRICAL PESTLE FROM GRAVELS AT KINCAID FLAT (ABOUT ONE-THIRD ACTUAL SIZE).

EXPLANATION OF PLATE V.

Globular mortar, ornamented with incised markings, forming a rude reticulated design on the exterior surface. Found in 1863, with other stone relics and associated with mammalian remains in auriferous gravel, about 16 feet below the surface, in Gold Spring Gulch, Tuolumne County, Cal. Diameter, 12 inches; height, 9½ inches; depth of basin, 7 inches. Material, pinkish hornblende andesite. Referred to by Whitney, p. 263. This type of mortar is in use to-day and the incised reticulate decoration is occasionally seen. The pestle is of the simple cylindrical form usual in California. No. 12, Voy collection.

GLOBULAR MORTAR AND PESTLE FROM GRAVELS IN GOLD SPRING GULCH (ONE-HALF ACTUAL SIZE).

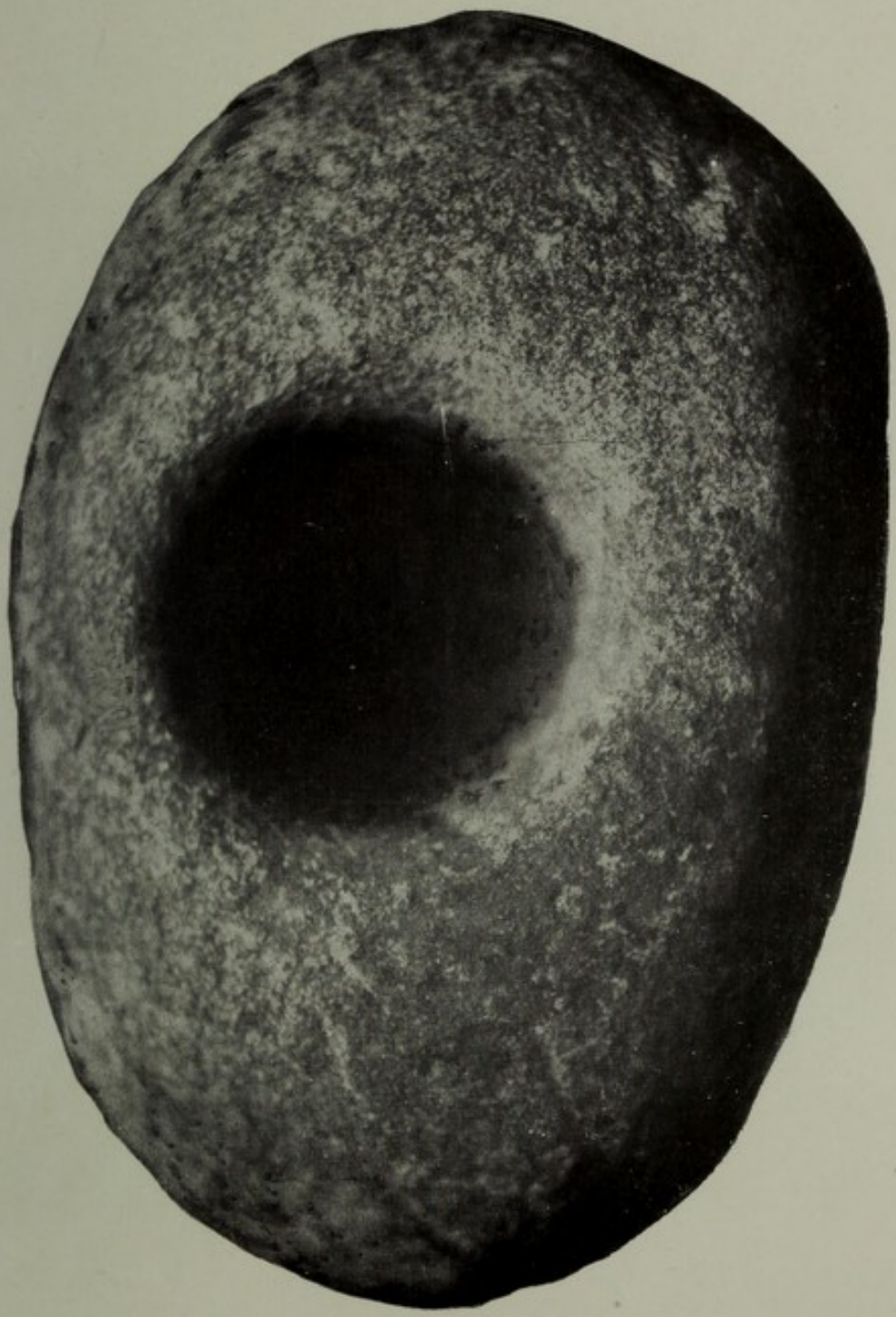
EXPLANATION OF PLATE VI.

Cylindrical mortar, found in 1861, with other relics of stone, embedded in auriferous gravel about 10 feet beneath the surface, 3 miles northeast of Shingle Springs, Eldorado County, Cal. Height, 9 inches; diameter near top, 7 inches; at base, about 5½ inches. Conical pit 4½ inches deep. The material is a rather soft talcose rock, probably altered dyke material. The outlines are somewhat irregular, but the surfaces are all artificial. Referred to by Whitney, p. 265. This type of mortar is not unusual in central California, but is apparently not often found in use by the present tribes. No. 20. Voy collection.

CYLINDRICAL MORTAR FROM GRAVELS AT SHINGLE SPRINGS (ONE-HALF ACTUAL SIZE).

EXPLANATION OF PLATE VII.

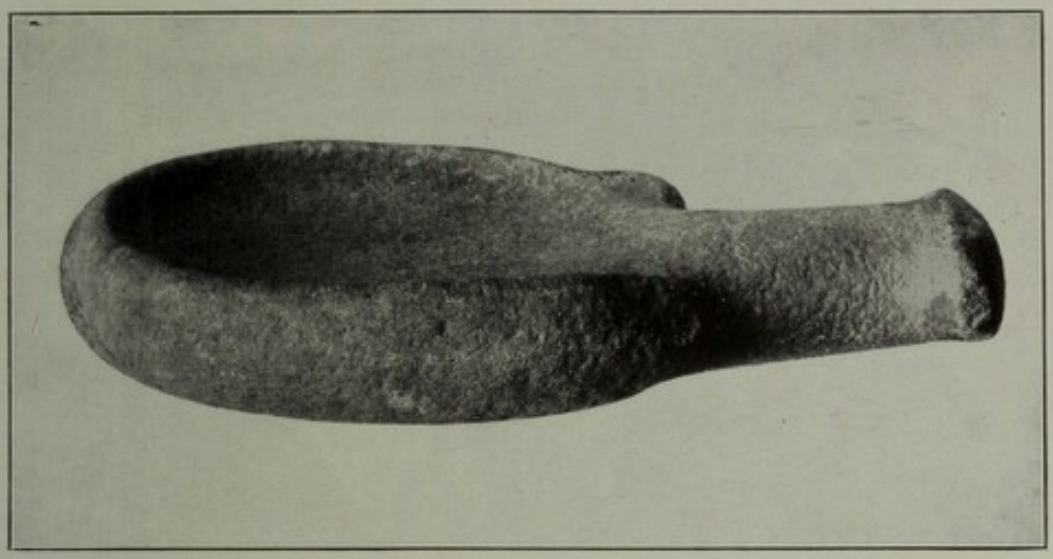
Mortar of oblong shape and with deep circular pit. Said to have been found in 1862 in auriferous gravel beneath 14 (or 140) feet of basalt and 200 feet in from the surface of the slope near the Boston Tunnel Company's mine, Table Mountain, Tuolumne County, Cal. Circumference, 25 inches. Material, hornblende andesite of somewhat unusual type. Shape only partially artificial and not peculiar to any region. No. 6, Voy collection.

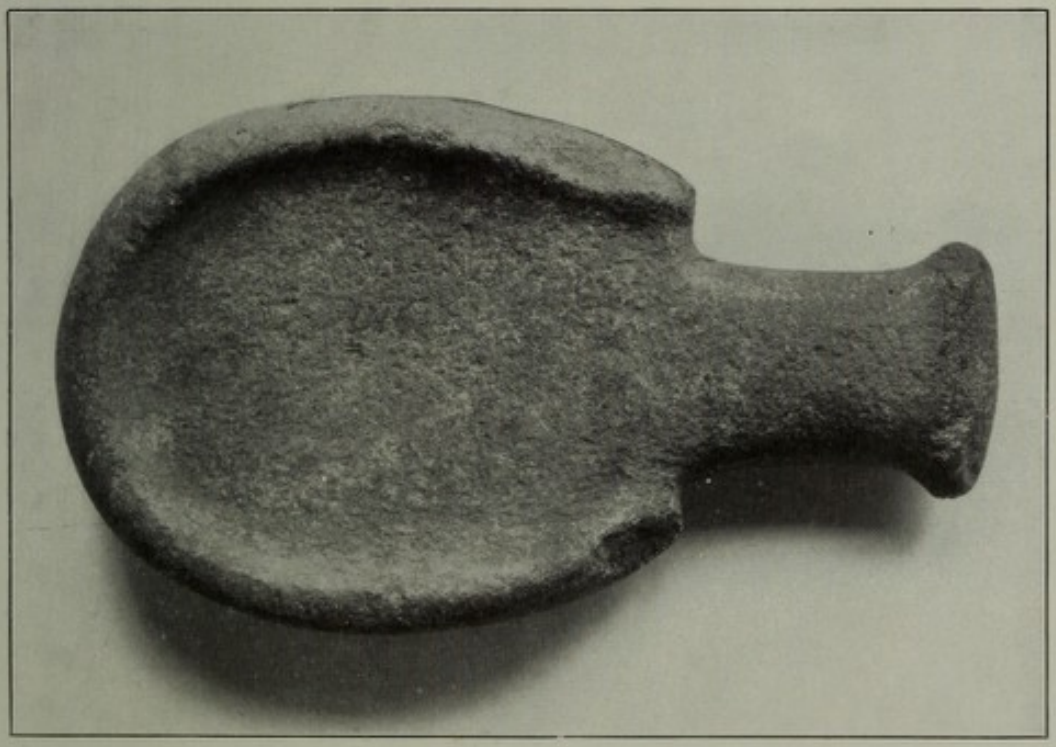


OBLONG MORTAR ATTRIBUTED TO GRAVELS UNDER LAVA CAP OF TABLE MOUNTAIN (ONE-HALF (?) ACTUAL SIZE).

EXPLANATION OF PLATE VIII.

Scoop-shaped utensil of gray diorite, found in 1864, in auriferous gravel, 16 feet below the surface, near Oregon Bar, North Fork American River, Placer County, Cal. The shape is unusual, although many specimens of somewhat similar character have been found in California. Length, 11¼ inches; width, 6¼ inches. This specimen is now in the Museum of Science and Art, Philadelphia, and was kindly forwarded for examination to the National Museum by Dr. Stewart Culin.





SCOOP-SHAPED UTENSIL FROM GRAVELS AT OREGON BAR (ONE-HALF ACTUAL SIZE).

EXPLANATION OF PLATE IX.

Grooved pebbles, probably used as hammers or as club heads. Found with other stone relics, in auriferous gravel, 10 feet beneath the surface, on Indian Gulch, near Spanish Flat, Eldorado County, Cal. Objects of this general character have a wide range geographically and served various purposes in the economy of savage and barbarian life. The upper specimen is of hornblende andesite and the lower of fine-grained diorite. Referred to by Whitney, p. 276. No. 21, a, b, Voy collection.

