

finds that the star C. DM. —30 deg. 16169 is a variable of the Algol type.

From an examination of 324 photographs it appears that the star had nearly its full brightness, magnitude 8.58, on 298 plates. On twenty-six photographs the star was distinctly below its maximum magnitude.

#### SUMMER MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

BY WILLIAM H. HALE, PH.D.

No more entrancing spot for a meeting of the American Association for the Advancement of Science than the campus of Cornell University, Ithaca, N. Y., was ever visited by that association in all the years of its history; and this return to summer meetings, which have for several years been discontinued, was rendered memorable by the dedication of the largest and best-equipped physical laboratory in America.

The meeting, which began on June 29 and continued till July 3, was a special summer one for the reading of papers only and for field meetings, for which meetings the environment of Ithaca presents many attractions to botanists and geologists. Dr. William H. Welch presided, but the presidential and the several vice-presidential addresses will be deferred till the meeting at New York next December.

Rockefeller Hall of Physics was dedicated on Friday afternoon. President J. G. Schurman, of Cornell, made the opening address. Prof. E. L. Nichols, head of the department of physics, gave some account of that department and of the new hall, which cost \$285,000, has some 20,000 meters of floor space and 478 rooms, and will accommodate the 2,000 students who are expected during the coming year—a striking contrast to the conditions existing at the time of constructing the old hall less than a quarter of a century ago, when the lecture room, accommodating eighty, was supposed to be larger than would ever be required.

Prof. William A. Anthony, former head of the department, was unable to attend, and his address on "The Beginnings of Physics at Cornell" was read by Prof. Ernest Merritt. Dr. Elihu Thomson spoke of "Physics and the Industrial Arts," and President Welch of the "Relation of Physics to Medicine."

A large number of papers were read in the section of physics. Prof. Wallace C. Sabine spoke of neglected factors in determination of musical quality. When a complex tone is sounded, the fundamental tones do not die away so soon as the overtones, and it is found that the material of which the walls of an auditorium is constructed has a material effect in deadening the overtones, and thus changing the quality of the music or of the voice. Hence it seems that more attention should be paid to the material with which the walls are covered. Prof. Henry S. Carhart and some associates report that silver perchlorate gives better results as an electrolyte in the silver voltameter than the silver nitrate now universally used.

Profs. E. L. Nichols and Ernest Merritt reported results of experiments on the phosphorescence of sidot blende. Light deadens phosphorescence, but not all wave lengths have equal effect. The greatest effect is produced by the infra-red waves, about 1½ millimeters; which, however, while they kill the green phosphorescence, very curiously stimulate the violet, which is conspicuous in sidot blende.

In the Mechanical Section, the paper of Prof. William H. Burr on the Panama Canal was read by title only in his absence, but he still insists on his position that the canal ought to be a sea-level and not a lock canal, not only because it is in an earthquake zone, and liable to derangement, but also because experience with all other important canals shows that they must be enlarged, and this cannot be done with a lock canal without putting it out of business for a long time. Dr. Mansfield Merriman reported on constant and probable errors in the estimation of linear distances and vertical angles determined by 1,712 observations on 128 students at the Lehigh University. He found that in estimating length, width, and thickness of boards, 60 per cent of the estimates were too large, and in estimating angles by degrees 80 per cent were too large, while the estimate of angles by ratio showed 60 per cent of estimates to be too large. The higher classmen made better estimates than the freshmen. Dr. H. T. Eddy gave technical data of interest in a novel line of investigation, the flexure of a heavy horizontal disk on a vertical axis increasing in thickness toward the axis, as used in the Curtis steam turbine.

The American Chemical Society, in joint session with Section C of the association, had a great array of papers covering a wide range of interesting topics. Special interest was shown in the paper of Dr. Eugene Haanel, superintendent of mines for the Dominion government of Canada, on smelting of ore by electricity in the manufacture of steel as now introduced at the Sault Ste. Marie mines, which process promises to revolutionize the steel industry.

