we might hope to have it on the shelves of our libraries in six months, or a year at most, after it is taken.

These remarks are made purely in the interest of science. Scientific investigation deals, first, with the elementary substances of which masses are composed, then with the forces which are at work to combine them into composite forms, and finally with the relations and principles which characterize and control organisms. Human society is an organism, for the right apprehension of which it is as essential to accumulate facts, and by means of comparison and analysis to deduce the laws which govern social phenomena, as it is to follow the same method of study in any other branch of science. The political and commercial bearings of the census we do not discuss; but it is evident that the census of the population and material resources of this country has for us a special significance, in view of our representative form of government and of the unprecedented growth of the American people. To these considerations may be added another; namely, that no other nation has such a heterogeneous population, and therefore such need of self-introspection, in order to comprehend its true capacity, limitations, and destiny. The political and financial needs of the country minister to science, and promote scientific research in this particular direction. All that scientific men insist upon is, that the investigation shall be in competent hands, and conducted according to the principles and methods which have done so much for science in general. A census bureau, wisely constituted, might, with respect to social science, occupy a relation, and perform a work, similar to that of the Smithsonian institution in the domain of the natural and physical sciences.

HEAD WATERS OF THE ATNA OR COPPER RIVER.[1]

VERY little has been known of this river, which enters the Pacific in about latitude 60° north, longitude 145° west. Several prospectors were left there tomake explorations last year, and will be called for this summer. The Ah-tena or Atnah Tinneh Indians reside on its banks, and from its bed have been taken numerous pieces of native copper resembling that of the Lake Superior region. The Wrangell Volcano is situated near it, about a hundred miles from its mouth.

In crossing the Chilkat portage from the head of Lynn Canal to the head waters of the Lewis branch of the Yukon, the head waters of another stream, called the Altsek River, are crossed. The natives allege that this stream falls into the sea; and on Tebienkoff's charts the mouth of the Altsek River is placed on the ocean-coast just north-west from Mount Fairweather, in the bed of the Grand Plateau Glacier. The observations of the U. S. coast-survey party, under my charge, in 1874 showed that no river from the interior could enter the Pacific between Cape Spencer and Yakutat Bay; all the depressions of the St. Elias Alps being filled with glaciers. In recent charts the Altsek has therefore been connected by a dotted line with the White River, one of the branches of the Yukon. I have for some time suspected that the Altsek was the head of the Copper or Atna River, but until lately have had no evidence sufficiently weighty to make it desirable to alter the charts. A recent letter from Dr. Arthur Krause states that his Indian guides told him that they had descended the Altsek to salt water, where there was a small village of Tlinkit Indians. This makes it certain that the Altsek and Atna rivers are continuous; for the Chilkhaat village at the mouth of the Atna is the only one answering to the situation, and the westernmost of all the Tlinkit villages, being separated from most of the others by a wide stretch of unoccupied coast.

This determination is of much importance. It determines the Atna River to be over four hundred miles in length, and the longest river falling into the Pacific between the Fraser in British Columbia and the Aliaskan peninsula. The opportunity for a most interesting exploration is here evident. The explorer need only take a couple of good canoes or portable boats up the Chilkat River, and across the portage to the Altsek, and float down the latter. Within a couple of days of the mouth of the Atna is the trading-post of Fort Constantine at Port Etches, commonly known as Nuchek, where supplies could be had and arrangements made for the trading company's vessel to convey the party to St. Paul, Kadiak Island, whence transportation to San Francisco could be had without difficulty, at some time during the autumn.

WM. H. DALL.

[1] Communicated by authority of the superintendent of the U. S. coast and geodetic survey.

THE ETOWAH MOUNDS.

IN *Science* of April 11 is an article by Mr. W. H. Holmes, on certain engraved shells and figured plates of copper found in southern mounds. As some of the most interesting of these articles were obtained from one of the

mounds forming the celebrated Etowah group near Cartersville, Ga., a description of the form, structure, and contents of this tumulus may be of interest to those who have read Mr. Holmes's article.