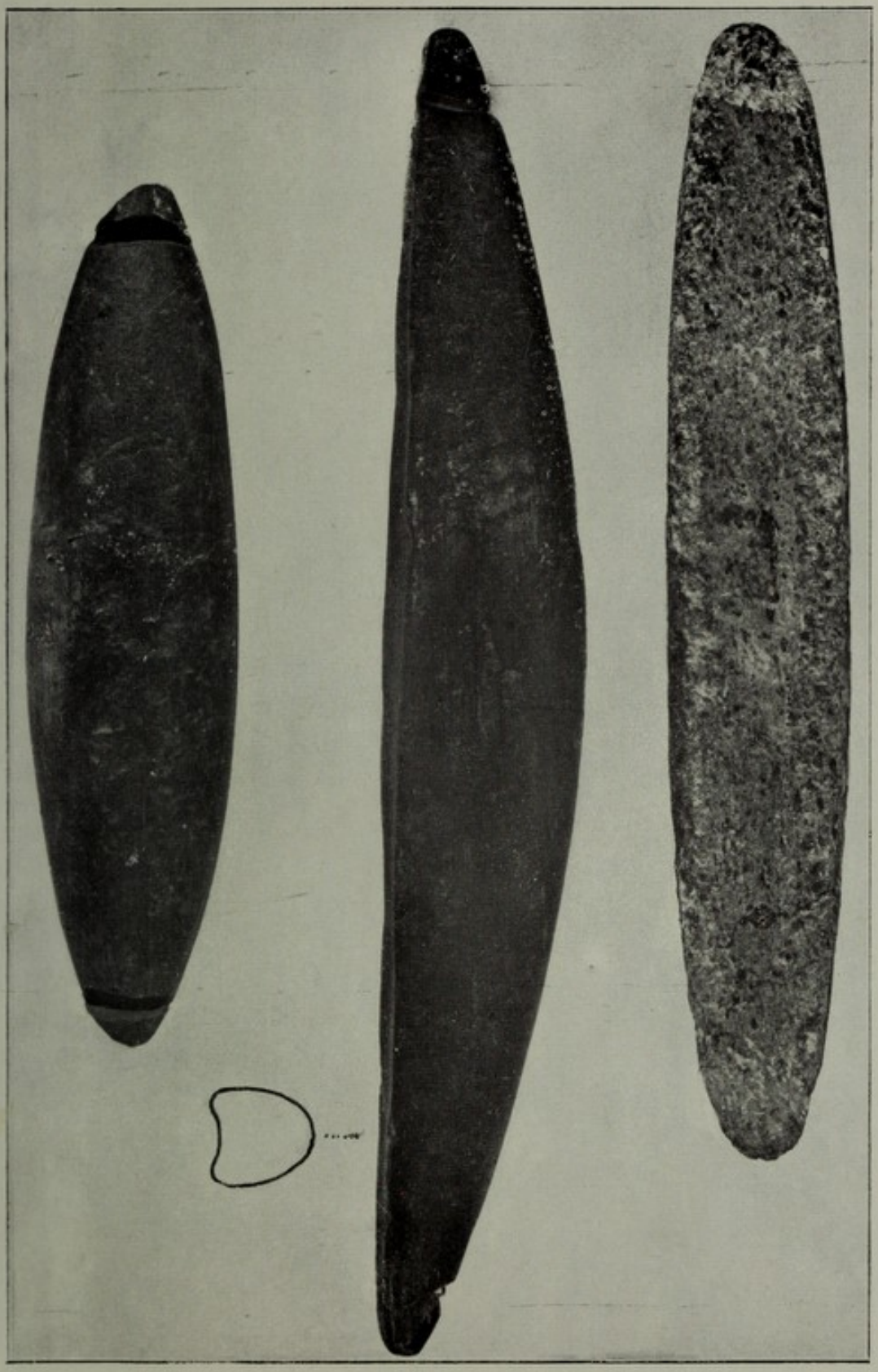
GROOVED PEBBLES FROM GRAVELS AT INDIAN GULCH (ACTUAL SIZE).

EXPLANATION OF PLATE X.

Three objects, usually referred to as charm stones, found in 1864, with other stone relics, in auriferous gravel, 10 feet below the surface, in Indian Gulch, Eldorado County, Cal. They are described as "boat-shaped," and have notches or grooves at the ends for convenience in attaching cords. The longest one is symmetrical in shape and well finished and is made of greenish-gray slate. The short specimen is similar in character and material, while the remaining piece is much ruder and is made of amphibolite schist. Referred to by Whitney, p. 276. No. 16, 16a, 16b, Voy collection.

These forms, as well as numerous variants, are found in large numbers in California.[1]

[1] Yates, Lorenzo G. Charm stones. Bulletin No. 2, Santa Barbara Society of Natural History, pp. 13–28. Five plates.

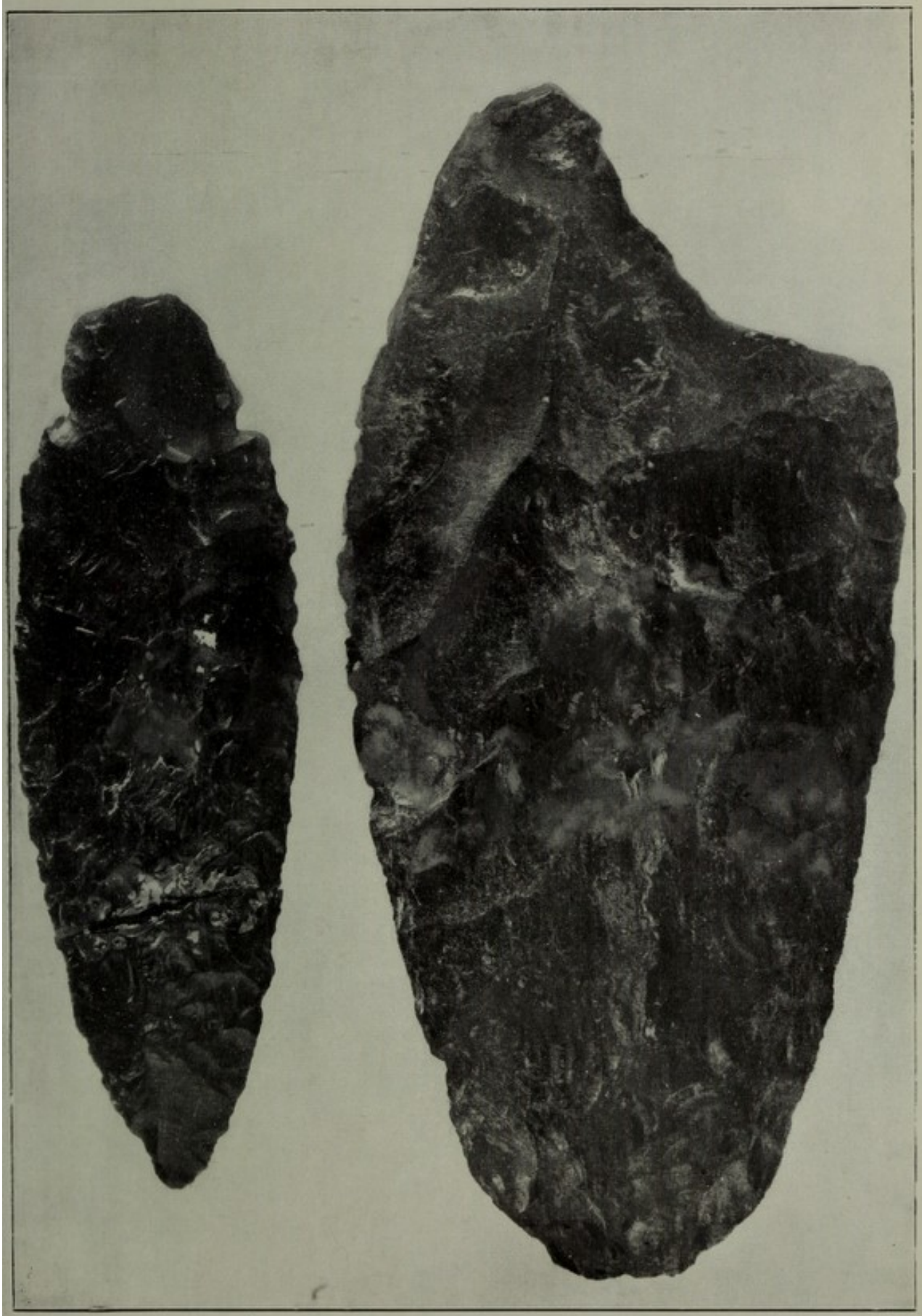


BOAT-SHAPED OBJECTS FROM GRAVELS IN INDIAN GULCH (ACTUAL SIZE).

EXPLANATION OF PLATE XI.

Obsidian blades, one specialized as a knife or lance head, and the other in the rough. The first was found in 1869, with other relics and with mastodon remains, in auriferous gravel, 10 feet below the surface, at Horse Shoe Bend, Merced River, Mariposa County, Cal. The second was obtained in 1863, with other relics, from auriferous gravel, 10 feet below the surface, near Princeton, Mariposa County, Cal. Referred to by Whitney, p. 261. A similar specimen came from the gravels in Fresno County, Cal. Nos. 23 and 24, Voy collection.

These specimens present no features at variance with the ordinary obsidian implements of California. Engraved actual size.



OBSIDIAN BLADES FROM GRAVELS AT HORSE SHOE BEND, MERCED RIVER (ACTUAL SIZE).

OBVIOUS SOURCES OF ERROR.

It was not expected that a short visit to the auriferous gravel region would lead to a final settlement of the whole question of auriferous gravel man, for the task is a most difficult one. The recorded observations on which the hypothesis of a Tertiary man is based can not be made over again or satisfactorily tested, and new observations of a crucial nature must necessarily materialize very slowly. However, a reasonably intimate knowledge of the region and its phenomena was gained, and a foundation was laid for future research and for intelligent judgment as to the value of the extensive body of testimony already on record.

On reaching the mining region attention was turned first toward the nature, age, and relations of the gravel deposits to the topographic character of the district, and to the profound changes brought about by the mining operations. Thanks to the thorough work done by our geologists, all of these matters were readily mastered, and nothing need be added to what has been said respecting them in preceding paragraphs.

In the second place, a study of the implements and utensils, ancient and modern, of the general region was made in order that comparisons might be instituted between them and the gravel finds. The results of this comparison have already been referred to, but further mention of the topic will later be made.

A third line of investigation related to the distribution of the aboriginal tribes and their relation to the mining areas and mines, and in this direction very significant observations were made. Indian village sites are scattered over the hills and table-lands, and ancient Indian sites were found everywhere. At Nevada City, Nevada County, a Digger Indian (Shoshonean stock) village was encountered on the margin of the table-land overlooking the great gravel mines a mile west of the city. Its people were engaged in gathering acorns and grinding them in mortars of various shapes. Some of the mortars were worn in outcropping masses of granite, or in large, loose bowlders, while others consisted of flattish or globular masses of stone more or less modified in shape by artificial means, and it was realized that, as the hydraulic work progressed in the mine below, this site might be undermined, and that one by one the utensils would drop in and become intermingled with the crumbling gravels, possibly to be recovered later with every appearance of having been embedded with these deposits when they were laid down unnumbered centuries before. One of the mortars reported by Whitney was obtained from a mine on the western slope of this same hill, and it is easy to see how it could have rolled in from an Indian camp site above, either before or during the prosecution of mining operations. The conditions observed here

were repeated at nearly every mine visited in Nevada, Placer, Eldorado, and Calaveras counties. At Forest Hill, Placer County, the Dardanelles mine, extensively worked in the early days by Richard Clark and others, has undermined and obliterated a half or more of a terraced spur or "flat," as such features are called in that country, formerly occupied by an Indian village. (See plate XII.) According to Mr. Clark, who still resides in Forest Hill, this site has not been occupied by the natives since work began in the mine in 1852, but an hour's search brought to light a dozen mortars and grinding stones, twenty or thirty rubbing stones and pestles, together with several varieties of smaller tools. As the ground of the site sloped toward the mine, most of the larger and especially the rounder objects must long since have rolled into the great pit (fig. 1), the gravel walls of which are on the one side upward

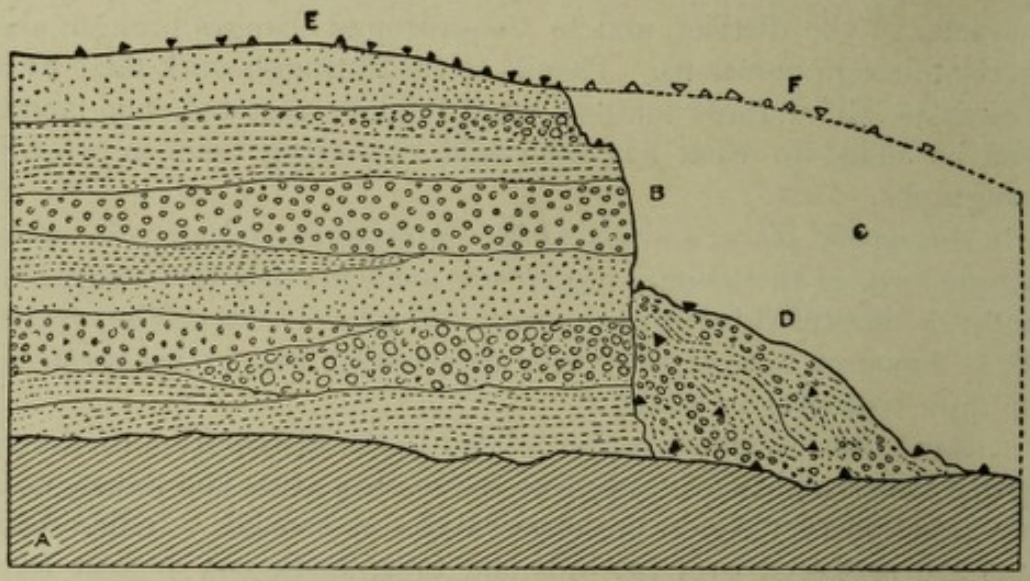


FIG. 1.—Section showing relations of ancient village site to gravel mine.

A, Auriferous slates—bed rock; *B*, auriferous gravels, 250 feet thick; *C*, great excavation made in gravels by hydraulic mining; *D*, crumbled gravels, result of caving in; *E*, ancient village site; *F*, portion of village site destroyed by mine. The dark triangular figures in the talus show the distribution of artifacts resulting from mining operations.

of 200 feet in height. Many of the objects obtained by me were already in the gullies leading down to the mine, and in the preceding half century large numbers must have gone over to become intermingled with the gravels, where they would remain for good, unless some observant miner happened to bring them to light. Specimens thus found, falling into the hands of such collectors as C. D. Voy, would naturally be added to the growing list of Tertiary gravel relics. The flat dish or platter found by Voy in this or a neighboring mine[1] is identical in type with several of the specimens from the village site on the brink of the mine. A rough, roundish mortar and a small handstone were found by Professor McGee on a ledge 30 feet below

[1] Auriferous gravels, p. 277.