The feature of the meeting of chemists was the reports of researches carried on during the past year at

leading American universities, which included Toronto, Pennsylvania, Johns Hopkins, Cornell, Yale, Chicago, Columbia, Purdue, Ohio, Illinois, Minnesota, and North Carolina universities, Lafayette College, College of the City of New York, and Massachusetts Institute of Technology.

Dr. L. O. Howard, government entomologist, told the Section of Zoology about the great work now in progress by the government under his supervision, of introducing parasites to prey upon the brown-tail moth and the gypsy moth, which has been carried out on a far larger scale than was ever before attempted. Appropriations having been made both by the State of Massachusetts and by the general government, Dr. Howard visited Europe in June, 1905, and arranged with experts in Italy, Austria-Hungary, South Germany, Switzerland, and France, to send to Boston full-grown larvæ and pupæ of the gypsy moth. The many specimens received were cared for at Malden, Mass., and many different species of parasites issued; the most promising being the tachina fly.

Dr. Howard again visited Europe last April, and secured shipments from many localities, importing into Massachusetts 185,000 nests from forty different localities, ranging from Rennes on the northwest to Buda-Pesth on the southeast. From these nests were bred thousands of parasites of different groups; these have been colonized in the open and in outdoor cages, and placed over good-sized trees thoroughly infested with moth larvæ. It was realized that the introduction of additional pests of the same species could do no possible harm in localities already so thoroughly infested, whereas by such wholesale introduction vastly greater numbers of the parasites would be secured, thus promising earlier relief than by the method of introducing only the parasites themselves.

The Economic Section has maintained the high standard reached at previous meetings, both in the number and interest of the papers presented in the first two days of the meeting, which included a paper on the "Economic Advisability of a National Department of Health," by Prof. I. Pease Norton, in which he strongly urged the project with a cabinet officer, Secretary of Public Health, at the head of the department. The paper was discussed by several eminent sanitarians.

Prof. James W. Crook read a paper on the "Limitation of Great Fortunes." The morning of June 30 was given up to a discussion of Conditions and Problems of Agriculture in the United States, Socially and Economically Considered, led by Prof. Liberty H. Bailey; Rural Conditions and Problems in Europe, by Prof. G. W. Lanman; Causes and Consequences of the Past Ten Years of Agricultural Prosperity in the United States, by George K. Holmes; Economic Geography, by I. Russell Smith, and Investigation of Mathematics and Formal Discipline by Prof. G. V. Collins.

Prof. Carhart gave an evening lecture on the meeting of the British Association for the Advancement of Science in South Africa last summer, which he attended as an invited guest. His story of this new region so rapidly opening up to civilization, illustrated by photographs taken by him on that memorable journey, proved most fascinating to the large audience gathered in Sibley College.

The attendance of members at this meeting was less than usual, hardly over 200 having registered. Sections A, H, and I did not meet, but the proceedings of the other sections were none the less valuable.

#### THE SENSE OF COLOR IN ANIMALS.

The hypothesis that the sense of colors is possessed to a high degree by animals, and especially by birds, furnished a basis for some of the most beautiful and fecund of the Darwinian theories of sexual selection. No Darwinist doubts that the brilliant colors of the male birds of some species are destined to attract the attention of the female birds, and this presupposes naturally on the part of these birds a fine sense of color. Wallace has asserted that to the fact that certain plants bear fruit of brilliant colors is due their preservation; the animals, attracted by these colors, break the fruits from the trees or plants, carry them off, and thus indirectly assist in the dissemination of the seeds which they contain over large tracts of land. And this function of selection on the part of animals presupposes in them a certain sense of color. Still, scientific documents in support of these hypotheses are rare. Dahl, alluding to the scarcity of them in an article in a recent number of the *Naturwissenschaftliche Wochenschrift*, relates some interesting experiments which he made with a monkey. He colored some sweets with a certain colored dye, and some bitter substances with that of another color, and declares that after a few attempts, the monkey learned to leave without even tasting those articles of food colored with the dye which indicated bitter-tasting substances, and seized at once upon those which indicated sweets. Varying the experiments sufficiently he found that the monkey distinguished all the different colors readily, save only dark blue. Dahl calls attention to the fact that Mayer has stated that many

savage tribes cannot distinguish dark blue from black, and that even children do not distinguish this color until later than all others.