As this group has been repeatedly described and figured (see Jones's 'Antiquities of the southern Indians,' chap. vi., pl. i.; and an article by Col. Whittlesey in the 'Smithsonian report' for 1880, p. 624), it will be unnecessary for me to add more in this regard than to correct one or two errors.

The dimensions of the large mound marked *A* in the figure alluded to, as ascertained by the assistants of the Bureau of ethnology, are as follows: the slant height along the steepest slope, which I found by personal examination to be just about 45°, is eighty-five feet, giving a perpendicular height of sixty-one feet; the longer diameter of the level top a hundred and seventy-five feet, and the shorter a hundred and seventy, giving an area of about seven-tenths of an acre; the length of the roadway which winds up the southern slope is two hundred and one feet, and the width sixty-one feet. This roadway is described, in all the reports I have seen, as reaching the summit level. This is a mistake; as it stops short of the top by thirty feet slant height, or twenty feet perpendicular height. I can also state confidently that it never reached any farther up, as is apparent from a mere glance at the plan of construction. The remainder of the ascent, which is quite steep, was probably made by steps or ladders.

The mound in which the articles mentioned were found by Mr. Rogan, who excavated it on behalf of the bureau, and a vertical section of which is given in fig. 1, is the smallest of the three, and the one marked *C* in Jones's plate, and also in Col. Whittlesey's fig. 2. The measurements, as ascertained by Mr. Rogan, are as follows: average diameter at the base, a hundred and twenty feet; diameter of the level top, sixty feet; height above the original surface of the ground, sixteen feet. The form is more nearly that of a truncated cone than represented in the figures alluded to.

The construction was found, by very thorough excavation, to be as follows: the entire surrounding slope (No. 4, fig. 1) was of hard, tough, red clay, which could not have been obtained nearer than half a mile; the cylindrical core, sixty feet in diameter, and extending down to the original surface of the ground, was composed of three horizontal layers, — the bottom layer (No. 1), ten feet thick, of rich, dark, and rather loose loam; the next (No. 2), four feet thick, of hard, beaten (or tramped) clay, so tough and hard that it was difficult to penetrate it even with a pick; and the uppermost (No. 3), of sand and surface soil between one and two feet thick. A trench was dug from opposite sides to the central core; and, when the arrangement was ascertained, this central portion was carefully explored to the original surface of the ground.

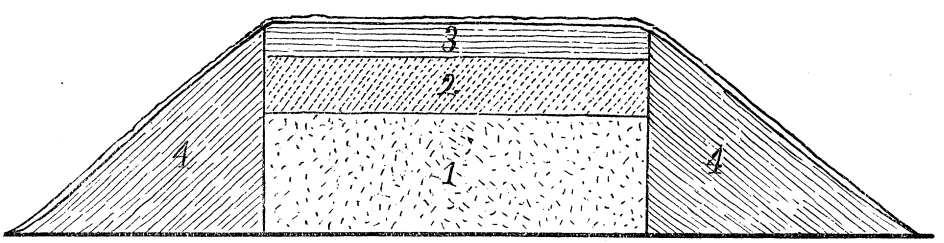

FIG. 1.

Nothing was found in the layer of clay (No. 2), except a rude clay pipe, some small shell beads, a piece of mica, and a chunkee stone. The burials were all in the lower layer (No. 1), of dark, rich loam, and chiefly in stone cists or coffins of the usual box-shape, formed of stone slabs, and distributed horizontally, as shown in fig. 2, which is a plan of this lower bed.

From Mr. Rogan's field-notes I quote the following description of these graves, mode of burial, etc.: —

Grave *a*, fig. 2. — A stone sepulchre two feet and a half wide, eight feet long, and two feet deep, formed by placing steatite slabs on edge at the sides and ends, and others across the top. The bottom consisted simply of earth hardened by fire. It contained the remains of a single skeleton, lying on its back, with the head east. The frame was heavy, and about seven feet long. The head was resting on a thin copper plate, ornamented with figures of some kind; but the head was crushed and the plate injured by fallen slabs. Under the copper were the remains of a skin of some kind; and under this, coarse matting, probably of split cane. The skin and

matting were both so rotten that I could only secure them in fragments. At the left of the feet were two clay vessels, — one a water-bottle, and the other a very small vase. On the right of the feet were some mussel and sea shells; and immediately under the feet two conch-shells, Pyrula perversa, partially filled with small shell beads. Around each ankle was a strand of similar beads. The bones and most of the shells were so far decomposed that they could not be saved.