1.—Weathered gravel wall of mine 200 feet in height, with ancient village site above.

2.—Margin of mine, showing ancient village site on the hill beyond.

VIEWS IN DARDANELLES MINE SHOWING POSITION OF ANCIENT VILLAGE SITE.

the brink of this mine, where they had fallen from above, and at Todds Valley, a few miles farther southward, a roundish bowlder some 3 feet in diameter, having a neatly shaped mortar in one side of it, was found resting on the bed rock of a deep mine. This specimen also had undoubtedly fallen in from above. An Indian dwelling was situated on the rim of the mine near by, and about it were scattered mortars of all kinds. A brush shelter in which the women grind acorns, a little higher up than the dwelling, contained a fixed mortar with numerous pits and at least a dozen pestles, both flattish and cylindrical in shape.

These significant relationships of Indian village sites and gravel diggings were repeated everywhere, and although Whitney observed the presence of the "Diggers," he made the mistake of supposing they used only fixed mortars, that is, those worked in the surface of large masses or outcrops of rock. The fact is that portable mortars and grinding stones of diversified forms are and have been used by Indians in all parts of California. It is not to be supposed that miners would pay much attention to the origin of relics found by them in the mines, since they attached no particular significance to them; so that between the unwary geologist, the unthinking miner, and the professional collector cultivating a prolific field, it is to be expected that many mistakes would be made.

No one can venture to say just what percentage of the finds reported by Whitney and accepted by him as evidence of antiquity are of the class here described, but certainly a large proportion may be assumed; and the observations made above cast a shadow of doubt over all specimens corresponding to known Indian forms reported from open mines, from such shafts and tunnels as do not extend beneath undisturbed formations, or from positions where any kind of post-Tertiary disturbance could have taken place.

In a second paper I hope to review the evidence further, and especially to present some data relating to the Calaveras skull.

Second Paper.

INTRODUCTION.

The main features of the problem of auriferous gravel man in California stand out in bold relief. On the one hand the evidence is interpreted as establishing the existence of a Tertiary man of high type physically and mentally, equal or superior to the Indian tribes of the region to-day, and occupying a culture plane corresponding to the polished-stone age of Europe. It is assumed that this remotely ancient man continued to live and thrive without perceptible advance or retrogression while nature passed through a thousand centuries of revolution; or that, as an alternative proposition, if the Tertiary race did not

persist, but disappeared along with the other mammalian fauna of the time, a new race sprang up, duplicating the physical characters and culture of a former geologic period. There are those high in the councils of anthropologic and geologic science who profess to see no reason for rejecting these bold and extraordinary propositions. On the other hand, there are those who hold that the facts adduced do not warrant either of these conclusions, who see in the whole body of observations and assumptions only a mass of errors and misinterpretations. Thus for a number of years the opposing views have stood without apparent change, the proofs, though strong, not being sufficiently decisive to carry full conviction with regard to a proposition of such exceptional magnitude. It is probable that without positive reenforcement the evidence would gradually lose its hold and disappear; but science can not afford to await this tedious process of selection, and some attempt to hasten a decision is demanded. If new evidence can not be found, renewed discussion will at least develop the full strength or weakness of the old, and it is especially desirable to take this matter up while some of the pioneers of the Sierra Nevada are still with us.

It has been shown in the preceding pages that much of the testimony furnished by Whitney is not well considered, and that there is excellent reason for questioning or rejecting most of the observations placed on record regarding the deep finds. The mines of the more northern counties, already referred to in some detail, seem to have furnished nothing that can be relied upon to prove anything more than the presence of the Digger tribes or their immediate predecessors in the region, and it remains now to look critically into the evidence furnished by the vast diggings of the south, and especially in the great valleys of the Tuolumne and the Stanislaus.

TABLE MOUNTAIN REGION.

The region of Table Mountain, in Tuolumne and Calaveras counties, has yielded a large part of the testimony most relied on to support the theory of an auriferous gravel man. Here finds have been reported in bewildering numbers, the objects coming from many sources, often apparently wholly independent of one another. During my visit to this region I sought to get back as near as possible to original sources of information, to see the people having personal knowledge of the finds, and to acquire a correct notion of the aboriginal occupancy before, during, and since the great period of mining activity.

Indian implements in mines.—Accompanied by Prof. W J McGee, I journeyed from Jamestown, the railway terminus, situated under the eastern escarpment of Table Mountain, to Sonora, Sawmill Flat, Yankee Hill, Columbia, Springfield, and Shaws Flat. I crossed over and passed around Table Mountain, visiting Rawhide and Tuttletown,

and, traversing the great gorge of the Stanislaus, spent several days in the vicinity of Murphys, Altaville, and Angels Camp. These places were all centers of great activity in the early days of gold mining, as amply attested by vast excavations covering many square miles of territory, and I was told by those who had seen it that the Indians flocked in from the surrounding mountains to such an extent that it was not unusual to see the lodges of a thousand Diggers gathered about a single camp; and the hills and valleys still bear ample evidence of their presence. Numberless pits and trenches were then gaping to receive the scattered utensils of these people, whose village sites, one after another, were undermined and destroyed, and collectors reaped a goodly harvest of supposed ancient relics from the mines. The Snell collection, referred to by Whitney and culled from by Voy, was gathered from this locality and consisted of the usual stone implements and utensils of the Indian tribes, as well as of several forms not in common use to-day and thought by some to especially represent the ancient time. A remnant of this collection is now owned by Mr. J. W. Pownall, of Columbia, and will probably pass eventually into the keeping of the University of California. Through the generosity of Mr. Pownall three specimens were obtained for the National Museum.

As indicated in the preceding paragraph, a thorough knowledge of the aboriginal occupancy is of vital importance in this discussion, but Whitney knew little of the native culture, as his remarks amply show, and he could not have separated objects that had fallen in or had been introduced by other means into the mines from like objects originally belonging in the gravel, if such there were. Neither Whitney nor Voy, so far as I can learn, had any idea of the need and vital importance of such discrimination. Their lists of finds from the mines are hardly more than lists of Indian implements.

Implements from deep tunnels.—But what is to be said of the finds reported from the deep shafts and tunnels that penetrate obliquely or horizontally beneath the lava-capped summits of Table Mountain? (See fig. 2.) Relics of the swarming Diggers could not fall in horizontally, and if these relics do not belong with the fossil animals and plants in the gravels of the ancient river channels, we are left to determine how they could have been introduced, or how deception was so successfully and generally practiced.

The fact that the implements recovered from the deep horizontal diggings are, so far as I have encountered them, all identical in type with the prevailing recent forms emphasizes the need of inquiring with the utmost care as to whether or not these implements could have been introduced while the mines were in operation. As already shown, the mountain Indians were in those days very numerous about the mining camps. The men were employed to a considerable extent in

the mines, and it is entirely reasonable to suppose that their implements and utensils would at times be carried into the mines, perhaps to prepare or contain food, or perhaps merely as a natural proceeding with half-nomadic peoples habitually carrying their property about with them from want of a house in which to lock it up. That any kind of native implement should be carried into the tunnels, there to be lost or forgotten and covered up as the handling and rehandling of gravels went on, is not unnatural. That such should be afterwards dug up with the reopening of passageways and the shifting of the tailings is to be expected, for the search for gold under these old lava beds was not a straight-away boring of the mountains, but a driving and redriving of tunnels in any direction that promised renewed finds of pay material. As a matter of course little attention was paid to the comings and goings of the humble helpers, and if miners came upon stray implements buried in the gravels it is quite natural that they should report them to the foremen or superintendents without seriously considering the question as to recent or ancient origin. Naturally little value was attached to such specimens, as the real significance of their occurrence in the old gravel was at most but dimly understood.

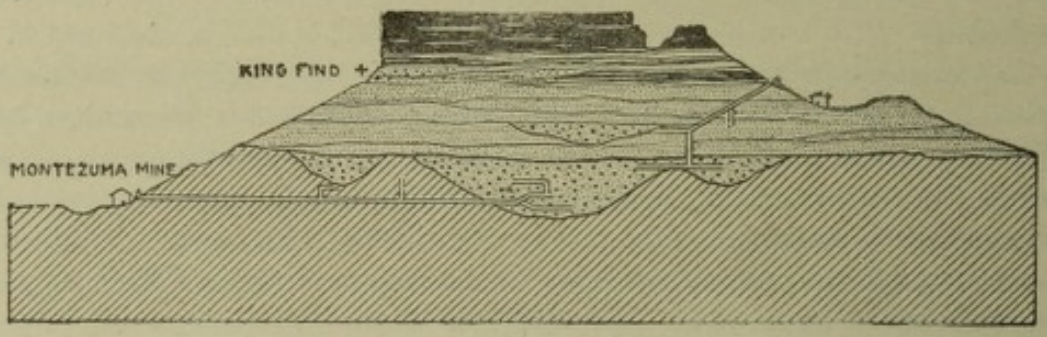
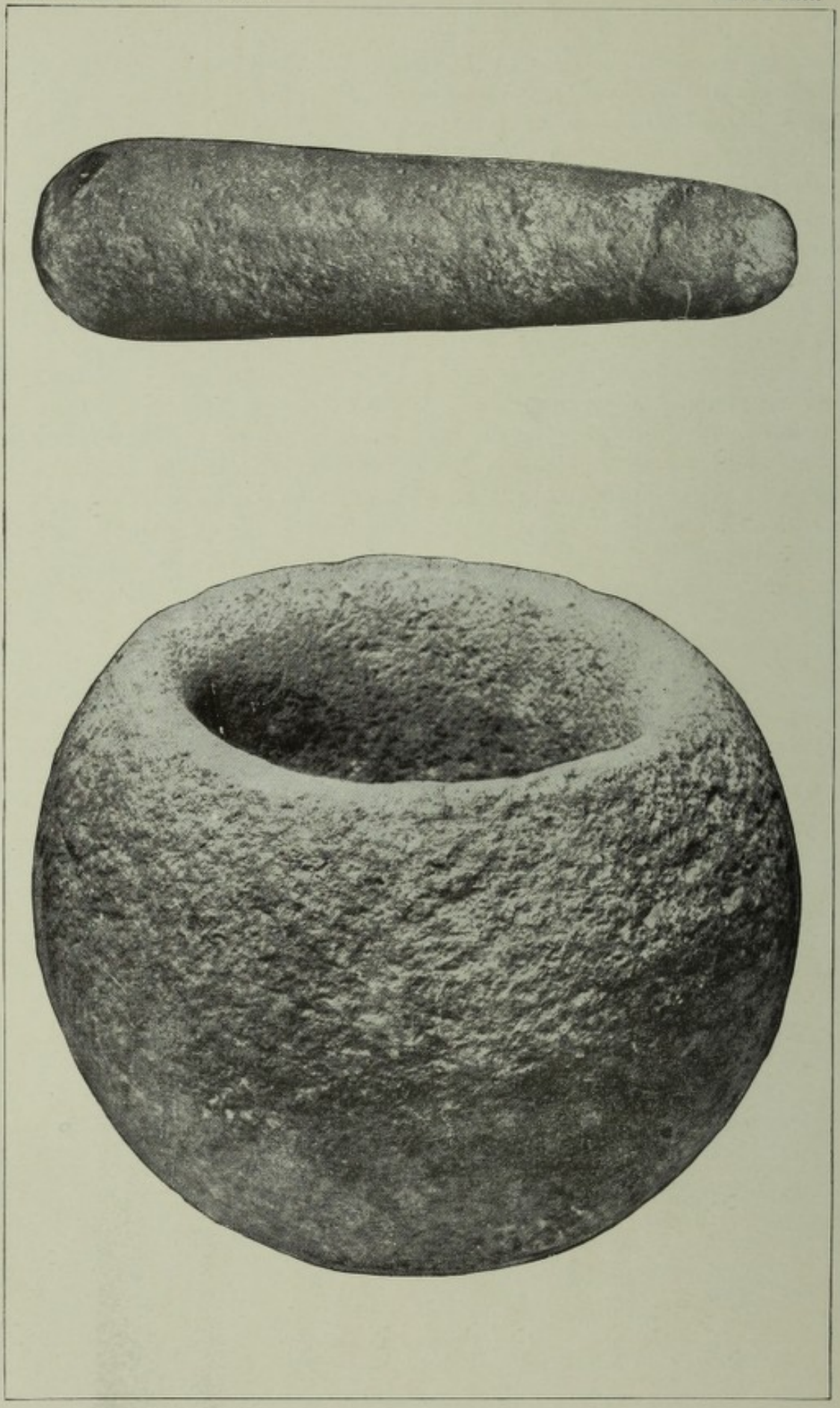


FIG. 2.—Section of Table Mountain showing mines penetrating to old river channels. The tunnels are not literally rendered, but are sketched in merely to show the methods of reaching the gold gravels. The position of the King find beneath the lava cap is shown. See illustration of specimen, Pl. XIV.

