In every aspect of the matter the sense-organ must be present before its nerve can have a separate existence. The terms "utricularis" and "saccularis" are in all respects suitable and descriptive of the things to be named. Both of the nerves to which they are applied supply parts of the same organ complex which forms a well differentiated structure, and since both parts must have very similar functions it is certainly unadvisable to leave out of the designation all reference to the accepted idea as to the function which they subserve. Consequently, I hold that the names which I used in my memoir on the ear are the most suitable and the best grounded terms yet proposed for a revised nomenclature. The names may be used in full as Nervus acusticus utricularis and Nervus acusticus saccularis, or abbreviated to N. ac. utric. and N. ac. sac., or, since they are not liable to become confused with other nerve names, we may write simply N. utric. and N. sac. For the branches of each of these nerves we may write respectively:—

N. utric. { ramus cristæ anterioris. " " externæ. " maculæ utriculi.

N. sac. { ramus cristæ posterioris. " " cochlearis. " maculæ sacculi.

HOWARD AYERS.

The Lake Laboratory, Milwaukee, Wis., Mar. 20, 1893.

The Neanderthal Skull.

I HAVE waited in the hope that some one more competent than myself would take up this matter, but, this failing, I am induced to send a short note on the enquiry into the reality of our venerable troglodyte.

Dr. Brinton quotes very high authority in his letter; few higher than Virchow could be found. But it appears to me that the whole story was not given. We are all concerned to know the exact truth and value of these old relics of pre-historic man. But just now the iconoclasts are abroad in the land, and they may, as they have done in days past, go too far on that side.

The Neanderthal skull has never been unequivocally accepted as a type, chiefly because it stood so long alone. But a race has been named after it by some anthropologists, provisionally at least — the Canstadt, etc.

The evidence in favor of its authenticity has been before the world for many years almost unchallenged, and, with all respect to the eminent men engaged in the controversy, I submit that it is not quite in accord with logic or with scientific method to base an objection against the positive testimony of the discoverer on the mere recollection of his surviving widow nearly forty years after the discovery was made.

Waiving all other considerations, we know how treacherous is the memory of an event in which we were not deeply interested (and which we only in part comprehended) after half a lifetime has passed since it occurred. And that Frau Fuhlrott was in this mental condition is obvious from Professor Virchow's own admission, that she made this statement to him in entire unconsciousness of the weighty results involved. This of itself is sufficient to greatly reduce its value.

But there is yet another important element in the problem to be considered. In Sir C. Lyell's "Antiquity of Man" he thus describes the place: "I visited the spot in 1860 in company with Dr. Fuhlrott (sic), who had the kindness to come from Elberfeld expressly to be my guide, and who brought with him the original fossil skull." "The spot is a deep and narrow ravine. The cave occurs on the precipitous southern or left side of the winding ravine, about sixty feet above the stream and a hundred feet below the top of the cliff." He then gives a sectional view, showing an opening to the surface, and adds, "Through this passage the loam which covered the floor and possibly the human body to which the bones belonged may have been washed into the cave below." "There was no stalagmite overlying the mud in which the human skeleton was found." "The loam, which was five feet thick, was removed and the human skull was noticed near the entrance, the other bones lying farther in on the same horizon. The skull and bones had lost so much of their animal matter as to adhere strongly to the tongue, agreeing in this respect with the ordinary condition of fossil bones of the post-pliocene period."

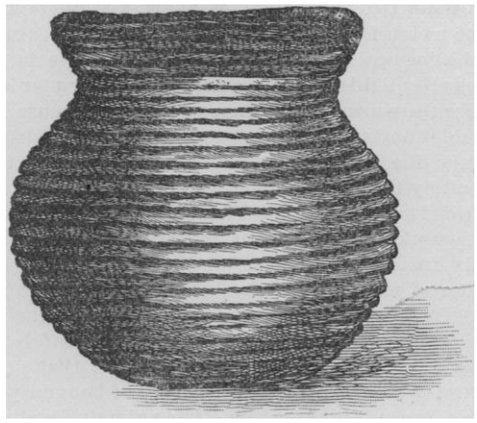
The loneliness of the Neanderthal skull has been much relieved by later discoveries, especially by that of Professors Lohest and Fraipont at Liège, but waiving this and keeping to the main point it is not easy to understand how testimony so direct and explicit can be at once overthrown by a recollection of an uninterested party after 35 years interval. It will be at once seen how widely Sir C. Lyell's description of the ground, written by an eye-witness, differs from that given in the first letter on the subject in *Science*. Moreover, Lyell's description shows that not the skull alone, but other bones, and probably the whole skeleton, were present. Our low-browed palæolithic (?) ancestor has still enough material left to make out a good case.

