

In Part IV. Dr. Dall has greatly enlarged on the subject, giving a complete synopsis of many of the leading generic groups of American Tertiary species. Upwards of 500 species and varieties are enumerated, including 152 new to science. These are shown on 13 plates containing 244 figures.

The Pliocene fauna is closely allied to the recent, and Dr. Dall in his investigation has been obliged to make so many changes in nomenclature, that the work is indispensable to the paleontologist and conchologist.

In 1893 Professor Dall edited the republication of Conrad's 'Fossils of the Medial Tertiary of the United States' a work of 136 pages and 49 beautifully executed plates. In 1898 he wrote for the Transactions (Vol. 5), Notes on the Paleontological Publications of Professor William Wagner. Several plates prepared by Professor Wagner in 1839, but never published with text, were found in the Institute library. The plates were new species of fossils from the Carolinas for which credit was given in Brown's Index Paleontologicus, but there was no record of the original paper.

Professor Wagner doubtless had the plates prepared for the Journal of the Academy of Natural Sciences, and afterwards contented himself with sending the plates to his correspondents.

THOMAS L. MONTGOMERY.

PHILADELPHIA, Nov. 10, 1899.

THE CARNEGIE INSTITUTE.

THE fourth annual celebration of Founder's Day, of the Carnegie Institute at Pittsburg, was held on November 2d. President Arthur T. Hadley, who was the guest of honor, presented an address upon 'Modern Changes in Educational Ideals.'

Mr. Samuel H. Church, the secretary of the Board of Trustees, read the annual report of the progress of the year in all departments of the Institute, stating that a considerable plot of land had been secured to the east of the buildings for additions already planned, which are to provide space for a permanent picture gallery, an art school, and for the scientific museum.

The department of paleontology, recently established under the curatorship of Dr. Wortman, has progressed rapidly. The expedition

to Wyoming this summer has resulted in the securing of a large collection of unusually fine fossil bones of extinct vertebrates.

Several addresses upon art were given, and the announcement was made of the prizes awarded for paintings entered in the Carnegie Institute exhibit for 1899.

Dr. J. L. Wortman then reported on the work of the museum in paleontology.

HARLAN I. SMITH.

ALCOHOL AS FOOD.*

BULLETIN No. 69 of the Office of Experiment Stations of the U. S. Department of Agriculture gives the first detailed accounts of a number of experiments lately made by the Department in coöperation with Wesleyan University and the Storrs Experiment Station, under the immediate direction of Professor W. O. Atwater. These experiments were made with men in the Atwater-Rosa respiration calorimeter described in Bulletin No. 63 of the Office Experiment Stations. The object of the inquiries is the study of the laws of nutrition. Each experiment lasts from four to twelve days, during which time the man under experiment lives day and night in the chamber of the calorimeter. He has different kinds and amounts of food, and is under different conditions of activity, from actual rest to severe muscular or mental work. The results show how the body uses its food, what materials are needed for its support, and how different food materials compare in nutritive value. The six experiments reported in Bulletin No. 69 were made with a variety of dietaries and in two of them alcohol made a part of the diet.

The general plan of the experiments consists first in finding a diet of ordinary food materials, such as meat, potatoes, bread, and coffee, which is sufficient to meet the demands of the man's body when he is at rest, and in determining just how much of the different materials must be added to meet the increased demands when the man is engaged in more or less severe muscular work. Arrangements are made by which all the food and drink supplied to the body, and

* From the Division of Publications, United States Department of Agriculture.

likewise all the excretory products given off from the body, are measured and analyzed. Even the air before and after it is breathed is thus treated. This gives the exact income and the outgo of matter of the body. Furthermore, the energy which is latent in the material supplied to the body, and in the excretory products given off from the body, is carefully determined; while the energy that is transformed by the body and given off in the form of heat and external muscular work is very accurately measured by the calorimeter. We thus have an exact measure of the income and outgo of energy. By thus striking the balance of income and outgo of both matter and energy, it is possible to learn with great accuracy just how the body utilizes the different materials supplied to it in food and drink.

When results had shown what quantities of food ingredients were required for the maintenance of the man's body when he was at rest, and how much more was necessary to enable him to perform a measured amount of muscular work, the experiments were repeated, but with this variation: A certain amount of the fuel ingredients of the food—sugar, starch and fat—which the body uses to furnish heat for warmth and energy for work, was taken out, and a chemically equivalent amount of alcohol was substituted for them; that is, an amount of alcohol which contained the same quantity of potential energy as the ingredients which it was to replace. As a matter of fact, the amount actually used was $2\frac{1}{2}$ ounces of absolute alcohol per day—about as much as would be contained in three average glasses of whisky, or in a bottle of claret or Rhine wine. This alcohol was given in six nearly equal parts, three with meals and three between meals, the object being to avoid any especial influence of the alcohol upon the nerves, and thus to test its action as food under normal bodily conditions. In the experiments in which the man did no muscular work, this amount of alcohol furnished about one-fifth of the total energy of the food; but in those with hard muscular work more food was given, so that the alcohol supplied only about one-seventh of the energy.