Grave *b*. — A stone sepulchre four feet and a quarter long, two feet wide, and a foot and a half deep, differing from *a* only in size and the fact that the bottom was covered with stone slabs. The skeleton was extended on the back, head east. On the forehead was a thin plate of copper, the only article found.

Grave *c*. — A stone sepulchre three feet and a half long, a foot and a third wide, and a foot and a half deep; the bottom being formed of burnt earth. Although extending east and west, as shown in fig. 2, the bones had probably been interred without regard to order, and disconnected; the head being found in the north-east corner with face to the wall, and the remaining portion of the skeleton in a promiscuous heap. Yet there is no indication of disturbance after burial, as the coffin was intact. Between some of the bones I found a thin plate of copper that had been formed by uniting and riveting together smaller sections. Some of the bones found in this grave were saved.

Grave *d*. — A small sepulchre, a foot and a half square by a foot deep, contained the remains of an infant, also a few small shell beads. The slabs forming the sides and bottom of this grave bore very distinct marks of fire.

Grave *e*. — Simply a headstone and footstone, with the skeleton of a very small child between them; head east. On the wrists were some very small shell beads. The earth on the north and south sides had been hardened in order to form the walls.

Grave *f*. — Stone sepulchre six feet long, three feet wide, and a foot and a third deep, with stone in the bottom. Skeleton with the head north. There was a lot of copper about the head, which, together with the skeleton, was wrapped in a skin. The head rested on a large conch-shell (Pyrula perversa), and this on the remains of a coarse mat. Shell beads were found around the neck, each wrist, and ankle. On the right was a small cup, and on the breast an engraved shell. The copper had preserved a portion of the hair, which I saved; portions of the skin and matting were also secured.

Immediately under *b* was another stone grave or coffin, three feet long, a foot and a half wide and deep, extending north and south. The head of the skeleton was toward the north, but the feet were doubled back under the frame in order to get it in the allotted space. The only things found with this skeleton were some beads around the neck.

At *g* the remains of a child were found, without any stones about them. Some shell beads were around the neck and wrist, and an engraved shell on the breast.

Grave *h*. — A stone sepulchre a foot and a half square and a foot deep, stone slabs on the four sides and top, but the bottom consisting simply of earth hardened by fire. This contained only a trace of bones, and presented indications of at least partial cremation; as all around the slabs, outside and inside, was a solid mass of charcoal, and the earth was burned to the depth of a foot.

Grave *i*. — A stone sepulchre four feet and a half long, a foot and a half wide and deep, bottom earth, contained the remains of a skeleton resting on the back, head north, and feet doubled back so as to come within the coffin. On the breast was a thin plate of copper, five inches square, with a hole through the centre. Around the wrists were beads, and about the neck rather more than a quart of the same.

At *j* were the remains of a small child, without stone surroundings; under the head was a piece of copper, and about the neck and wrists shell beads.

These graves were not on the same level; the top of some being but two feet below the clay bed (No. 2), while others were from two to three feet lower.

