ture, is radically allied to the ancient Pueblos and to the short-headed people of to-day in other parts of New Mexico and Arizona, and possibly in old Mexico.

Dr. M. H. Saville presented a paper entitled 'Notes on the Mexican *Codex Telleriano-Remensis*.'

CHARLES H. JUDD,
Secretary.

DISCUSSION AND CORRESPONDENCE.

DR. WILSON ON PREHISTORIC ANTHROPOLOGY.

IN SCIENCE October 27th and November 3d, last, Dr. Thomas Wilson has committed several errors which if not corrected are calculated seriously to mislead one not familiar with the subject. The position he occupies as an officer in the United States National Museum of itself gives weight to any paper he may publish, added to which he calls special attention to his travels in Europe and his thorough familiarity with the museums and individuals who believe in a paleolithic period, his acquaintance with the Dordogne, and his many years in the National Museum, all of which he asserts peculiarly fits him to form a valuable opinion in any comparison of American with European Implements. As in at least one paragraph Dr. Wilson has assailed certain assertions of the writer and has referred to the same by misquoting what has been written, opportunity should be taken to show his errors if such exist.

His subject is Paleolithic man in Europe, and America, and his existence through eons of time, only measureable by geologic periods; through all of which man chipped stone and did not know the art of grinding it; or as Dr. Wilson contends, of sawing or drilling stone, of making pottery, or of the use of the bow and arrow; that paleolithic implements are in a class by themselves. Dr. Wilson goes further than do the European archæologists; he adopts their classification and holds up a danger flag to Americans who would deny the existence of evidence of a paleolithic period in America. The writer's denial that European classification is based on sound scientific reasoning he strenuously combats.

Dr. Wilson is one of ten or a dozen members of the Anthropological staff of the United States National Museum, and though the majority of that staff have had equally as good opportunity to study the American branch of the subject, and several of them far better than he, he stands alone in his views. He takes exception to the writer's opinion that the art of chipping stone, technically considered, is more difficult than is pecking and grinding. Yet all experience as well as all implements employed by savage races wherever found, show that the tools used in chipping are complicated, whereas a simple discoidal hammer constitutes the sole implement employed in pecking and battering stone and is found in all countries throughout all periods. No one has suggested the reversal of the paleolithic and neolithic periods for the simple reason that such classification is illogical, it would argue the absence of man during the whole paleolithic period from the areas of metamorphic stone on the continent as such stone does not chip. All experience teaches that man of the stone age wherever found was thoroughly acquainted with the artificial fracture of the available material of his vicinity whether for chipping flint, for battering diorite or kindred stones, or for hammering copper which to him was but a malleable stone. In chipping flint and similar stones, the artificial fracture varies enormously, even in the same ledge, and consequently is treated invariably in the way best suited to its peculiar texture. The present classification of stone age periods has become bewildering chiefly because of its many divisions and subdivisions. Many of these are very useful and suggestive especially that of Thomsen of Denmark who divided the human periods into Stone, Bronze and Iron, but when we read Paleolithic, Neolithic, Prehistoric, Copper, Eolithic, Upper and Lower Tertiary, the same of Quarternary, Mesolithic, Acquitanean, Sortorian, several classes of Lacustrian and a host of Cave periods, named from animals present, or from the type of stone implements found, it must be admitted the series become difficult to remember. This list is but partial and if it were necessary could be greatly increased, but, however useful for local purposes or for a single country, it will not answer for general stone age conditions. Adrien de Mortillet made a most valuable contribution

when he formulated a classification according to the function of the implement, as by pressure, friction, etc. De. Mortillet's classification was elaborated by Holmes. The present writer classified human periods and conditions by showing that nature in its stone, bone, shell, and vegetable products furnished practically all primitive material, with which man could perform such labor as conditions required, as to cut, crush, color, pierce, bind, contain, etc., as knives, hammers, paints, thorns, thongs, vessels and similar primitive implements, which in combination with one or other material became special and in time complex tools, and eventually machines, as human culture increased. In this no effort was made to reverse accepted classification, but an effort was made to show that to insist upon it could only lead to inextricable confusion.

European archæologists deny the finding of ground tools in quaternary strata, and account for their alleged presence by asserting the intrusion through water, by the burrowing of animals, or by the want of scientific training of their discoverers; but the chief objection is that because ground they must be neolithic. In areas where only non-chippable stone is found it is argued that this constitutes evidence that paleolithic man never was there present. If only chipped stones are found, the argument is made that that of itself is proof of the presence of paleolithic man only. The specimens of river drift implements in American museums are quite commonly wastrels, due to the presence of knots or refractory spots in the stone, and can not be improved upon by the most skillful manipulation.