Again, let us not forget, it is quite within the bounds of probability that some fun-loving miner should have sought amusement by reporting objects found about the camp, to the superintendent or others, pretending that they came from beneath the mountain. There can be no doubt that practical joking of this character was prevalent in those days, and that implements of the classes involved in this discussion were known by the miners to excite unusual interest in religious as well as scientific quarters. There are thus two ways in which errors might have crept into the evidence—two ways, either of which would lead to that repetition of like finds which is considered so significant by advocates of antiquity.

The Neale finds.—The case cited in detail by Dr. Becker may well illustrate what I have been saying, and this case, it should be noted, is a typical one, and constitutes one of the strongest bits of testimony of



MORTAR AND PESTLE SAID TO HAVE BEEN FOUND IN MONTEZUMA MINE BENEATH THE LAVA CAP OF TABLE MOUNTAIN (ONE-HALF ACTUAL SIZE).

its class on record.[1] Mr. J. H. Neale was superintendent of the Montezuma mine, situated on the western slope of Table Mountain, 4 or 5 miles southwest of the village of Jamestown. The gold-bearing gravels of the old river bed beneath the mountain, covered by the claim, became exhausted, and the mine was closed several years ago. Mr. Neale now resides in the town of Sonora, 5 miles north of Jamestown. In 1877, according to Dr. Becker's account, Mr. Neale discovered some mortars, pestles, and obsidian implements in the deepest part of the mine, beneath Table Mountain and close to the bed rock. These objects soon passed out of his hands, and one of the mortars with the accompanying pestle (see Pl. XIII) was given to Dr. R. I. Bromley, of Sonora. Ten years after the finding these specimens came to the notice of Dr. Becker, who, desiring to learn more of their origin, sought out Mr. Neale, and obtained the statement to which affidavit was made, the circumstances being given in detail in Dr. Becker's paper. The essential paragraphs of the document are as follows:

> At a distance of between 1,400 and 1,500 feet from the mouth of the tunnel, or of between 200 and 300 feet beyond the edge of the solid lava, Mr. Neale saw several spearheads of some dark rock and nearly one foot in length. On exploring further, he himself found a small mortar three or four inches in diameter and of irregular shape. This was discovered within a foot or two of the spearheads. He then found a large, well-formed pestle, now the property of Dr. R. I. Bromley, and near by a large and very regular mortar, also at present the property of Dr. Bromley.
>
> All of these relics were found the same afternoon, and were within a few feet of one another and close to the bed rock, perhaps within 1 foot of it. (P. 192.)

I took the trouble to visit the mine, which was found closed and caved in about the mouth, and with a newly opened tunnel alongside. The site is on a steep slope, falling away to the west from the base of the towering escarpment of the mountain (and apparently much more than 1,500 feet from it), and is surrounded by limited areas upon which houses could be built or lodges pitched. All about I found traces of native occupancy, and a dozen mortars, pestles, and pounding stones were picked up. These did not differ in character or material from the corresponding varieties of utensils reported from the deep gravels. The Neale affidavit states that the mortars and other implements therein referred to were found in the tunnel, some 1,500 feet from the mouth of the mine and 200 or 300 feet in beyond the margin of the lava cap of the mountain, and hence beneath several hundred feet of the volcanic deposits that covered the country before the valleys of to-day began to be scored out (see fig. 2).

Is it not more reasonable to suppose that some of the typical implements of the Indians living at the mouth of Montezuma mine should

[1] Geo. F. Becker, Antiquities from under Tuolumne Table Mountain in California. Bull. Geol. Soc. of America, Vol. II, p. 189.

have been carried in for one purpose or another, embedded in the gravels, and afterwards dug up and carried out to the superintendent than that the implements of a Tertiary race should have been left in the bed of a Tertiary torrent to be brought out as good as new, after the lapse of vast periods of time, into the camp of a modern community using identical forms?

I took pains to have Mr. Neale tell me the story of the finds in all possible detail. The account as related in the work of Dr. Becker had evidently passed out of his mind in large degree, as it had also passed out of my own. His statements, written down in my notebook during and immediately following the interview, were to the following effect:

One of the miners coming out to lunch at noon brought with him to the superintendent's office a stone mortar and a broken pestle which he said had been dug up in the deepest part of the tunnel, some 1,500 feet from the mouth of the mine (see Pl. XIII). Mr. Neale advised him on returning to work to look out for other utensils in the same place, and agreeably to his expectations two others were secured, a small ovoid mortar, 5 or 6 inches in diameter, and a flattish mortar or

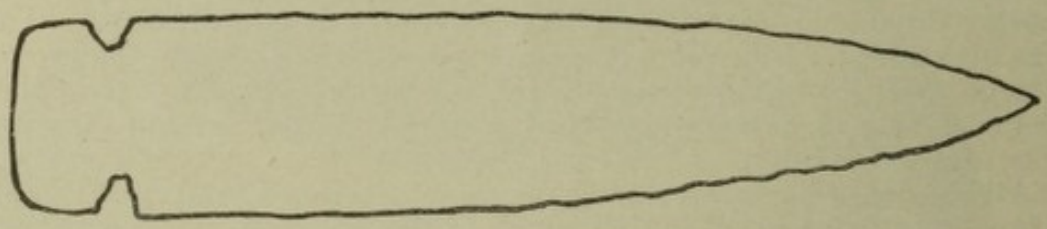


FIG. 3.—Outline of obsidian implement said to have been found in Montezuma mine, as sketched by Mr. Neale.

dish, 7 or 8 inches in diameter. These have since been lost to sight. On another occasion a lot of obsidian blades, or spearheads, eleven in number and averaging 10 inches in length, were brought to him by workmen from the mine. They had been found in what Mr. Neale called a "side channel;" that is, the bed of a branch of the main Tertiary stream, about a thousand feet in from the mouth of the tunnel, and 200 or 300 feet vertically from the surface of the mountain slope. These measurements were given as estimates only, but at the same time they were, he felt sure, not far wrong. Four or five of the specimens he gave to Mr. C. D. Voy, the collector. The others also had been given away, but all trace of them had been lost. Mr. Neale spoke enthusiastically of the size and perfection of these implements, and as he spoke drew outlines of long notched blades in the dust at our feet. Some had one notch (see fig. 3), some had two notches, and others were plain leaf-shape blades.

Desiring to find out more concerning these objects, he went on to say, he showed them to the Indians who chanced to be present, but, strangely enough, they expressed great fear of them, refusing to

touch them or even to speak about them; but finally, when asked whether they had any idea whence they came, said they had seen such implements far away in the mountains, but declined to speak of the place further or to undertake to procure others. This statement by Mr. Neale struck me at once as interesting and significant, and I was not surprised when a few days later it was learned that obsidian blades of identical pattern were now and then found with Digger Indian remains in the burial pits of the region. The inference to be drawn from these facts is that the implements brought to Mr. Neale had been obtained from some one of the burial places in the vicinity by the miners, who found no spot too sacred to be invaded in the eager search for gold. An additional inference is that the Indians were aware of the origin of the specimens and were afraid of them because of the mortal dread that every Indian feels of anything connected with the dead. How the eleven large spearheads got into the mine, or whether they ever came from the mine at all, are queries that I shall not assume to answer, but that they came from the bed of a Tertiary torrent seems highly improbable; for how could a cache of eleven slender, leaf-like implements remain unscattered under these conditions; how could fragile glass blades stand the crushing and grinding of a torrent bed; or how could so large a number of brittle blades remain unbroken under the pick of the miner working in a dark tunnel? For, as Dr. Becker states, "The auriferous gravel is hard picking; in large part it requires blasting."

That the affidavit of Mr. Neale does not materially strengthen the evidence favoring antiquity I am now fully convinced. In his conversation with me he did not claim to have been in the mine when the finds were made, and a sworn statement vouching for the truth of assertions made by other persons, and these other persons unnamed miners, can not be of value in establishing a proposition requiring proofs of the very highest order. That the other like finds of the Table Mountain region, recorded by Whitney, are equally open to criticism may reasonably be assumed.

The King Pestle.—The only bit of testimony that may not be challenged with impunity is the finding of a fragmentary pestle in the face of Table Mountain 2 or 3 miles north of the Montezuma mine by Mr. Clarence King and reported in detail and with an illustration in Dr. Becker's paper (p. 193), already referred to. Dr. Becker says:

"Another unpublished discovery has also been made in these gravels, which will be in so far more satisfactory to the members of this society, that the discoverer is well known personally to most of them and by reputation to every geologist. In the spring of 1869 Mr. Clarence King visited the portion of the Table Mountain which lies a couple of miles southeast of Tuttletown, and therefore near Rawhide camp, to search for fossils in the auriferous gravels. At one point, close to the high bluff of basalt capping, a recent wash had swept

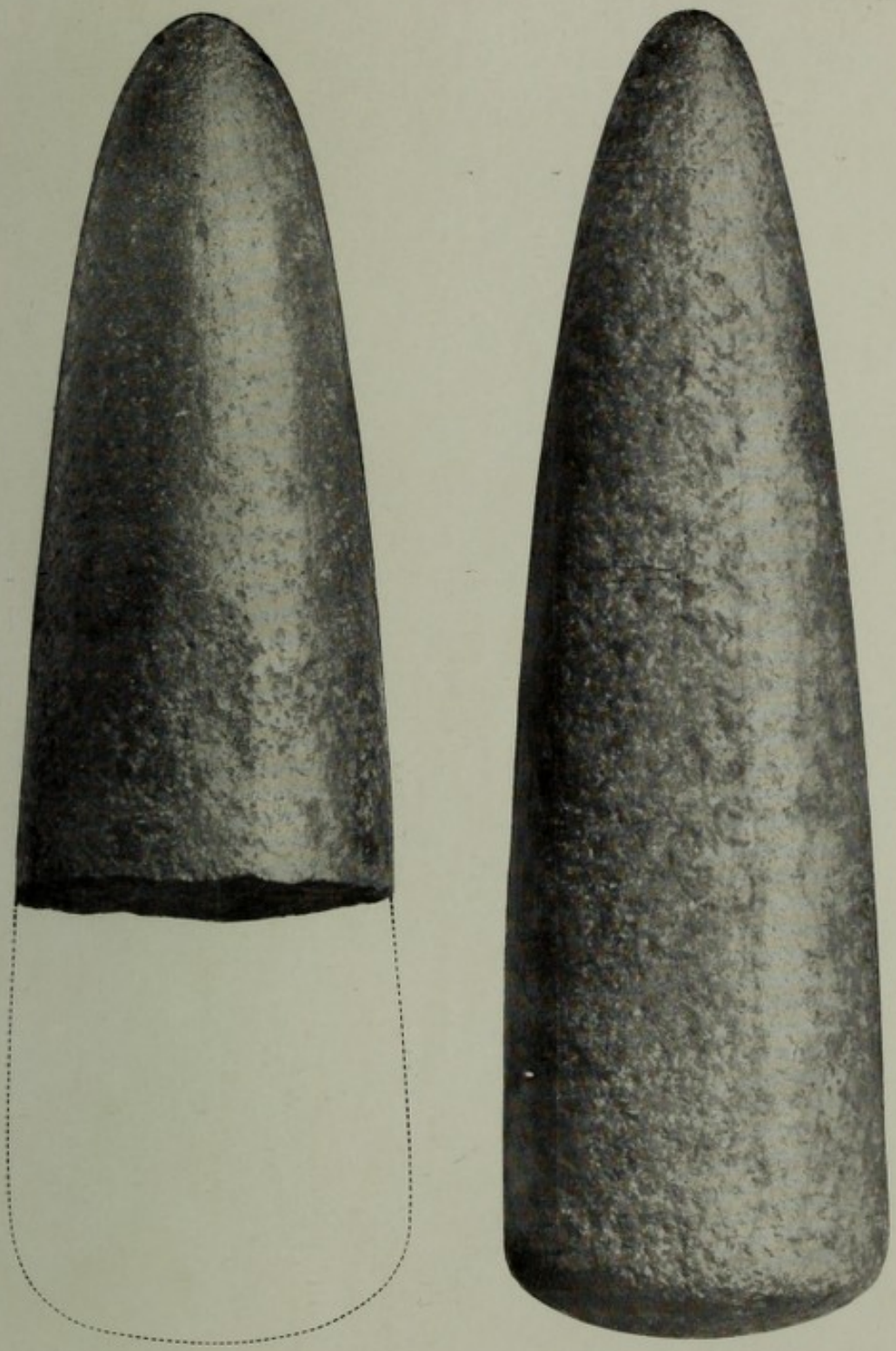
away all talus and exposed the underlying compact, hard, auriferous gravel beds, which were beyond all question in place. In examining this exposure for fossils he observed a fractured end of what appeared to be a cylindrical mass of stone. This mass he forced out of its place with considerable difficulty on account of the hardness of the gravel in which it was tightly wedged. It left behind a perfect cast of its shape in the matrix and proved to be a part of a polished stone implement, no doubt a pestle. It seems to be made of fine-grained diabase. * * * It is difficult to imagine more satisfactory evidence than this of the occurrence of implements in the auriferous, preglacial, subbasaltic gravels."