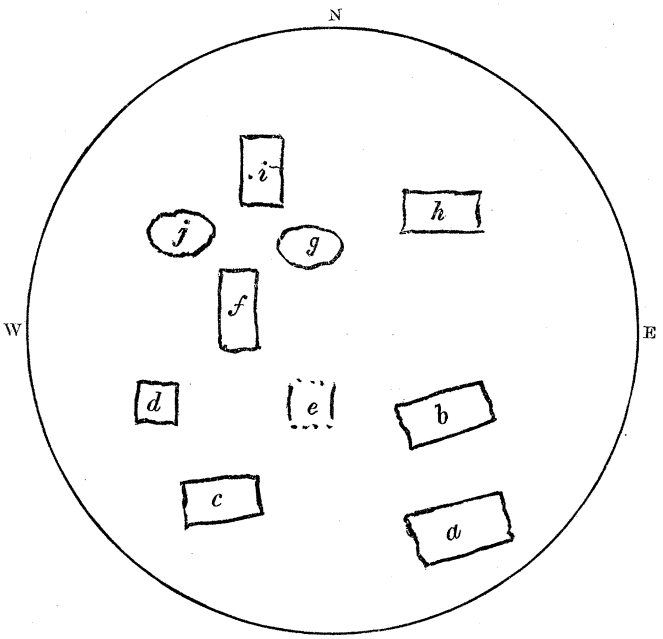

FIG. 2.

All the articles alluded to as obtained in this mound were forwarded at once to the Bureau of ethnology, and are now in the National museum. Examining them somewhat carefully since their reception, I find there are really more copper plates among them than Mr. Rogan supposed; the number and description being as follows: —

1. A human figure with wings, represented in fig. 5 of Mr. Holmes's paper, and repeated in our fig. 3. This is thirteen inches long and nine inches wide. A portion of the lower part, as shown by the figure, is wanting, probably some three or four inches. There is a break across the middle, but not sufficient to interfere with tracing out the design. A crown-piece to the head ornament is also wanting.

2. Also a human figure, shown in our fig. 4. Length, sixteen inches; width, seven inches and a half.

FIG. 3.

3. Figure of a bird, very similar to that represented in fig. 6 of Mr. Holmes's paper, but considerably larger, and varying slightly in details. This is imperfect, as part of the head, and the outer margin of the wings, are wanting. Length, thirteen inches and a half; width, seven inches and a half. This plate shows indubitable evidence of having been formed of smaller pieces welded together, as the overlapping portions can be easily traced. It has also undergone repairs: a fracture commencing on the left margin, and running irregularly halfway across the body, has been mended by placing a strip of copper along it on the under side, and riveting it to the main plate; a small piece has also been riveted to the head, and the head to the body; several other pieces are attached in the same way. The rivets are small, and the work neatly done.

4. An ornament or badge of some kind, shown in fig. 5. The two crescent-shaped pieces are entirely plain, except some slightly impressed lines on the portion connecting them with the central stem. This central stem, throughout its entire length and to the width of six-tenths of an inch, is raised, and cross-strips placed at various points along the under side, for the purpose of inserting a strip of bone; a part of which yet remains in it, and is seen in the figure at the break immediately below the point where the oblique strips meet. The most important and interesting fact presented by this specimen is the indubitable evidence it furnishes that the workman who formed it made use of metallic tools, as the cutting in this case could not possibly have been done with any thing except a metallic implement. A single glance at it is sufficient to satisfy any one of the truth of this assertion. Length of the stem, nine inches; width across the crescents, seven inches and a half.

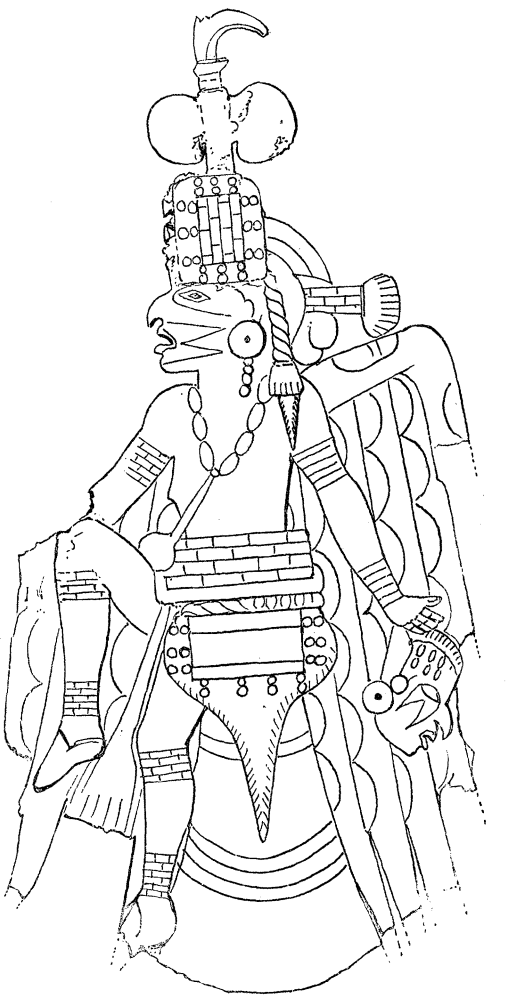

FIG. 4.

