

good as the few skulls which were found. But I must say that one fossil monkey-skull or man-ape skull which really belonged to a human proprietor has never been found. Every addition which we have obtained in the material inventory of objects for discussion has moved us further away from the problem to be solved. Now of course we cannot avoid the consideration that perhaps it was on some quite special spot of the earth that tertiary man lived. This is quite possible, since during the last few years the remarkable discovery has been made in North America that the fossil ancestors of our horses occur in countries from which the horse had entirely disappeared for a long time. When America was discovered there were no horses there at all; in the very place where the ancestors of our horses had lived no living horse had remained. Thus it may also be that tertiary man has existed in Greenland or Lemuria, and will again be brought to light from under the ground somewhere or other. But as a fact we must positively acknowledge that there is always a sharp limit between man and the ape. *We cannot teach, we cannot designate it as a revelation of science, that man descends from the ape or from any other animal.* We can but designate this as a problem, may it seem ever so probable and may it lie ever so near.

We ought to be sufficiently warned by the experiences of the past, at a time when we are not justified in drawing conclusions, not unnecessarily to burden ourselves with the obligation, or yield to the temptation of drawing them all the same. Look you, gentlemen, it is in this that the difficulty lies for every naturalist who speaks to the world at large. Whoever speaks or writes for the public, ought, in my opinion, doubly to examine just now, how much of that which he knows and says is objective truth. He ought to try as much as possible to have all inductive extensions which he makes, all progressing conclusions by the laws of analogy, however probable they may seem, printed in small type underneath the general text, and to put into the latter only that which really is objective truth. In that case we might perhaps succeed in gaining an always increasing circle of followers, in obtaining an always increasing number of fellow-workers, and in causing the educated public to continue to take part in that fertile manner in which it has already taken part in many domains. Otherwise, gentlemen, I fear that we overrate our power. Certainly old Bacon said with perfect justice, *scientia est potentia*, knowledge is power. But he has also defined knowledge, and the knowledge which he meant was not speculative knowledge, not the knowledge of problems, but it was the objective knowledge of facts. I think that we should abuse our power, we should endanger our power, if in our teaching we do not fall back upon this perfectly justified, perfectly safe, and impregnable domain. From this domain we may as investigators make our excursions in the direction of problems, and I am convinced that every attempt of this kind will then find the necessary safety and support.

AMERICAN SCIENCE

THE principal paper in the *American Journal of Science and Arts* for November, is Prof. Marsh's able address at the recent meeting of the American Association, on the Introduction and Succession of Vertebrate Life in America, which we have given at length. —Discussing the question, Is the existence of growth rings in the early exogenous plants proof of alternating seasons? Dr. Warring concludes from observations, that some exogens form rings at intervals much less than a year; others require intervals of several years, and some form no rings. The presence or absence of rings in exogens occurs in all climates. Large and well-defined rings are found where there is absolutely no appreciable variation of temperature or moisture throughout the year. An exogen naturally forming rings will continue to form them, although the climate become uniform throughout the year. Thus the existence of these markings in ancient flora gives no information as to the existence at that time of seasons, and so far as they are concerned we are left free to adopt any conclusion as to inclination of the earth's axis, which may appear most reasonable. —Some years ago Prof. Newcomb showed that the improvements introduced into the theory of the moon's mean motion by Hansen's lunar tables did not extend to the inequalities of long period in that motion. While Hansen, by an empirical term had secured a very good agreement with observations from 1750 to 1860, this agreement was found to have been obtained by sacrificing the agreement before 1750, and the moon had then begun to deviate from the tables at such a rate that they could

not continue satisfactorily to represent the observations. Prof. Newcomb has since attempted a complete discussion of all recorded observations of any astronomical value before the year 1750, and his suspicion has been entirely confirmed. The results of this examination are communicated. Comparing a theory of the moon's mean motion founded on gravity alone, with the observations, he is led to suppose that the deviations may be due to the action of some of the bodies of the solar system. He corrects Hansen's term by an empirical addition. — Prof. Dana contributes to the number a note on the Helderberg formation of Bernardston, Massachusetts, and Vernon, Vermont, and Mr. Mallet describes "Serpylite," a new niobate, from Amherst County, Virginia.

The *New York Tribune* states that the Johns Hopkins Scientific Association has recently been organised in Baltimore. Prof. Sylvester is president, Prof. Remsen, vice-president, Dr. Story, secretary. A great feature in the programme is that the essays presented are to be short and concise, and to contain the particulars of original research exclusively. There is also to be a discussion of new scientific publications, both foreign and domestic, at the meetings, of which the first has been held, with a score of members present.

Under date November 20, the *Tribune* has the following telegram from Washington:—Messrs. S. H. Scudder of Cambridge, and F. C. Bowditch, of Boston, have just returned from a two months' tour in Colorado, Wyoming, and Utah, where, under the direction of Dr. Hayden, they have been exploring for fossil insects and collecting specimens especially in the high regions. They report having secured many specimens of fossil insects at different points along the railways from Pueblo to Cheyenne, and from Cheyenne to Salt Lake, as well as at Lakin, Kansas, and Garland, and Georgetown, Col., and in various parts of the South Park and surrounding region. Their time was so limited that they were unable to visit White River and explore the beds of fossil insects known to exist there. Ten days were spent at Green River, and in that vicinity, in exploring the tertiary strata for fossil insects, but with very unsatisfactory results. Near Florisante the tertiary basin was found to be exceedingly rich in insects and plants. Mr. Scudder spent several days in the careful survey of this basin, and estimates that the extent of the insect-bearing shales there is at least fifty times as great as that of those in Southern Bavaria. Six or seven thousand specimens of insects, and 2,000 or 3,000 of plants have already been received from Florisante, and as many more are expected before the close of the year. Arrangements were also made with persons who have found a new and rich deposit of fossils in the tertiary strata in Wyoming to forward all the specimens obtained there. Mr. Scudder believes that the tertiary strata of the Rocky Mountain region are richer in the remains of fossil insects than any others in the world, and that within the next few months the amount of material at hand for the study of the subject will be greater than was ever before possessed by any single naturalist. Prof. Joseph Leidy, the comparative anatomist and microscopist, has also recently returned from his second visit to the west, under the direction of Dr. Hayden. His field of operations during the past season was the country about Fort Bridger, Uintah Mountains and the Salt Lake Basin. The specimens he has collected comprise the lowest and simplest forms of animal life, the most minute requiring high microscopic power to distinguish their structure.

THE METEOR

WE have received some further communications concerning this remarkable phenomenon, and some interesting details concerning a similar body will be found in our "Astronomical Column." Mr. A. O. Walker writes from Chester:—

In reading the notice of the meteor of November 23 in *NATURE*, vol. xvii. p. 94, I am surprised to see no mention of any report from it. As I only heard it without seeing it I send you the notice of it from my diary, written immediately after the occurrence:—

"About 8.30 P.M. heard a loud report like that of a cannon (say 32 lbs.), fired about 200 yards off, which shook the house, and the servants saw a bright flash. The sky overhead was quite clear and only cloudy on the horizon south and east. Thought it was the explosion of an aerolite."

Next day I made inquiries and added the following:—

"Parry and Field said the flash was blue, and five minutes