The Mousterian specimens found at La Madelaine, though commonly considered as being rudely chipped, owing to their being worked on one side only, resemble greatly the yet ruder chipped obsidian objects from Easter Island, which if struck upon the opposite side to that from which chipped, are destroyed by fracturing along lines of lamination or natural cleavage. This inferior texture has led many to suppose the American Indian to have been an inferior stone worker, though the contrary is proved by many specimens of obsidian, jasper and chalcedony from the west and southwest. Notwithstanding the rude chipping of the cave of La Madelaine, it was inhabited by people who were skillful artists in the working and etching of bone, antler and ivory compared by any standard. In this cave and in that of La Bicheaux-Roches near Spy in Belgium, and elsewhere, there have been found at the very bottom, with the oldest of the extinct cave fauna, elaborately carved and bored antlers commonly called Batos-de-Commandement, bone pins with eyes and without, toggles, and other objects of known and unknown use, skillfully made from bone, antler and ivory. This ivory, antler and bone is much more difficult to grind, saw or smooth than is the average neolith, yet is sawed, ground, smoothed and bored notwithstanding.

Dr. Wilson himself refers to bored or drilled teeth among the tertiary remains presented by L'abbé Bourgeois. Near the bottom of the cave at Spy were found plates of ivory representing seals, ground ochre in a hollow bone, and three pieces of burned pottery. In Belgium, in Wurtemberg, in France, in Baden, many of the most distinguished archæologists have recorded the finding of pottery repeatedly.

The existence of plateau man, either in England or France before the present rivers began to form valleys, has but little evidence to support it.

Similarity of implements in widely separate parts of the earth is accounted for by similarity of man's needs, and the natural supply of most regions furnishing objects to pierce, cut, hack, or pound with or even to supply covering, in the abundance of shells, stones, trees and animals to furnish the great essentials of human life. And this similarity of man's tools appears to be due more to his efforts to imitate nature and its products, than to any inter-communication of races or nations carrying their trades from continent to continent throughout all times, and can not be designated as materialism. The suggestion of two invasions of America from Europe, one corresponding to the chipped, and the other to the ground stone area, will find few supporters.

Dr. Wilson's belief in man of the Trenton gravel and elsewhere in America belonging to the paleolithic period has its supporters, though

the fact that one of the most expert of the assistants of the Bureau of American Ethnology spent a whole season in the great ditch dug through this gravel without finding a single specimen, is a powerful argument in favor of the contention of Holmes and McGee that those found are from the talus or within a few feet of the surface.

The finding of pottery, arrow and lance heads, and axes with Koch's mastodon in Missouri can not be said to be a scientific argument in support of a paleolithic period during which Dr. Wilson asserts man did not possess three of the four objects enumerated, it appears equally true that the drilled objects of Bourgeois hardly strengthens the theory of tertiary man if we follow correctly the argument.

European drilling, all things considered, appears to have been accomplished with better tools than were those of America, and the holes were commonly larger and drilled through harder stone than were those drilled in America. We can not expect to find any of the remains of man in the gravel of the drift which has usually ground to powder all other stones softer than flint, and the Calaveras skull alleged to be found in the auriferous gravel could hardly have survived; even the pestles and mortars found with it were like those of to-day and the skull is said not to present the appearance of a fossil.

J. D. McGUIRE.

ELLICOTT CITY, MARYLAND.

A NATURALIST'S DIRECTORY.

A BOOK which recently came to this library was called to the author's attention a few days' ago. The book is entitled 'The Naturalist's Directory' and is published by L. Upcott Gill, London, 1899. In the preface it is stated that the object and purpose of the book has been so enlarged as to include all naturalists, especially of Great Britain, and we were lead to believe by this preface that the book might be of value as a directory to naturalists in general. When, however, we turned to the lists of naturalists outside of Great Britain, we were at once impressed with the incompleteness of the work, and this incompleteness is especially noticeable in the case of the United States.

Under the general head of zoology, which includes entomology and mere collectors, as well as scientific zoologists, only thirty-three names are mentioned as pursuing this line of work in the United States. Of these names only eight or ten are of men who are at all well known. In the subjects of Microscopy and Botany, we were astounded to find that only three men in the United States were pursuing these branches of science. Of these names two are well known. According to the lists of workers in geology and paleontology, we find that the United States can boast of six men to grace these professions. Besides these interesting discoveries, we notice that there is one gentleman in the United States who is interested in Indian relics, and one other gentleman who is making a study of anthropology.

It would seem as if even in such a far away town as London, more complete information might be obtained concerning the status of scientific work in this country.

E. V. WILCOX,

U. S. DEP'T OF AGRICULTURE.

DR. G. W. FOSTER AND THE 'LAKESIDE MONTHLY.'

TO THE EDITOR OF SCIENCE:—I have read with much interest, in your issue for November 17th, the sketch of my old friend Dr. J. W. Foster. One statement, however, needs correction: that "he was the editor of the *Lakeside Monthly*." Dr. Foster was for a year or two a frequent and valued contributor to the *Lakeside*, but was at no time its editor.

FRANCIS F. BROWNE.

BOTANICAL NOTES.

THE WILT DISEASE OF COTTON, WATERMELON AND COWPEA.

A FEW days ago Dr. Erwin F. Smith, of the Division of Vegetable Physiology and Pathology of the United States Department of Agriculture, issued an important contribution to our knowledge of the fungi which produce plant diseases. After about five years of investigation enough facts are known to warrant the publication in a pamphlet of seventy-two pages of what the author calls a condensed account of the disease, and the fungus which causes it. The gross symptoms of the disease in the water-