5. Part of an ornament similar to No. 4. These plates, especially No. 4, appear to be enlarged patterns of that seen behind the head of fig. 3.

6. An ornament or badge, shown in fig. 6, which Mr. Rogan, when he found it under the head of the skeleton in grave *a*, was inclined to

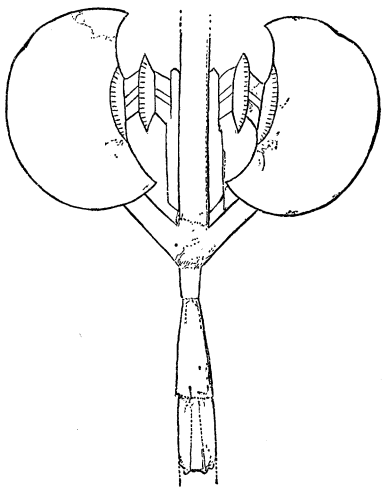

FIG. 5.

consider a crown. It is imperfect, a narrow strip across the middle and a portion of the tip being missing. As shown in the figure, it measures around the outer border nineteen inches and across the broad end three inches and a half. The six holes at the larger end, in which the remains of strings can be detected, indicate that it was, when in use, attached to some portion of the dress, or fastened on a staff.

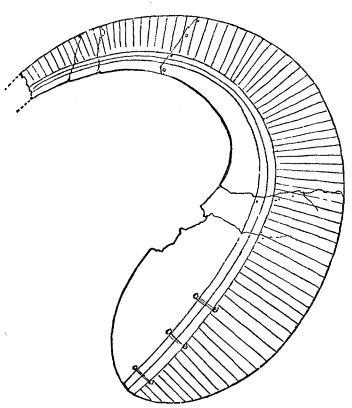

FIG. 6.

7. A fragment from the larger end of a piece similar to the preceding. Attached to this is a piece of cloth.

In addition to the foregoing, there are a number of small fragments, probably broken from these plates; but so far I have been unable to fit them to their proper places.

An examination of what Mr. Rogan calls a skin shows beyond question that it is animal matter. The matting he speaks of appears to be made of split canes.

FIG. 7.

The shell represented in Mr. Holmes's fig. 3, reproduced in our fig. 7, is the one obtained in grave *g*. The one shown in Mr. Holmes's fig. 4, reproduced in our fig. 8, is that found in grave *f*.

I shall not attempt at present to speculate upon these singular specimens of art, further than to call attention to one or two facts which appear to bear upon their age and distribution.

First, We notice the fact alluded to by Mr. Holmes, which is apparent to every one who inspects his accurately drawn figures, that, "in all their leading features, the designs themselves are suggestive of Mexican or Central-American work." Yet a close inspection brings to light one or two features which are anomalies in Mexican or Central-American

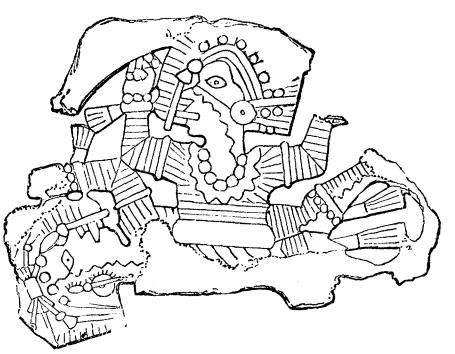

FIG. 8.

designs; as, for example, in figs. 3 and 4, where the wings are represented as *rising from the back of the shoulders*,— a fact alluded to by Mr. Holmes. Although we can find numerous figures of winged individuals in Mexican de-

signs (they are unknown in Central-American), they always carry with them the idea that the individual is partly or completely *clothed in the*

FIG. 9.

skin of the bird. This is partially carried out in our copper plate, as we see by the bird-bill over the head; the eye being that of the bird, and not of the man. But when we come to the wings, we at once see that the artist had in mind the *angel figure* with wings arising from the *back of the shoulders*, — an idea wholly foreign to Mexican art.