I sought the particular site from which the object was obtained, and passed up and down over every outcrop of rock on the slope, from the lava cap to the pasture fields below, in the hope of finding some trace of human handiwork, but beyond the usual Digger mealing stones scattered over the surface, nothing was found. I tried to learn whether it was possible that one of these objects could have become embedded in the exposed tufa deposits in recent or comparatively recent times, for such embedding sometimes results from a resetting or recementing of loosened materials, but no definite result was reached. This remarkable specimen is now in possession of the National Museum, and is shown in Pl. XIV, *a*, in connection with a typical pestle of the California tribes of modern times (*b*). It has been symmetrically shaped and the upper end is highly polished from long use in the hand.

The unfortunate part about this very noteworthy feature of the testimony is that Mr. King failed to publish it—that he failed to give to the world what could well claim to be the most important observation ever made by a geologist bearing upon the history of the human race, leaving it to come out through the agency of Dr. Becker, twenty-five years later.

THE CALAVERAS SKULL.

Notwithstanding the fact that the finds of stone implements in intimate relation with the auriferous gravels furnish the great body of testimony upon which a Tertiary man is predicated, they have attracted but slight attention from the public as compared with the reputed discovery of human remains, and more especially the discovery of the so-called Calaveras skull in a mine shaft at Altaville. The prominence of the latter find is due largely to the fact that it is the only specimen of its kind that has escaped oblivion. This relic has been the subject of much disputation, but I shall not stop here to cite or review the literature. It may be observed, however, that the general trend of sentiment and even of scientific opinion has been adverse to the specimen as proof of antiquity. At the same time there is a very important contingent of scientific men, especially those grouped about the original apostle of antiquity, Whitney, who cling tenaciously



a b

STONE PESTLES.

a. Fragment of pestle obtained from Tertiary deposits of Table Mountain, by Mr. King. The lower end was probably longer than is indicated by the dotted line. (Three-fourths actual size.)

b. Modern Indian pestle of form common throughout California. Introduced for comparison. (Three-fourths actual size.)

to the idea that this and other finds of human bones are bona fide relics of Tertiary man. As long as this condition exists it is manifestly unwise to attempt to pass over the evidence of the Calaveras skull, as some are inclined to do, with the assertion that it is insufficient and hence unworthy of consideration.

In Plate XV, *a*, is given a view of the skull as it appeared when first brought to the attention of Whitney in 1866, and in *b*, we see it as it appeared after having been cleaned up by Dr. Wyman at Cambridge.[1] The former is from a photograph made by Alonzo Rhodes,

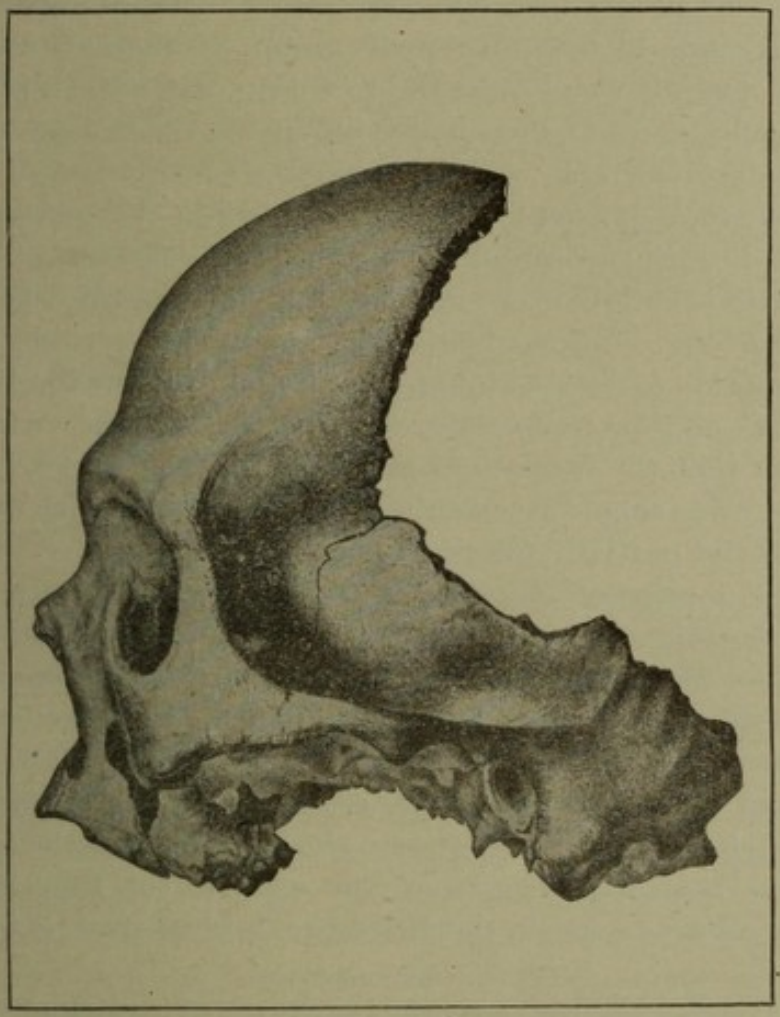


FIG. 4.—Profile view of the Calaveras Skull. From Plate L, Auriferous Gravels.

at Murphys, Cal. Being faded, the photograph had to be redrawn for engraving, hence the cut has not the merits of a photograph directly reproduced. The latter is copied from a lithographic plate published by Whitney in his work on the Auriferous Gravels and is manifestly defective, quite a little of the character and natural ruggedness having been lost by the draftsman. The profile view, from the same work, is reproduced in fig. 4. The specimen is now preserved in the Peabody Museum at Cambridge, and comprises about three-fourths of the skull. Enough remains, however, to enable the craniologist to

[1] Auriferous gravels, Pl. L.

determine something of the physical characteristics and hence of the mental equipment of the person to whom it belonged. The account of the skull given by Whitney includes a careful description by Jeffries Wyman, one of the highest American authorities of the time. The whole subject is presented in such manner as to convey to the unprejudiced mind an impression that the skull is a genuine and well-authenticated relic of antiquity.

The skull is said to have been taken from the Mattison & Co. mine on the gentle slope of an oblong rounded hill, some 300 feet in height, situated in the suburbs of Altaville, a mile or more northwest from the important mining town of Angels Camp. This shaft is still open, a roomy rectangular well some 130 feet deep, cut in beds of compact, tenacious, volcanic rock and underlying strata of varying character, and has undergone little change in the thirty-three years that have passed since the reported finding of the skull. A road once passed the mine and continued around the hill, but it is now nearly obliterated, and all traces of buildings are gone from the slope, which is diversified only by occasional old mine dumps and a growth of scrubby trees. It was my intention to descend into the shaft and examine the formations, but there was no time to spare for erecting the necessary windlass. It is important that the formations at the depth from which the skull is said to have come should be examined for comparison with the material adhering to and partially filling the skull.

Whitney's account of the skull.—According to Whitney's account the skull was taken from the shaft of Mattison & Co's. mine in February, 1866. Mr. Mattison, with his own hands, took the skull from near the bottom of a bed of gravel 130 feet from the surface and within a few feet of the bed rock—the crystalline slates in which the Tertiary river had carved its channel. It was "lying on the side of the channel [of the Tertiary river] with a mass of driftwood, as if it had been deposited there by an eddy of the stream, and afterwards covered over in the deposit of gravel by which bed No. 8 was formed."

Figure 5 embodies the essential features of a section obtained by Mr. Edward Hughes, of Stockton, in connection with an unpublished paper on the Calaveras skull, written by Dr. A. S. Hudson. It seems to correspond in every essential feature with the section published by Whitney and with a section furnished me, together with photographs of implements and human and animal remains from the region, by Mr. R. E. C. Stearns, of Los Angeles.

According to Whitney, Mr. Mattison did not recognize the object as a skull when taken from the gravel, but "thought it to be a piece of the root of a tree." Mr. Scribner also stated that when the skull was brought to him "it was so embedded and incrusted with earthy and stony material that he did not recognize what it was." Mr. Mat-

tison, however, seems to have considered the curious gravel-covered lump of sufficient interest to note carefully the conditions under which it was found, "as if deposited in the eddy of a stream," and soon afterwards carried it in a bag to Angels, presenting it to Mr. Scribner, merchant, and agent of Wells-Fargo & Co. It was not until a clerk in Mr. Scribner's store, probably Mr. Matthews, cleaned off a portion of the incrusting material that anyone suspected that the object was a human skull. Soon after this the skull was sent to Dr. William Jones, at Murphys, 12 miles away. The Doctor was an enthusiastic collector of natural-history specimens, and, regarding the skull as having more than ordinary interest, wrote to the office of the State geological survey in San Francisco, describing the specimen. A few days later, on June 29, at the request of Mr. William M. Gabb, paleontologist of the survey, the Doctor forwarded it to San Francisco.

Professor Whitney soon afterwards visited Calaveras County and proceeded to make careful inquiries into the origin of the skull. He visited Mr. Mattison and others, obtaining the statements embodied in

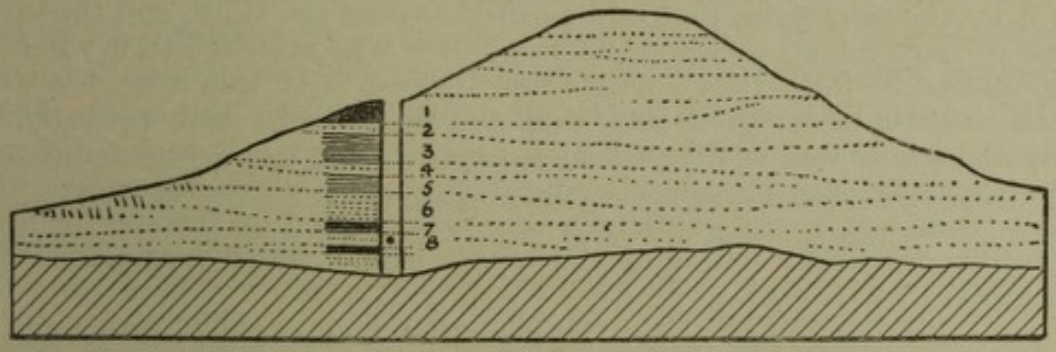


FIG. 5.—Section of the deposits exposed in Mattison mine, Bald Mountain. The skull is said to have been found in stratum No. 8.

his report, and became convinced that the skull had been found precisely as described by Mr. Mattison, and that its subsequent history was correctly given by Mr. Scribner and Dr. Jones.

When delivered to Professor Whitney the base of the skull was "embedded in a conglomerate mass of ferruginous earth, waterworn pebbles of much altered volcanic rock, calcareous tufa, and fragments of bones. This mixed material covered the whole base of the skull and filled the left temporal fossa, concealing the whole of the jaw. A thin calcareous incrustation appears to have covered the whole skull when found; portions of it had been scaled off, probably in cleaning away the other material attached to the base" (Pl. XV, *a*). Together the two eminent professors carefully chiseled away the foreign matter adhering to its base, so as to expose the natural surface of the skull, leaving it in its present state (Pl. XV, *b*). The skull was found to be that of a very old person, the teeth being gone and the alveoli nearly absorbed. The lower jaw is gone and the cranium is far from perfect; portions of the occiput are missing and the remaining por-

tions are badly fractured. Professor Whitney expresses his views as to how the specimen came to be thus rudely fractured, and as to subsequent events in its history, in the following words:

"The skull was unquestionably dug up somewhere, and had unquestionably been subjected to quite a series of peculiar conditions. In the first place, it had been broken, and broken in such a manner as to indicate great violence, as the fractures go through the thickest and heaviest parts of the skull; again, the evidence of violent and protracted motion, as seen in the manner in which the various bones are wedged into the hollow and internal parts of the skull, as, for instance, the bones of the foot under the malar bone. The appearance of the skull was something such as would be expected to result from its having been swept, with many other bones, from the place where it was originally deposited down the shallow but violent current of a stream, where it would be exposed to violent blows against the bowlders lying in its bed. During this passage it was smashed, and fragments of the bones occurring with it were thrust into all the cavities where they could lodge. It then came to rest somewhere, in a position where water charged with lime salts had access to it, and on a bed of auriferous gravel. While it lay there the mass on which it rested was cemented to it by the calcareous matter deposited around the skull, and thus the base of hard mixed tufa and pebbles which was attached to it when it was placed in the writer's hands was formed. At this time, too, the snail crept in under the malar bone, and there died. Subsequently to this the whole was enveloped by a deposit of gravel, which did not afterwards become thoroughly consolidated, and which, therefore, was easily removed by the gentlemen who first cleaned up the specimen in question, they only removing the looser gravel which surrounded it" (p. 272).

In cutting away the incrusting material several fragments of bones were found—some that might have belonged to the same individual to whom the skull pertained, while others evidently belonged to a smaller person. Besides these there were bones of some small mammal, a small snail shell of the species *Helix mormonum*, a small wampum or shell bead, and some bits of charcoal.

Chemical examinations by Mr. Sharpless developed the fact that nearly all the organic matter of the bone had disappeared and a large portion of the phosphate of lime had been replaced by the carbonate, indicating a fossilized condition; a trace only of organic matter remained.

From Dr. Wyman's report, published in Whitney's paper, we learn:

"First. That the skull presents no signs of having belonged to an inferior race. In its breadth it agrees with the other crania from California, except those of the Diggers, but surpasses them in the other particulars in which comparisons have been made. This is especially obvious in the greater prominence of the forehead and the capacity of its chamber. Second. In so far as it differs in dimensions from the other crania from California it approaches the Eskimo" (p. 273).