E. W. CLAYPOLE.

Akron, O., March 29.

Prehistoric Coil Pottery.

IN the dim past when primeval men occupied this continent, no one knows for how long a period, they raised mounds, dwelt in caves, or built towns that are now below the surface of the earth. In all this long era they used flint or stone implements for all edged tools, hammers, axes, spears, etc. At the same time having no



COIL POTTERY.

metal pots or kettles, a rough earthen ware was used for cooking and for all other uses for which we now use iron, tin, and wooden vessels. There is somewhat of a resemblance in many of the stone implements all over the world. It is only recently that it has been discovered that there is a similar resemblance in much of the pottery of this early age, especially in the coil pottery. This pottery was made by rolling clay into long strings like cord, and while soft beginning with one end to coil it round and round, increasing the size of the bottom till it assumed the desired dimensions, then shaping it up the sides (just as straw hats are made) till the required form and size was attained (see illustration). The most extraordinary part of the investigation is that this ware made in the same manner is found in the mounds of Florida and Ohio, in the cliff-dwellings of New Mexico and Arizona, in the buried cities of the cañons of these territories, also in the Connecticut Valley and under the ancient shell-heaps of Cape Cod, Mass. What a long period of time it must have taken to have this art disseminated over so vast a territory at this early age. According to the uses these pots were intended for, so were they made large or small, thick or thin, and of various shapes. It was a common practice to use some sharp instrument to dint or work up some fanciful designs without obliterating the lines of the coil; in some cases they are beautifully marked, looking like carved black oak, others made of light-colored clay in very fine coils prettily indented forming neat designs. Some of the best ware is handsomely smoothed and rubbed to almost a polished surface before baking. All are smoothed inside, before they were dry; probably some of those

intended to withstand heat have plumbago mixed in the inner surface of the vessels. There are many fanciful designs of this ware, some very large jars, pots of all shapes, bowls, cups, pitchers, etc. HENRY HALES.

Ridgewood, N. J.

The Sense of Boundary in Dogs.

I HAVE followed with much interest the discussion in *Science* caused by the recent communication of my friend, Dr. Hall, entitled "Is there a Sense of Direction?"

Dr. Hall's query recalls to my mind a striking example of animal intelligence which I witnessed in a dog, and of which I sent a brief notice at the time to the London *Spectator*.

Some eight years ago I was staying with friends who had a full-blooded Irish deer-hound. On the adjoining estate lived a pointer. Our dog was scarcely more than a year old, while our neighbor's dog was quite well along in life. The dogs had never been friendly; indeed, from the first, the pointer manifested a decided aversion to the young deer-hound. Whenever the old dog caught his youthful neighbor trespassing he would immediately drive him back over the boundary between the estates. Both dogs, even when going at full speed, would invariably stop the moment our dog had crossed the line. The two estates are virtually continuous, there being neither hedge nor fence separating them. The dividing line runs between two stone posts about a foot in height and some two hundred feet apart. These posts, of the existence of which I was quite unaware, until the singular behavior of the dogs called my attention to them, are in the summer time usually hidden by the grass, and in winter are often buried under the snow. I mention them, not because I think it at all probable they served as guides to the dogs in determining the boundary line, but merely because they enabled us to observe more accurately the phenomenon in question.

This exhibition of canine intelligence was first observed by my neighbors, who kindly pointed it out to me. It was repeated almost daily for several months, and was a constant source of amusement and wonder to those who witnessed it. The question arises, How did the pointer know where the line ran, and how did his canine neighbor know when he was safely across it? The only answer which occurs to the writer is, that dogs (some dogs, certainly) possess a very acute sense of boundary.

Whether this sense is shared by other animals I am unable to say, though, on this point, it is possible that some of your readers may be able to throw light. The question is certainly an interesting one from its bearing on the general question of animal intelligence. F. TUCKERMAN.

Berlin, Germany, Feb. 28.

The Results of Search for Paleolithic Implements in the Ohio Valley.