#### SCIENCE NOTES.

A deep sink-hole near Orlando, Fla., has recently become of considerable geological interest. Through its subterranean outlet it had carried away the overflow water of more than a dozen neighboring lakes, and may have done this for a thousand years; but about two years ago this passage became stopped, and the water, thereby shut off from this means of escape, filled the sink-basin to overflowing and formed a lake which eventually covered nearly 250 acres of the surrounding lower-land, driving many colored people from their homes and covering gardens and cultivated fields. It is not known how the subterranean passage became stopped, but it may have been from a cave-in of the walls, or from water hyacinths which filled the sink basin. Many attempts were made to open the passage, and relieve the rising water situation by dragging the sink bottom, exploding dynamite among the debris collected there, and in other ways, but although much time and money were spent in this work, the opening remained stopped apparently as tightly as ever. A short time ago the idea was conceived of trying to find a new passage, or make a new opening into the old one, by drilling a well near the sink. A two-inch hole was first made and a passage was found, the hole carrying down the water easily and rapidly. Then an eight-inch hole was drilled, and now these holes are carrying away the water so freely that the big sink lake which has been so unmanageable a thing and the cause of much alarm in its ever-enlarging area for a long time is rapidly being drained, and the big sink environment will soon be in its normal condition.

An important scheme has been decided upon for the study of tropical diseases, by the Indian government. At the present time there are scattered over various parts of the country five centers, where the process of research is carried out upon a small scale. These institutions are the outcome of private enterprise, and work independently. Owing to their limited resources, the work they accomplish, while valuable, is necessarily somewhat small in scope. The Indian government has now arranged to consolidate these various institutions, to enlarge their field of operations, to found additional laboratories in other parts of the country where investigation on the spot is urgently required, and to control their operations from one central institution. The latter is to be located at Kasauli, a small hill station in close proximity to Simla, from which point it can be easily reached and the institute supervised by the central medical and sanitary authorities of the Indian government. The situation is well adapted for the work, the temperature being moderate, while scattered among the surrounding hills are numerous sanatoria, each of which possesses a large hospital. There is a Pasteur institute already in operation, but this will be merged with the new building, and the present administrator of the Pasteur institute, who has carried out much important and valuable work, will be the first director. The new laboratory will carry out original researches, and prepare and investigate curative sera for tropical diseases indigenous to this country and other similar climes, and the training of scientific workers. The existing scattered institutes will continue their present operations, original research in particular being stimulated. This new arrangement will prove of great value for all investigators of different countries of tropical diseases, since they will be encouraged to avail themselves of the institutions in India for carrying out on-the-spot investigations.

When we remark that in the manufacture of cocaine it is the percentage value of the alkaloid which determines the value of the raw material, we can see the necessity for the planter of finding a method of drying by which he will lose the least amount. In two series of experiments made by M. de Jong, of France, upon two products having different origins, he obtained the percentages of 1.49 to 2.77, or, in mean, 1.52 to 2.75 and 2.05 to 2.91. The fresh leaf furnishes the greatest amount of alkaloid, or from 2.72 to 2.91 per cent. When dried over lime, the leaf loses cocaine, and the value falls to 2.55 per cent. Drying in the sun is found to give values from 2.38 to 2.50 per cent, while drying at a heat of 40 deg. C. gives 2.28 per cent. A heat of 60 to 75 deg. affords 2.16 per cent of cocaine. By drying in the shade for four days and then for over an hour in the sun, we find from 2.05 to 2.18 per cent. The method of drying in the sun after immersion in boiling water gives 1.50 per cent. From this we find that it is not an advantage to dry the leaf over quicklime in practice. If sun-drying is to be advised, we must remark that the leaves should not be allowed to become overheated. It is not a good plan to let the leaves dry up naturally in the shade, but they should be dried as quickly as possible. By the use of hot water we dissolve out some of the alkaloid. The best yield of cocaine is afforded from the fresh leaf.