Portions of the above statements will be referred to in some detail farther on.

Information from local sources.—During my short visit to the district I found only a few men who could claim personal knowledge of the skull and of the people most directly concerned in its discovery and immediately subsequent history. Scribner and Jones are dead and others have removed from the district. At Big Trees, 18 miles above Murphys, I found Mr. J. L. Sperry, who kept the hotel at Murphys and was Whitney's host while the latter was visiting that section. He proved to be a good friend of the Professor and a believer in the correctness of his views regarding the skull. His hotel faced the office of Dr. Jones, to whom the skull was sent from Scribner's, and he told me that one day as he was standing in the door of his hotel Dr. Jones came out of his office opposite, and with characteristic imprecations threw a broken skull into the middle of the street. Called upon to explain, the Doctor said that the skull had been brought to him as a relic of great antiquity, but that he had just discovered cobwebs in it, and concluded that he had been made the subject of one of Scribner's practical jokes. Afterwards the Doctor picked up the specimen again and carried it into his office, saying that perhaps he had been too hasty and that he would give it further consideration. Shortly afterwards the skull was sent to San Francisco, and a little later Whitney returned to Murphys and proceeded to make inquiries as to its origin. Mr. Sperry drove him to Angels Camp to see Mattison and to obtain from him a statement regarding the discovery of the skull. The statement was obtained, and satisfied Whitney as to the genuineness of the find. The opposition to the evidence was, he said, mainly the result of religious prejudices and, he thought, had no solid foundation.

Others at Murphys were familiar with the story, often told and retold, but all were unbelievers and took great pleasure in telling of the practical jokes perpetrated by Scribner and his coterie upon their friends, and upon Dr. Jones in particular. In general the versions of the story of the skull were much alike, showing a common origin, but having individual variations characteristic of memory recitals. I talked with J. L. N. Shephard, C. A. Curtis, W. J. Mercer, E. H. Schaeffle, and others well informed on the events of the early days; and the statement by Mr. Joseph Shephard, a prominent local engineer, made in writing to Mr. H. W. Turner, of the United States Geological Survey, may serve to indicate the general trend of these accounts and the character of the persons connected with the story of the skull. His statement is as follows:

"When the skull was found in Mr. Madison's (Mathewson's) shaft, there lived in Angels three men, John Scribner (merchant), William Coddington (ditch owner), and Ross B. Coons (saloon keeper). In Murphy's there lived William Griffiths (ditch superintendent) and Dr. Jones, all good friends one with another, and all owners in the Union Water Company's ditch, except probably Coons. Griffiths delivered the skull to Dr. Jones, how long after Madison (Mathewson) found it

I know not, but when Dr. Jones found cobwebs in it he threw it out of his office, but decided to take it back again. From this on I suppose the history of the skull is well known. I recollect that when the public began to talk about it, the common belief was that Scribner, Coddington, and Coons, of Angels, and Griffiths, of Murphys, knew how the skull got into Madison's shaft, and used it simply to play a practical joke on their friend Dr. Jones; and, as has been said, they were capable of doing it. There is no doubt that Madison was sincere in his belief that the find was genuine."

As all authentic details relating to the history of the skull are valuable, the following extracts are made from a paper written several years ago by Dr. A. S. Hudson, of Stockton. The manuscript was obtained for me by Professor Edward Hughes, of Stockton, and being imperfectly finished and somewhat erratic in treatment, it is not considered advisable to publish it in full, but such parts as relate to the author's visit to the mining region are interesting and suggestive and may be given.

In 1883 Dr. Hudson corresponded with Dr. John Walker, of Sonora, who, in a letter, stated that he had taken a lively interest in the skull, opposing its claims to authenticity, and had endeavored to convince Whitney that he was doing a great injury to science by accepting the evidence. He induced a friend to convey to Whitney the information that "the specimen was found at Salt Spring Valley, near the surface, and not in a mine on Bald Mountain; but Whitney treated the information discourteously." Continuing, the letter stated that "about the time the discovery was made several caves were found and skulls of the same description taken from them. They were evidently the burial places of Digger Indians. No one about the diggings supposed otherwise."

Later Dr. Hudson visited Dr. Walker at Sonora, but made up his mind that the Doctor had little actual knowledge of the matter, and slight foundation for his assertion "that the whole affair was a fabrication and a joke on Whitney." Going on to Angels, he interviewed Scribner and Mattison. He was most favorably impressed with Mr. Scribner, who in a dignified and convincing manner assured him that Dr. Walker was wrong, and that no deception whatever had been practiced. Having gathered all the facts in the case that Scribner cared to impart, the Doctor visited Mr. Mattison, "the veritable miner and supposed discoverer of the head of our inquiry. Fortunately he and his wife were found at home, and without hesitation proceeded to relate the story, with the steps which brought the find to light. The man's wife had a better memory than he, and she seemed to be equally well informed about it. Thus I was furnished with two witnesses in one home. It was said: late in the year 1865 he (Matson) began to dig for gold. He sank his shaft in Bald Mountain, and not Table Mountain. * * * Reaching the depth of 128

feet, the industrious miner struck some old wood. Here in neighborly pose the remains of vegetable and animal [human] life were found. They were found embedded in gravel and a kind of cement, which he thought was wood also. Taking the round or globular, dirt-covered bundle home, he said nothing about it to his family, but kept it in his house a year or more. Here I showed Matson and his wife the figure or cut copied from Professor Whitney's book. * * * Mrs. Matson at once recognized the picture as representing the specimen in question.[1] It was said the cemented gravel so adhered to it as to fill out the back head and make it look a natural occipital portion."

Dr. Hudson left Calaveras County "perplexed and discouraged." The stories told him seemed "incomplete and incoherent." "But," he continues—

"Some two weeks later Mr. Scribner called at our office in Stockton with the welcome errand of a refreshed memory, and with additional facts fitting into the body of the narrative, making it more consistent. * * * It seems, as time went on, Mrs. Matson, an orderly housekeeper, began to take a dislike to that untidy thing—an unwashed dead head in her house—and made complaint. It was more in the way than of use or ornament, and she decided to get rid of it. Thereupon her husband, like a proper acquiescing partner in life, carried it to Mr. Scribner's store, where at the same time the Wells-Fargo Company had its business office. Mr. J. C. Scribner and his partner, Mr. Henry Matthews, now became the uninvited custodians of the topmost part of an aged and unknown man. * * * This man Matthews had a common failing among people—he was fond of liquor—and sometimes indulged his taste to excess. Some few days, or maybe weeks, prior to the advent of the skull at Scribner's, Matthews, not feeling well, paid a visit to Dr. Jones, a worthy physician at Murphys, consulted him in regard to his health, and obtained from the Doctor a prescription and medicine. The medicine proved rather strong; it depleted the patient rapidly and produced unlooked-for discomfort. As he grew weaker and impatient under the continued action of the purge, it made Matthews swear; he swore at the unholy medicine and at the d—d outcast of a doctor who gave it. The natural result was, he became cross toward Dr. Jones. Not to lose sight of the skull, we note that as soon as Mr. Scribner saw the dirty, rotted remains of old mortality before him, so soon he decided it was out of his line, and he did not want the offensive thing about. But Matthews took to it instinctively and at once. He thought that it, with some half-rotted and half-petrified pieces of wood and a few lumps of native ore might do to embellish Dr. Jones's cabinet of geological and natural history curiosities. Therefore they, the uneasy head and the rest, were immediately dumped into an empty potato sack and sent to Dr. Jones at Murphy's. On the same day it came, without note, comment, or message, and Esculapius opened the sack and took out its contents one by one. After a short inspection of the specimens of

[1] A comparison of the skull as it originally appeared and as seen by Mrs. Mattison, and the skull as cleaned up by Wyman and illustrated by Whitney will be instructive in this connection. See Pl. XV; also Auriferous gravels, p. 268.

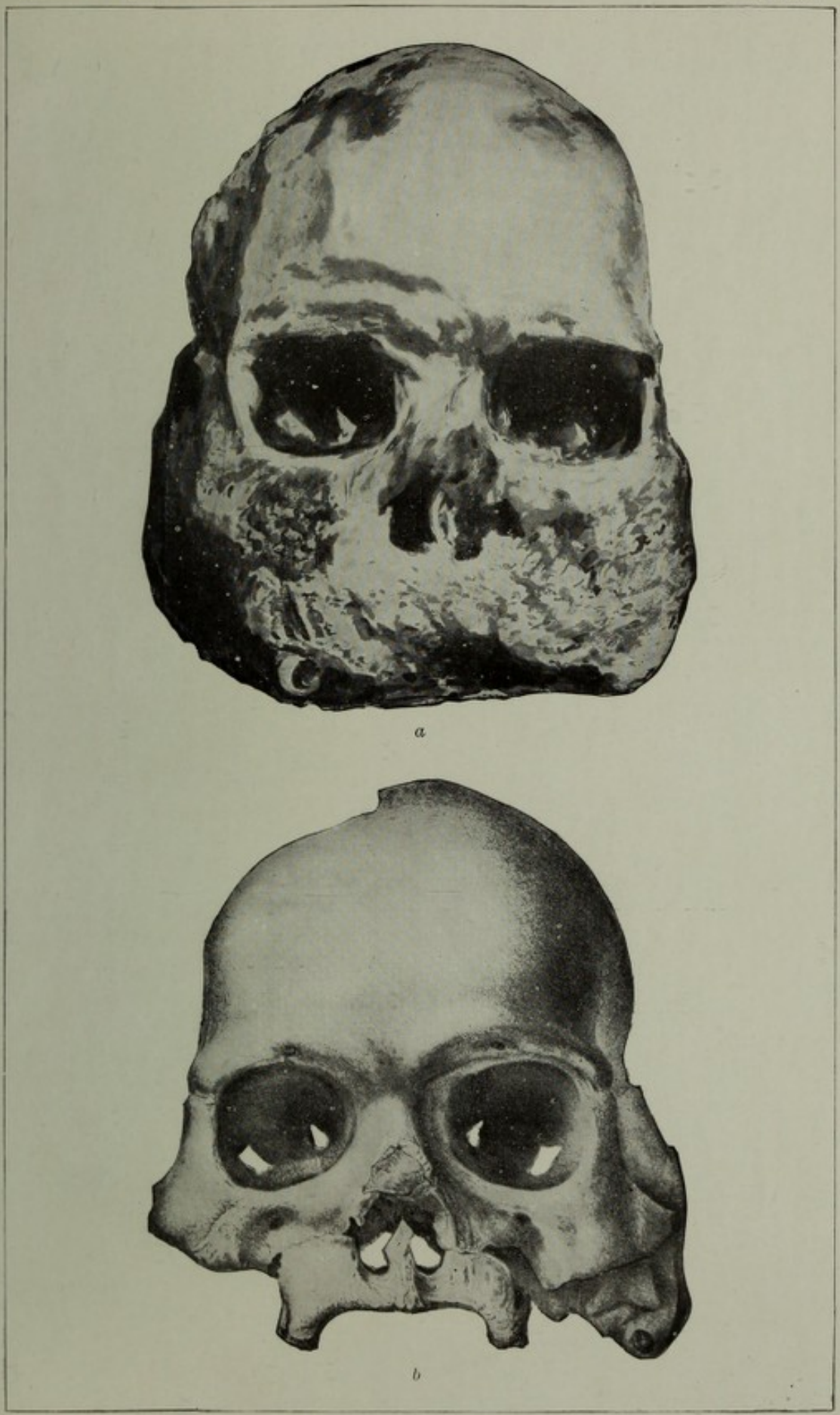
ancient remains, he, with a pious imprecation on the head of the other fellow and his impudence, gave it a toss into the back yard. There the bony thing, which had long resisted the tooth of final destruction, was again exposed to a more quickening action of hurtful elements. There in the damp of rain and mildew it remained for many months unnoticed. There it is quite likely—indeed, probable—that the little *Helix mormonum*, which can be seen photographed at the left-hand base of the figure (Pl. XV, *a*), became attached.

"At length Mr. Matson, in one of his occasional visits to Murphys, saw, like a familiar ghost, his old acquaintance, the same old head. He inquired of Dr. Jones where he got it, not knowing what disposition Mr. Scribner and company had made of it. Learning for the first time that several months anterior thereto Matson had dug the head out of his own shaft 128 feet below the surface of the ground, the Doctor then suspected it might turn out something of interest. These unlooked-for facts at once invested the dirty topknot with new and even profound considerations. It was soon photographed by Mr. Alonzo Rhodes, of Murphys, and the negative was sent to Mr. Shew, at San Francisco, where pictures were printed. The attention of Professor Whitney was now called to the resurrected head. He, in company with Mr. Matson, the miner, visited the now old and abandoned miners' shaft. They found it partly filled with water and dirt, which was soon pumped dry. Mr. Matson pointed out on the wall of the bank the precise spot the interesting object lay in conjunction with fragments of wood. The wood he thought was a fragment from quite a large tree. From this spot Whitney told Mr. Scribner he gathered gravel and carefully compared it with that scraped from the skull.[1] They proved identical one with the other. It seemed the gravels in the different layers above were of other kinds. This fact precludes the possibility of designing person or persons securing the object from 'Salt Spring Valley' (as opposers have asserted), and dropping it down the shaft. I inquired of Mr. Matson how it came to be rumored that the skull was taken from 'mud spring in Salt Spring Valley' and thence conveyed to his mining shaft? He answered, 'Before I began mining at that place and several years back into the decade of 1850, a Mrs. Hoffman had gathered several skulls from Salt Spring Valley, a place some 12 miles distant from Angels, and had them on exhibition in a sort of cabinet collection.' One of these heads had been fractured and crushed on the left parietal bone, the line of fracture running to the temple. Some similitude or relationship between these and the Calaveras head was believed to exist. But how or in what manner nobody could tell, for none knew.