Another fact worthy of note, in regard to these two plates, is that there is a combination of Central-American and Mexican designs: the graceful limbs, and the ornaments of the arms,

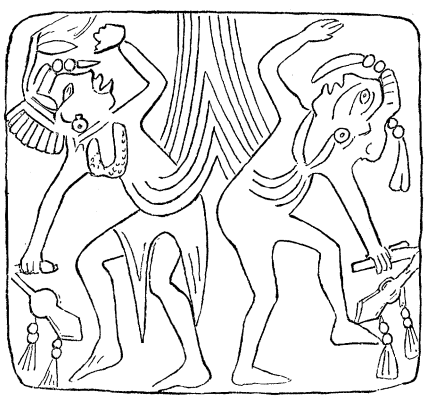

FIG. 10.

legs, waist, and top of the head, are Central American; and the rest, with the exception, possibly, of what is carried in the right hand, Mexican.

That these plates are not the work of the Indians found inhabiting the southern sections of the United States, or of their direct ancestors, I freely concede. That they were not made by an aboriginal artisan of Central America or Mexico of ante-Columbian times, I think is evident, if not from the designs themselves, from the indisputable evidence that the work was done with hard metallic tools.

Second, Plates like those of this collection have only been found, so far as I can ascertain, in northern Georgia and northern and southern Illinois. The bird figure represented in fig. 9 was obtained by Major Powell, the

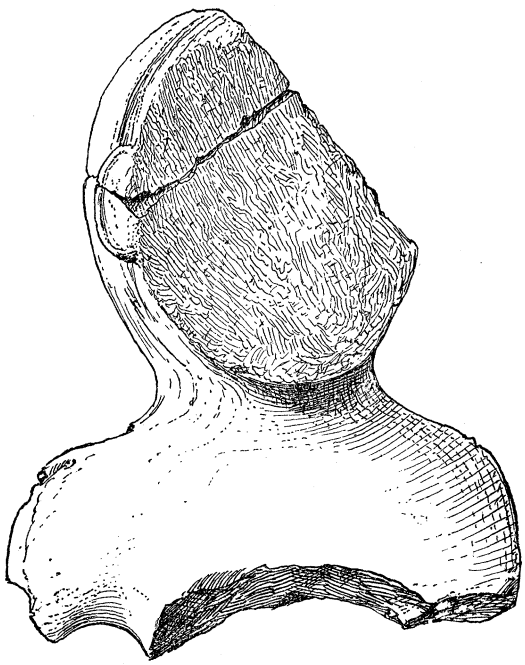

FIG. 11.

director of the U. S. geological survey, from a mound near Peoria, Ill. Another was obtained in Jackson county, Ill., by Mr. Thing, while engaged by the Bureau of ethnology, from an ordinary stone grave. From another similar grave, at the same place, he also obtained the plate represented in fig. 10. Fragments of another similar plate were obtained by Mr. Earle from a stone grave in a mound in Alexander county, Ill. All these specimens were received by the Bureau of ethnology, and are now in the National museum.

I cannot enter at present into a discussion of the questions raised by the discovery of these engraved shells; nor is it necessary that

I should do so, as Mr. Holmes has discussed somewhat fully these designs in the second annual report of the Bureau of ethnology. But I may add that these figured copper plates and engraved shells present a problem very difficult to solve, as is evident from the following facts: —

1°. A number of the designs bear too strong resemblance to those of Mexico and Central America to warrant us in supposing this similarity to be accidental. 2°. The indications of European workmanship are too evident to be overlooked. 3°. The fact that some of them were found in connection with articles of European manufacture is unquestionable. 4°. The evidence that some of the engraved shells can be traced to the Indians is well-nigh conclusive.