As regards the special action of alcohol three important results were observed in these ex-

periments: (1) Extremely little of the alcohol was given off from the body unconsumed, in the breath or otherwise. The alcohol was oxidized, *i. e.*, burned, as completely as bread, meat, and other ordinary foods, in the body and in the same way. (2) In the oxidation all of the potential energy of the alcohol burned was transformed into heat or muscular energy. In other words, the body transformed the energy of the alcohol just as it did that of sugar, starch and fat. (3) The alcohol protected the material of the body from consumption just as effectively as the corresponding amounts of sugar, starch and fat. That is, whether the body was at rest or at work, it held its own just as well when alcohol formed a part of the diet as it did with a diet without alcohol.

Besides the six experiments reported in Bulletin No. 69, the final result of thirteen later ones are ready for publication. Of these eight were with a diet including alcohol. In some of them pure alcohol was given, in others it was in the form of whisky or brandy. The two alcohol experiments in Bulletin No. 69, and ten of the later ones, were with the same subject, a Swede by birth who had lived some time in this country and had been accustomed from his youth to the use of small quantities of alcohol. For a time previous to the period of the experiments he abstained from all use of alcohol, and during that period he used only what was needed for the experiment. The subject of the other three experiments was a native American who had always been a total abstainer. The results of all these later experiments are practically the same as those described in Bulletin No. 69. No difference has been found with different forms of alcohol or with different subjects.

In unauthorized statements regarding these experiments, which have been widely disseminated, much more has been claimed for them than they legitimately cover. The fact is that these are purely scientific experiments of limited scope, in which small quantities of alcohol were consumed for brief periods of time. They do not show the effects of habitual or excessive use of alcohol as a beverage. Their purpose and nature are such that they give no evidence regarding its pathological or toxic action.

They simply show that the limited quantity of alcohol that was given with other food material in the diet of healthy men for periods of a few days was almost completely burned in the body and yielded a certain amount of energy, and that this energy was actually utilized by the body, as is the energy which the body obtains from sugar, starch, fat and other ingredients of food. The clear evidence of this fact presented by these experiments is an important contribution to our knowledge concerning the nutritive action of alcohol.

These experiments mark only a single step toward the settlement of the broad questions involved in the use of alcoholic beverages. It is believed that the facts presented by them are reliable. But it should be remembered that the physiological action of alcohol involves much beside its nutritive effect. Its influence upon the circulatory and nervous functions is especially important. These matters are not treated in Professor Atwater's experiments.

SCIENTIFIC NOTES AND NEWS.

DR. SAMUEL W. STRATTON, associate professor of physics in the University of Chicago, has been appointed director of the Bureau of Weights and Measures, United States Coast and Geodetic Survey.

THE Rumford Committee of the American Academy of Arts and Sciences has appropriated the sum of \$500, to Professor E. B. Frost of the Yerkes Observatory, to assist in the construction of a spectrograph especially designed for the measurement of stellar velocities in the line of sight.

PROFESSOR H. A. ROWLAND of the John's Hopkins University has been elected a foreign member of the Royal Society of Lombardy.

AT the November meeting of the American Academy of Arts and Sciences, Mr. Rudyard Kipling was elected a foreign honorary member in Class III., Section 4; and Sir Benjamin Baker of London, a foreign honorary member in Class I., Section 4; the latter in the place of the late Sir Henry Bessemer.

OWING to the press of his official duties as the Hydrographer of the United States Geological Survey, Mr. F. H. Newell has been obliged to

resign the Secretaryship of the National Geographic Society (Washington, D. C.), an office which he has ably and zealously filled for the last two years. As a successor to Mr. Newell the Society has been fortunate in securing the acceptance of the office by Mr. Joseph Stanley-Browne, well known as the editor of the publications and proceedings of the Geological Society of America.

THE National Academy of Sciences is holding its annual autumn meeting at Columbia University as we go to press.

THE American Society of Naturalists will meet at Yale University, New Haven, on Wednesday, December 28th. The discussion in the afternoon will be on 'The Position that Universities should take in Regard to Investigation.'

PRELIMINARY announcements have also been prepared in regard to the meetings at New Haven of the American Psychological Association and of the Anthropological Section of the American Association for the Advancement of Science. The meetings will be on Wednesday, Thursday and Friday, December 27th, 28th and 29th. In the case of the Psychological Association the address of the president, Professor Dewey, will be given on the afternoon of Wednesday, followed by an informal discussion, while on Thursday morning there will be simultaneous sectional meetings for technical papers.

THE New York Zoological Park was formally opened to the public on the 8th inst. An address of welcome was made by Professor Henry F. Osborn, Chairman of the Executive Committee of the Zoological Society, which was responded to by Mr. Bird S. Coler, Controller of the City, and Mr. August Moebius, Park Commissioner of the Borough of the Bronx. Mr. Levi P. Morton, President of the Zoological Society, then formally declared the Park open. Twenty-five buildings and other installations for animals have been completed, and these now contain 850 animals.

M. BÉNARD, the French architect whose plans for the University of California are described in the present issue of SCIENCE, will leave Paris this month for Berkeley.