have been described a thousand times. But I take pleasure in directing public attention to two adjacent caverns, belonging to the Mammoth Cave estate, and that are seldom visited, though each for different reasons should challenge admiration. The White Cave (so named eighty years ago on account of the whiteness of its formations) is entered at a point half a mile from the hotel. Its floor is cut by numerous channels, through which water runs so pure as to be almost invisible, leading to exquisite pools with ruffled and incurved rim, none of them being more than two or three feet deep. The roof is for the most part low and fretted with numberless dainty stalactites. Advancing, we find the floor encumbered with huge blocks of limestone, and the cave divided longitudinally by a wall of noble stalagmites far beyond anything of the sort to be seen in the adjacent larger cavern. It ends in a profound pit, named by us Bishop's Dome, for our guide, Eddie Bishop, who, so far as is known, was the first to descend to its bottom, which feat he accomplished in our presence. It is supposed that the White Cave is connected with the Mammoth Cave at some point near the end of Audubon Avenue, or possibly at Little Bat Avenue; but this remains yet to be proved.

For ten years past I have heard of Dixon's Cave, but had never been informed that it was in any way remarkable, except for having possibly been at some remote period the original mouth of Mammoth Cave, and even this seemed to be a matter of doubt. Being desirous of seeing it, simply for the sake of completing my work, I donned my usual cave attire, and sallied forth one March morning with Bishop the guide. Snow had fallen to a depth of four inches, through which the brave daffodils in the garden lifted their golden heads, while the more modest spring flowers that had been tempted to bloom too soon lay hidden under the wide, snowy blanket. The ice-laden trees glistened in the vernal sunshine. As we broke our way through the budding underbrush of the oak opening, tracks were visible of rabbits, foxes, and wild turkeys. After going thus for several hundred yards, we were confronted by a wide chasm in the hillside, into whose yawning gulf great moss-grown forest-trees had plunged headforemost. Creeping under or climbing over their prostrate trunks, we gazed awe-stricken into the mightiest cavern-mouth I ever saw. The whole cavern is a single hall, which, by our measurement, is 1500 feet long, from 60 to 80 feet wide, and from 80 to 125 feet high, gradually curving from southeast to due south; the dimensions being quite uniform from end to end and from top to bottom. The roof is decorated here and there by alabaster stalactites, and at the time of our visit it was also appropriated by myriads of hibernating bats, clinging in great clusters like swarms of bees. The floor was long ago gone over by the saltpetre miners of 1812, who had left the rocky fragments piled in what might be described as stony billows lying across the cave, each wave being 40 feet through at the base and rising 25 or 30 feet above the true floor. At the extreme end the mass of nitrous earth seemed not to have been disturbed, over which we climbed to the very roof, and amid whose nooks we diligently sought a way of access to Mammoth Cave. We did not succeed; but subsequent outside measurements satisfied us that we had reached within 60 feet of the desired goal, and that by suitable excavation the connection might be made. Before leaving Dixon's Cave, I stationed Bishop at the inner end, while I gained a point midway where I could see the white sunlight as it was reflected from the snow, and then had him ignite three Bengal lights. The effect was indiscribably grand as their brilliant illumination crept through the black darkness till it cast my shadow on the fainter sunlight itself, like a giant spectre, and finally blended with the outer light, thus enabling me to take in at a single glance the vast dimensions of what may be justly styled the most magnificent subterranean hall in the known world. On our return to the hotel, we made our way by the mouth of Mammoth Cave and saw it environed by trackless snow, its mosses and vines spangled with silver, and the wild, pattering cascade falling from the rocks above to the rocks below as it has done for ages. And, turning away, I echoed with all my heart the guide's naive exclamation, "I fairly love old Mammoth Cave."

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

Anatomical Nomenclature.

As the years go by the movement for a thorough and scientific revision of biological nomenclature gains in depth and strength, and we have every reason to believe that great and lasting benefits will accrue to science as the result of these attempts to increase the precision and fitness of our scientific language. Believing that every increment, however small, is a distinct gain if it only possess the qualities above mentioned, I propose the following modifications in anatomical nomenclature for the consideration of all anatomists interested in this important work.

In my paper on the vertebrate ear,[1] I brought out in considerable detail the two following considerations regarding the morphology of the auditory nerve and made certain suggestions looking to an improved nomenclature of these parts. In the first place it was shown that anatomists had not adequately recognized the true nature of the auditory nerve owing to the persistence of the older view of the nature of the auditory organ, which was regarded as a morphological unit. Such a well-defined unit could only be supplied by an equally well-defined (single) nerve. It was there for the first time proposed to recognize in our terminology the fact that the auditory nerve is composed of two very thoroughly separated parts, both as concerns their central ends and their peripheral origin.

In the second place it was brought out that these two parts showed certain important anatomical relations to two other cranial nerves from which these branches of the auditory had in all probability arisen during phylogenetic development. The names proposed are N. auditorius ramus utricularis and ramus saccularis, or the utricular and saccular nerves, respectively. This nomenclature is based on a very extended study of the comparative morphology of the acoustic apparatus. These terms are superior to and in every way perferable to the other current designations such as N. cochleæ and vestibuli, or N. superior and inferior.

The terms, N. vestibuli and N. cochleæ, are ill-chosen, from the fact that the morphology of the "vestibule" and its parts as conceived by the anatomists who first proposed this term has no real existence. On the other hand, the term N. cochlearis is unsuitable, not to say inadequate, from the fact that this nerve is not solely a cochlear nerve since its trunk contains nerves to the "vestibule" as well, viz., the saccular and posterior ampullar nerves wherever these are not provided with separate foramina. The central relation of these two nerves is always with the mass of cochlear fibres in those forms possessing an enlarged cochlear apparatus, as well as in the more primitive condition of the auditory organ.

While engaged in reconstructing our anatomical nomenclature it is very desirable that we choose those terms which express the present condition of our knowledge and give promise of being adequate for the future as well, for, I take it, the recent movement for a betterment of biological nomenclature is dominated by the universal desire for as simple, short, and expressive a terminology as shall be adequate not only to the science as it exists to-day, but also to its expanded condition in the not distant future. None of these conditions are fulfiled by any of the terms yet applied to the ear-nerve except the two, utricularis and saccularis.

No broad-minded anatomist will desire to retain names in human anatomy that are inapplicable to all other vertebrates possessing the homologous arrangements of the parts under consideration. Not all vertebrates, not even a majority of them, possess a cochlea, consequently we should have to provide another name for the same nerve in lower forms or else have the anomaly of an animal without a cochlea provided with a "cochlear nerve."

[1] A contribution to the Morphology of the Vertebrate Ear, etc. Journ. Morph., VI., 1892.

In every aspect of the matter the sense-organ must be present before its nerve can have a separate existence. The terms "utricularis" and "sacculars" 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 sacculars, 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