"It may be proper here to say that Mr. Matson is a plain, hard-working day laborer, a blacksmith by calling. He seems to be a very honest-appearing man. He evidences no disposition to magnify, falsify, or to depart from the correct line of truth. Here ends all there is or, as far as I can learn, ever was, about the so-called 'joke' over the Calaveras skull, except its occasional rehearsal and the more important fact that it was a joke by Matthews on Dr. Jones and not on Professor Whitney.

"As mentioned above, the animus of it was not to play upon the spirit of scientific inquiry nor to deride native anthropological study,

[1] Compare with "Auriferous gravels," p. 271.



a

b

THE CALAVERAS SKULL.

a. Copied from a photograph made by Alonzo Rhodes at Murphy's. *b*. From Whitney's lithographic plate.

but it was a trick sprung on the spur of the moment, in a spirit of humorous hilarity, by Matthews, Scribner's partner in business. But the Doctor, being the victim, did not see the point."

This story is interesting as emanating from Mr. Scribner, who, according to many accounts, knew more than any other person regarding the origin and early movements of the skull.

At Angels Camp I visited Mr. Rasmussen, a former business partner of Mr. Scribner's, but he had given the matter little attention and did not know whether Scribner believed in the authenticity of the skull or not; but Mr. George Stickle, present postmaster of the village, showed a decided interest in the matter. He had been closely associated with the Scribner coterie in the early days, and knew all the principal people of Angels Camp almost from its foundation. It is his belief that the whole affair grew out of the "joshing" proclivities of his fellow-townsmen, and he laughed heartily as he recited the circumstances of the finding and subsequent misadventures of the so-called Calaveras skull. He went on to state that the skull had been in his store several weeks before it fell into the hands of his fun-loving associates. Together with a companion specimen, it had been brought to him from a burial place in Salt Spring Valley, 12 miles west of Angels, by Mr. J. I. Boone. I was extremely sorry not to be able to visit the supposed place of origin of so famous a specimen, for the stories seemed sufficiently circumstantial to warrant scientific attention.

Is it a changeling skull?—According to some of the current stories of the region, the skull was placed in the mine by one of Mattison's neighbors merely as a joke, while he was at home for dinner, and he is supposed to have found it where it was buried among the débris at the bottom of the shaft. This may or may not be true. At any rate, as no names are given, the statement can not be verified.

The remark made by Mr. Stickle and others that the skull obtained by Whitney did not come from the Mattison mine or through Mattison at all may also have little value as evidence; but it is suggestive, and gives rise to a legitimate inquiry as to the possibilities in the case. There were ancient skulls in plenty in this region in early times, and the valley and county received their name *Calaveras*—which in Spanish signifies *skulls*—from this circumstance.

The Indians of the high sierra do not bury their dead, but cast them into pits, caverns, holes in the rocks, and deep gorges. Generation after generation follows one another into these gaping Golgothas where, in a confused heap, along with rude personal belongings and sacrificial offerings, the bodies decay and are covered by accumulating débris and deposits from running or percolating waters. As mining operations went on these burial places were cleaned out and the bones became public property. Skulls were plentiful at Angels in those

days, as many persons testify. There is, therefore, a chance that the skull sent to Dr. Jones was not the one found by Mattison, but a cement-covered specimen derived from some other source, as Stickle states and Scribner suggested. Certainly there were several months during which little or no trace was kept of the lump of conglomerate carried home by Mattison. The usual answer to the suggestion that there might have been a changeling skull is that the Calaveras specimen is not a common skull, but a fossil, and must have come from gravel deposits identical with those in Bald Mountain, if not actually from the Mattison mine, and that its great age is thus sufficiently established. But who shall say that many of the skulls found about Angels Camp were not obtained from comparatively recent burials in surface exposures of auriferous gravels or in other gravels where the conditions were such as to permit of rapid ferruginous and calcareous cementation, giving rise to phenomena identical with those observed in the Calaveras skull?

Testimony of the skull itself.—Recognizing the fallibility of human testimony and the consequent difficulty of surely connecting the Calaveras skull with the gravels in place in Bald Mountain, the characteristics and condition of the skull itself have been appealed to by advocates of its authenticity. The report on its physical characters, however, made by Jeffries Wyman, does not in any way aid the case. It is to be expected that a Tertiary skull would in some manner show or suggest inferior development, but this skull appears to represent a people equal or superior to the present Indian tribes of the region. Again, it is to be expected that some distinctive characteristic, some race peculiarity, would appear in the skull of a people separated by uncounted centuries from the present; that it would be longer or shorter, thicker or thinner, or more or less prognathous than the Indian skull, but Wyman has nothing more startling to say than that "in so far as it differs in dimensions from the other crania from California, it approaches the Eskimo." This vague variation is just as likely to be an individual peculiarity as a racial character. It need not be regarded as strange that the skull should be superior to the average Digger cranium, for no anthropologist would be willing to affirm that the Diggers are the first and only people who have occupied this region during the present geological period. The chances are that the Shoshonean stock, to which these Diggers belong, is a somewhat recent intruder on the western slope of the sierra in California, and more than one of the present or past groups of Pacific coast Indians may have passed this way at some period in their history. The practical identity of the skull with modern crania speaks very eloquently against extreme antiquity.

I am glad to be able to introduce here a comparison, made by Dr. George A. Dorsey, of Chicago, between the Calaveras skull and a modern Digger skull obtained from a burial cave at Murphys, a few

miles east of the locality assigned to the more ancient relic. The modern skull undoubtedly belongs to the people now occupying the region and in all probability to the occupants of a village located within half a mile of the cave. It was obtained, with other human bones, from a slide or cone of loose débris just beneath the narrow, nearly vertical mouth of the cave, by W. J. Mercer, of Murphys, who owns the property. It still retains small portions of the lank black hair and of the partially desiccated fleshy parts, the latter still emitting an offensive odor, indicating recent inhumation.

Dr. Dorsey's report is as follows:

"A comparison of the skull of a Digger Indian of Calaveras County, California, forwarded by Professor Holmes, with a fossil skull from the same locality, described by Professor Whitney, has been made from the two views of the skulls published by Whitney and from the following description by Dr. Wyman, quoted by Professor Whitney on pages 272–273 of the 'Auriferous Gravels of the Sierra Nevada:' 'The volume of the frontal region is large, so that if the skull were viewed from above the zygomatic arches would be nearly concealed. As a large part of the occiput is destroyed, it is uncertain whether the head was long or broad. The face is somewhat deformed, the left orbit being smaller and the left cheek higher than the right, thus giving the whole an unsymmetrical appearance. The ridges over the orbits are strongly marked, and the lower border of the opening of the nostrils is not sharp, but, as in some of the crania of many savage races, is rounded, and the malar bones are prominent. The strongly marked borders of the orbits are the most striking features of the fragment.'

"Dr. Wyman also made six measurements of the fossil skull. These I also quote, placing beneath them in tabular form similar measurements made on the skull of the Indian (Digger):

	Breadth of cranium.	Breadth of frontal.	Frontal arch.	Length of frontal.	Height of cranium.	Zygomatic diameter.
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
Fossil skull	150	101	300	128	134	145
Digger skull	152	104	336	120	141	148

"It will be seen at a glance that the Digger agrees in its measurements with the fossil skull more closely than does any of the other skulls measured, which were placed by Dr. Wyman side by side with the Calaveras skull. There is a considerable discrepancy in the measurements of the frontal arc, but as the skull measured by Dr. Wyman was fragmentary, this measurement would be hard to take with accuracy on the fossil skull, and hence the opportunity for error would be greatest. In all other respects there is no greater discrepancy between the Digger and the fossil skull than might be found in any two skulls of the same tribe. When one compares the Digger skull with the pictures of the fossil skull there is a pronounced resemblance. Both are male skulls, having a pronounced supraorbital ridge, prominent glabellas and mastoid processes, and sharp and pronounced temporal crests. Both skulls are of a rather marked prognathic type; in both skulls also the entire orbital rim is heavy and pronounced.

The Digger skull, like the Calaveras, has a large and highly developed exterior angular process. In the Digger skull also the volume of the frontal region is large, and in the *norma verticalis* the zygoma are nearly concealed. In another respect also the two crania are alike, the nasal crests in the Digger skull having the same rounded and sloping surface which is one of the points emphasized by Dr. Wyman and which the engraving brings out so well. In regard to the orbital openings, while measurements are not at hand for the Calaveras skull, there is a general similarity between the two, and in both crania there is a broad infraorbital space.

"While the comparison of an actual skull with the drawings of a fragment of another must be unsatisfactory, yet the conclusion is necessary that the two skulls have the same general features and may easily be pronounced of one and the same type."

Professor Whitney lays much stress upon the fact that the specimen is undoubtedly a fossil.

"Chemical analysis proves that it was not taken from the surface, but that it was dug up somewhere, from some place where it had been long deposited, and where it had undergone those chemical changes which, so far as known, do not take place in objects buried near the surface."

If there was a trick on the part of fun-loving miners, "they must themselves," he adds, "have obtained from somewhere the object thus used; and as all the diggings in the vicinity are in gravels intercalated between volcanic strata, it becomes, really, a matter of but little consequence, from a geological point of view, from whose shaft the skull was taken."[1] It would appear that Whitney failed to notice that, although the gravels were originally wholly intercalated with strata of volcanic materials, they have been exposed in many places by the erosion of valleys, that they outcrop on the hillsides and lie uncovered in the valleys, and that any of the modern tribes may have buried their dead in previously undisturbed Tertiary river gravels. I learned of more than one case of this kind; and when so buried, there is no reason why the osseous remains, especially if deeply covered by overdeposits of shifting materials, should not have assumed in a comparatively short period of time exactly the conditions characterizing a fossil. Such comparatively recent burials in exposed very ancient river gravels may readily have taken place within less than a hundred yards of the Mattison mine, in fact in the actual beds exposed in the mine (Fig. 5,) since these outcrop in the slopes of Bald mountain.

The term "fossil" really signifies little in this connection, although assumed by some to signify much. No one would venture to assert that a skull might not lose nearly all its organic matter, and that a large portion of the phosphate of lime might not be replaced by the

[1] Auriferous Gravels, p. 271.

carbonate in a few hundred years if the conditions were reasonably favorable to the change. That such changes do not readily take place very near the surface is probably true; but we must not lose sight of the fact that, setting aside the possibility of the accumulation of deep overplacements, burial in caves and pits was practiced in this section and that these receptacles are sometimes of very considerable depth. Bodies cast in are rapidly covered up and are subject to just such conditions as those favoring fossilization.

It should be noted that silicification of the osseous matter of the skull is not mentioned; iron and lime from surface coatings merely. Iron is everywhere and its reactions are rapid; and in a region abounding in limestone formations calcareous matter is freely dissolved, carried, and redeposited by the waters. The conditions characterizing the skull are just such as might be expected in a skull coming from one of the limestone caves, crevices, or pits of the district. The thin film of calcareous matter coating the skull and extending throughout the porous filling makes it heavy, but does not necessarily indicate a prolonged period of inhumation.

It would appear from statements made by Scribner (in Hudson's paper, already quoted) that Whitney descended into the mine and examined the gravel bed from which the skull is said to have been obtained, but in his monograph the latter states that he failed to accomplish this on account of the water in the mine. He says that "the excavation has remained filled with water during the whole time since the skull came into my possession." (P. 271.) However, some one must have succeeded in overcoming the difficulty, as Dr. W. H. Dall states[1] that while in San Francisco in 1866 he compared the material attached to the skull with portions of the gravel from the mine and that they were alike in all essentials. But even if the material from the mine is like that attached to the skull, nothing is proved, as the same may well be true of materials from many parts of the Angels district. The peculiar agglomeration of earth, pebbles, and bones is readily explained by referring to conditions existing in the limestone caverns and crevices of the region where the calcareous accretions bind together bones, gravel (very generally present), cave earth, and whatever happens to be properly associated, in just such manner as that illustrated in the specimen under discussion.

Again, much stress is laid on the fact that the skull obtained by Whitney "had been broken in such a manner as to indicate great violence," as if subject to severe blows while swept by a torrent over a bed of bowlders. When it is remembered that the fractures exhibited by the skull are fresh and sharp, this highly imaginative statement (previously quoted in full) loses its force, for the tossing in a

[1] Proceedings of the Academy of Natural Sciences of Philadelphia, 1899.

torrent over bowlders would not only have bruised and abraded the sharp edges of the bone, but the loose earth, broken bones, wampum, and shells, instead of being packed into the skull, would have been quickly dislodged and widely scattered by the rushing waters. The facts are that the conditions of fracture and the impacting of bones of more than one individual, along with other miscellaneous articles, in the cavities of the skull, are just such consequences as would result from pitching body after body into an Indian burial pit, where young and old were jammed into a conglomerate mass and covered with earth, gravel, and stones.