Mr. Rogan sank a large shaft, seventeen feet square, to the bottom of the second mound (marked *B* in Jones's plate, and also in Col. Whittlesey's figure). No burials or objects of interest were found in it, except the remains of four posts, extending four feet below the surface, placed in the form of a parallelogram, two feet one way, and six feet the other. The strata were as follows: first, a bottom layer of white sand two feet thick; next, between nine and ten feet of dark red clay; then two feet more of white sand; and, lastly, a top layer of some six or seven feet of dark sandy loam.

Mr. Rogan found in one of the small, low mounds east of the large one (those marked *FF* on Jones's plate), the fragment of a stone image. This fragment, which shows most of the form of the bust, is represented in our fig. 11. It is made of a coarse white marble: and the part shown in the figure is ten inches and three-quarters long; the length of the head, seven inches and a fifth; and width of the head, five inches and three-quarters. The face is entirely wanting, and from appearance, I judge, was broken off designedly.

CYRUS THOMAS.

A HUMAN SKULL FROM THE LOESS OF PODBABA, NEAR PRAGUE.[1]

AMONG collections of bones from the diluvium of the vicinity of Prague, human skulls are often found. From the color of the earth adhering to them, however, it is evident that they come from graves of the stone and bronze age, which here frequently occur in the top layer of the loess deposit, and are filled with dark loam. I also once received a normal skull found at a great depth in a lime-kiln at Tyrolka, not far from Prague, but in such relations that the overlying strata were presumed to have obtained their present position from a slide down the steep sides of the valley.

In the winter of 1883 some workmen brought me numerous bones of the reindeer, the rhinoceros, and the mammoth, from the clay behind the brewery at Podbaba, and, on the 30th of November, the remains of a human skull. After carefully putting together the newly broken parts, a skull was apparent, the remarkably depressed shape of the forehead of which must surprise every one. As this came from the same strata as the bones of ancient mammals obtained from this place, I immediately went there in order to determine more definitely the state of things. The skull was found by a workman named Hlavatý, in undisturbed brick-clay (loess) two metres thick, lying under one metre of dense loam, and at the same level at which, about a week previously, I had obtained the tusk of a mammoth.

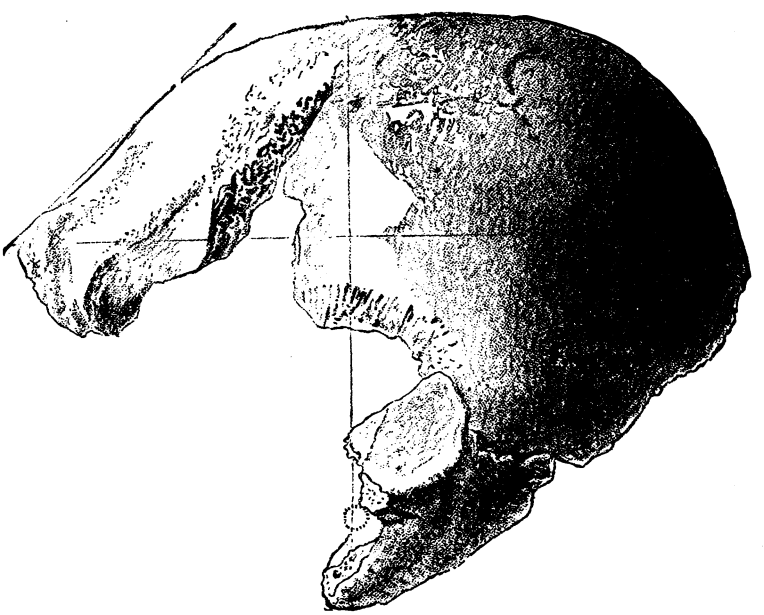

FIG. 1. — LATERAL VIEW OF HUMAN SKULL, FROM DELUVIAL CLAY NEAR PRAGUE (ONE-HALF NATURAL SIZE.)

[1] Abstract of a communication to the Bohemian society of sciences, by Dr. ANTON FRITSCH.