THOSE engaged in the recent discussion of Glacial Man have had little to say of the Ohio Valley. Without laying any claim whatever to geologic skill, I will submit some extracts from my private journal. These are submitted from the standpoint of a "field searcher" who knows nearly all the village sites and primitive remains of southern Ohio.

"May, 1891. Found in ash-pits near the Little Miami River, at Fort Ancient (Warren County), several objects of the character of those in the United States National Museum labelled from New Jersey and District of Columbia, commonly called paleoliths. These are in various styles — broken and whole, rude and well formed, large and small. Pottery fragments, bones, and flint chips side by side with the rough forms.

"Spent a large part of three days in inspecting the river banks, gravel strata and river bars. Pottery, several celts, arrow-heads, and paleoliths numerous. Two hearths discovered, the one six and the other nine feet below the surface. A modern brick was found lying just above one of them. Rough implements were gathered from the village sites and in the clay and sand of the river banks. No implement was seen protruding from the gravel layers.

"Rowed up the stream all day Saturday. Three experienced field-searchers were in the boat. No gravel bank was seen which contained implements. We saw no spot in clay bank, on village site or bar where only rude implements of paleolithic type (or approaching that type) were found. The rude objects, finished objects, pottery, etc., are always found together. Careful searching long continued might reveal isolated paleoliths. The river frequently washes cans, bricks, etc. out of its banks and transports them to remote parts. Just so it might carry a piece of pottery or a paleolith to a gravel bar and deposit it. A finder of an implement thus deposited would attach to it great importance, especially so were he a stranger in the valley."

This important point has been overlooked in the discussion. So far as Ohio goes, I think I am safe in saying, Dr. Metz is the only thorough archæologist who claims to have found paleoliths in the drift. All others have been found by travellers or persons not familiar with the prehistoric sites of occupation. Professor Wright does not claim to have found them himself. How is it that those of us who spend all of our time in archæologic work cannot find them? Were they so numerous in drift, surely we could see them whether we knew anything about geology or not. The type is fixed in everyone's mind, and while a searcher might not be able to name the deposit in which the implement occurred, he certainly could tell the implement when he saw it!

Dr. Cresson — strong in "paleolithic faith" — never found one specimen while he was for four months in my camp in Paint Valley, Ross County. Yet he often searched the creek banks or gravel exposures. My men, all good specimen hunters, quick to see an artificial object, could never find them in any kind of stratified gravel. I lay no claim to a knowledge of the gravels, but had implements been found in them geologists from Columbus or Cincinnati would have examined and named the deposits for me. During the coming summer I will spend as much time as possible in a further search for implements like those found by Metz and Mills. Any number can be found on the surface, but as yet I have not been able to find one in gravel layers. Probably my eyes are not sharp enough!

WARREN K. MOOREHEAD.

5,215 Washington Ave., Chicago, Ill., Mar. 24.

Probable Causes of Rainy Period in Southern Peru.

IN your issue of Oct. 21, Professor A. E. Douglass of Arequipa Observatory presents important facts evidencing a former rainy period in that region which is now nearly rainless. This change he attributes to a considerable increase in the elevation of the Andes in recent geological times. A most serious objection to this theory is, that in order to entirely cut off the precipitation from the trade-winds, an average height of broad mountain range not exceeding 6,000 to 8,000 feet would be necessary. Our experience in the Hawaiian Islands is that the trade-winds rarely surmount 5,000 feet of mountain, and, if they do this, they still more rarely carry much rain over that height, nearly all the moisture being precipitated upon the windward slope. It seems impossible to suppose that the Peruvian Andes were not more than at least one-half their present height during any recent geological period.

I would suggest that the glacial period was the cause of the former moisture of the climate of Peru. During the reign of ice in the southern hemisphere, it seems probable that the weather of the temperate zone was transferred to the tropic — was pushed towards the equator. Peru would at that time have enjoyed the westerly gales now prevalent in southern Chili and Patagonia, together with the heavy rains accompanying those winds.

In support of the very recent existence of such temperate zone climates in the tropics, I will adduce a fact stated to me by Professor A. B. Lyons of Oahu College, who recently found on the now arid slopes of Diamond Head buried land shells, *Achatinellæ*, of a species now only found upon the cold and wet summit of Kaala, 3,700 feet above the sea. This fact indicates that the present dry and warm climate of southeastern Oahu has been a change from one formerly cold and wet, such as would probably have existed during the ice age.