The presence of a wampum bead embedded with the earth, bones, and pebbles in the skull is a strong argument against antiquity. It is not claimed that this shell bead is fossilized, and it would seem that it resembles in every way—size, shape, manner of boring, and degree of elaboration—the concavo-convex beads made from clam shells and worn by members of nearly every Indian family in California. That a Tertiary people should have made and worn the identical form seems highly improbable.

The small snail shell, the fragile *Helix mormonum*, found also in the skull, is much more at home in a modern burial place than in the torrent-swept bed of a Tertiary river. The species is recent, and I am not aware that it has been found in Tertiary formations.

It thus appears that the so-called Calaveras skull exhibits nothing in its character, condition, or associated phenomena incompatible with the theory of recent origin and very much that may be justly construed as favoring that theory.[1]

The skull at Cambridge.—On returning to the East I took the first opportunity of visiting Cambridge for the purpose of examining the Calaveras skull. Professor Putnam very kindly removed the specimen from its resting place and permitted me to examine it at leisure and to handle the loose materials—the lime-cemented earth, the bits of bones, and the shell bead—detached by Professor Wyman. I had looked forward with great interest to this glimpse of the specimen about which so much has been said and upon which so much has been and is predicated, and was prepared to be duly impressed with its character as a fossil, but I was distinctly disappointed. The importance of the skull as an index of antiquity has been overestimated. I find myself confirmed in the conclusions forced upon me by a consideration of the evidence already presented, namely, that the skull was never carried and broken in a Tertiary torrent, that it never came from the old gravels in the Mattison mine, and that it does not in any way rep-

[1] Contemporaneously with the preliminary publication of the present paper in the American Anthropologist, a short paper, written by Prof. W. P. Blake, of the University of Arizona, and referring to many of the questions here presented, appeared in the Journal of Geology of the Chicago University for October and November, 1899.

resent a Tertiary race of men. If the existence of Tertiary man in California is finally proved, it will be on evidence other than that furnished by the Calaveras skull.

Notwithstanding the above decided averments I must allow that with respect to the question of Tertiary man in California no final conclusion can as yet be drawn. I do not regard the investigation as satisfactorily completed and desire in the present writing only to state the problems and present the evidence in a way that will tend to bring out and establish the truth.

SUMMARY.

A brief summary of the arguments for and against the great antiquity of man in the gold belt of California may well be presented here for convenience of reference. The principal considerations arrayed in support of the affirmative are as follows:

(1) During the three or four decades succeeding the discovery of gold in California the miners of the auriferous belt reported many finds of implements and human remains from the mines. The formations most prominently involved are of Neocene age; that is to say, the middle and later portions of the Tertiary.

(2) Most of the objects came from surface mines, but some were apparently derived from tunnels entering horizontally or obliquely and to great depths and distances beneath mountain summits capped with Tertiary lavas, leading to a belief in their great age.

(3) The finds were very numerous and were reported by many persons, at various times, and from sites distributed over a vast area of country. They were made, with one exception, by inexpert observers—by miners in pursuit of their ordinary calling—but the statements made by the finders are reasonably lucid and show no indications of intentional exaggeration or attempted deception.

(4) The stories as recorded are uniform and consistent in character, and the objects preserved are, it is claimed, of a few simple types, such as might be expected of a very ancient and primitive people. The evidence, coming from apparently unrelated sources, is described as remarkable for its coherency.

(5) The reported finding of an implement in place in the late Tertiary strata of Table Mountain by Mr. Clarence King is especially important and gives countenance to the reports of inexpert observers.

(6) The osseous remains recovered are, in some cases, said to be fossilized, having lost nearly all their animal matter, and some are coated with firmly adhering gravels resembling those of the ancient deposits. These conditions give rise to the impression of great age.

(7) The flora and fauna with which the human remains and relics appear to be associated indicate climatic conditions and food supply favorable to the existence of the human species. It is a noteworthy

fact that in many cases the intimate association of the human remains with those of extinct animal forms is noted.

(8) The evidence as presented by Whitney and others seems abundant and convincing, and many scientific men have accepted it as satisfactory proof of a Tertiary man in America. It is clearly the strongest body of evidence yet brought together tending to connect man with any geologic formation earlier than post-Glacial.

On the other hand, numerous considerations are urged against great antiquity, as follows:

(1) It is held that the strength of testimony should be proportioned directly to the magnitude of the propositions to be supported and that this case requires proofs of a higher order than have as yet been presented.

(2) The existence of a Tertiary man, even of the lowest grade, has not yet been fully established in any country, and this California evidence, therefore, stands absolutely alone. It implies a human race older by at least one-half than *Pithecanthropus erectus* of Dubois, which may be regarded as an incipient form of human creature only. The finds reported indicate a Middle Tertiary people well advanced in the elements of culture; and culture, especially in the earlier stages, is necessarily of exceedingly slow growth. The *Pithecanthropus* of California would have to be looked for somewhere in the early Tertiary if not in a preceding period. The burdens thus thrown upon the auriferous gravel evidence are enormous.

(3) The presumption that a Tertiary man could have survived to the present time in California may well be held in abeyance. The physical and biological changes in the region have been profound and far-reaching. The western half of the continent has been twice or thrice remodeled since Middle Tertiary times, and every known species of plant and all species of the higher forms of animal life have been obliterated. Evidence based on random and inexpert observations is not sufficient to establish such a proposition.

(4) If it could be admitted that man did survive throughout the ages and continental transformations, it appears quite improbable that his physical characters and his culture should have remained unchanged. It seems equally unlikely that a modern race could have sprung up duplicating the man of a million years before in every essential particular.

(5) Examination of the human relics reported from the gravels fails to give support to the claim of antiquity. Fossilization of the osseous remains, upon which so much stress has been laid, may have taken place in comparatively recent times. The chemical changes noted are such as might be expected to characterize remains buried for a few hundred years in the deep pits and caverns of the region. The crania recovered are identical in character with recent crania.

(6) Objects of art from the auriferous gravels are said to be of the most primitive character, and, in large measure, peculiar to the gravels. When critically examined, however, they are found to belong to the polished-stone stage and to duplicate modern implements in every essential respect. They are such as may have fallen in from Indian camp sites or been carried in by the Indians themselves. They are made from varieties of stone belonging to formations ranging from the oldest to the youngest found in the district, and have been shaped by the ordinary processes employed by our aborigines. They evidently served purposes identical with the corresponding implements of our Indian tribes.

(7) None of these objects show evidence of unusual age, and none bear traces of the wear and tear that would come from transportation in Tertiary torrents. These striking facts relating to the condition of the human and cultural remains confirm and enforce the impressions received from a study of the geological and biological history of the region.

(8) The case against antiquity is strengthened again by a study of the recent history of California. All, or nearly all, of the phenomena relied upon to prove antiquity can readily be accounted for without assuming a Tertiary man. Indian tribes have occupied the region for centuries. They buried their dead in pits, caves, and deep ravines, where the remains were readily covered by accumulations of débris or of calcareous matter deposited by water. As soon as mining operations began, the region became noted as a place of skulls.

(9) Coupled with the above is the fact that no other country in the world has been so extensively and profoundly dug over as this same auriferous gravel region. The miners worked out the ossuaries and, at the same time, undermined the village sites, and thousands of the native implements and utensils were introduced into the mines and became intermingled with the gravels. Implements and utensils may also have been introduced into the deep mines by their owners who were helpers in the mining work.

(10) When these objects began to be observed by the miners, individuals interested in relics commenced making collections, but neither miners nor collectors understood the need of discrimination, the fact that the objects came from the mines being to them satisfactory evidence that they belonged originally in the gravels.

(11) Again, it is possible that deception was often practiced. A mining camp is the natural home of practical joking, and the notion that finds of human relics in the gravels tended to excite heated discussion would spread quickly from camp to camp until the whole region would be affected.

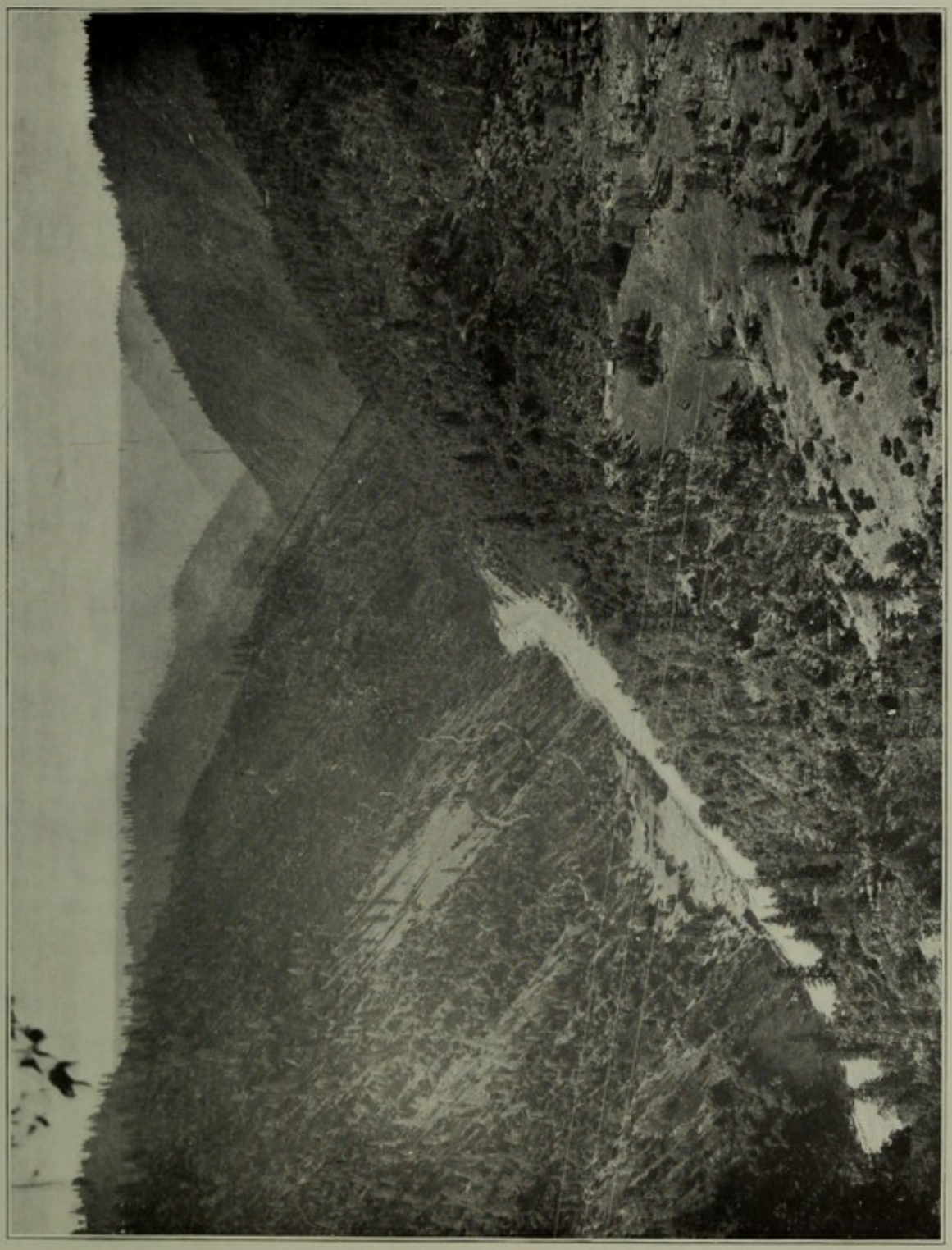
(12) The testimony for antiquity is greatly weakened by the facts (1) that the finds on which it is based were made almost wholly by

inexpert observers, and (2) that all observations were recorded at second hand. Affidavits can not redeem it. Nothing short of abundant expert testimony will convince the critical mind that a Tertiary race of men using symmetrically shaped and beautiful implements, wearing necklaces of wampum and polished beads of marble or travertine bored accurately with revolving drills, and having a religious system so highly developed that at least two forms of ceremonial stones were specialized, could have occupied the American continent long enough to develop this marked degree of culture without leaving some really distinctive traces of its existence, something different from the ordinary belongings of our present Indian tribes.

EXPLANATION OF PLATE XVI.

View from "Cape Horn," on the Central Pacific Railway, near Colfax, California, looking down the valley of the North Fork of the American River.

This valley serves as an illustration of the vast erosion that has taken place since the period to which auriferous gravel man is assigned. The depth of the gorge at the base of the distant plateau-like ridge is 2,000 feet. The gold-bearing gravels, said to yield such plentiful remains of man, were laid down in the beds of Tertiary rivers that meandered the region before the present great valleys were conceived. Many of the ancient channels buried in Tertiary volcanic deposits have been explored for gold, and the tunnels follow the winding water courses through the very crests of the distant ridges seen in this picture.



LOOKING DOWN NORTH FORK OF AMERICAN RIVER FROM CAPE HORN.