that facts must be cited before many of the stock examples of 'useful adaptations' can be cast out. And from this standpoint a number of Morgan's examples of non-useful adaptation fail to convince. Thus, why may not the different colors in the mouths of the male and female hornbills be useful in sexual selection? Morgan assures us that these differences in the colors are useless since they can not be seen, but on the other hand, from what we know of the habits of huge-billed birds, it is quite possible that during nuptial antics the bills are widely open. Again, Morgan admits that the green color of a frog is probably useful, but believes useless the black pigment lining the body cavity. He does not show that it *is* useless, in spite of our lingering suspicion that a black screen behind a thin body wall might well be useful in collecting warmth, or even in protecting from light delicate viscera. So, also, we are not convinced that gray hair and retreating chin are altogether useless organs, for it is quite possible that there is some foundation for the popular belief that they are adverse to sexual sentiment, and may thus, after all, play a useful part in selection.

BASHFORD DEAN.

SCIENTIFIC JOURNALS AND ARTICLES.

The Journal of Physical Chemistry, November. 'History of the Water Problem' (Mrs. Fulhame's theory of catalysis), by J. W. Mellor. A sketch of Mrs. Fulhame's 'Essay on Combustion,' published in 1794, in which appears the first clear statement of the influence of water on chemical transformations. 'An Apparatus for the Electrolytic Determination of Metals, Using a Rotating Cathode,' by E. S. Shepherd. By this means the copper in chalcopyrite was determined electrolytically in from twenty-five to forty minutes. 'Solubility of Calcium Sulfate in Aqueous Solutions of Sulfuric Acid,' by F. K. Cameron and J. F. Breazeale; 'The Solubility of Magnesium Carbonate in Aqueous Solutions of Certain Electrolytes,' by F. K. Cameron and A. Seidell. *December.* 'Action of Sodium and Potassium Amalgams on Various Aqueous Solutions,' by Gustave Fernekes; 'The Rate of Formation of Iodates in Alkaline Solutions of Iodin,' by E. L. C. Forster; 'Iron Salts in Voltameter Solutions,' by J. M. Bell.

SOCIETIES AND ACADEMIES.

THE WASHINGTON ACADEMY OF SCIENCES.

THE annual meeting of the Washington Academy of Sciences was held on Wednesday evening at the Cosmos Club and the following officers were elected for the ensuing year:

President—Charles D. Walcott.

Vice-Presidents—From the Anthropological Society, D. S. Lamb; Archeological Society, J. W. Foster; Biological Society, B. W. Evermann; Botanical Society, F. V. Coville; Chemical Society, F. W. Clarke; Entomological Society, W. H. Ashmead; Geographic Society, A. Graham Bell; Geological Society, G. K. Gilbert; Historical Society, W J McGee; Medical Society, C. W. Richardson; Philosophical Society, C. F. Marvin.

Secretary—Frank Baker.

Treasurer—Bernard R. Green.

Managers: 1905—L. O. Howard, O. H. Tittmann, Carroll D. Wright; 1906—C. W. Hayes, G. W. Littlehales, C. Hart Merriam; 1907—Geo. M. Kober, Gifford Pinchot, F. A. Lucas.

PHILOSOPHICAL SOCIETY OF WASHINGTON.

AT the 33d annual meeting, December 19, 1903, Professor C. F. Marvin, of the Weather Bureau, was elected president; Messrs. Abbe, Hagen, Littlehales and Day, vice-presidents; Mr. B. R. Green, treasurer; Messrs. Hayford and Wead, secretaries, and Messrs. De Caindry, Paul, Winston, Bauer, Briggs, Fischer, Harris, Rosa and Abbot as members of the general committee; on this committee are also *ex officio* Past Presidents Dall, Walcott, Rathbun and Gore.

The secretaries' and treasurer's reports showed the society to be in a prosperous condition.

THE 577th regular meeting was held January 2, 1904, President Marvin in the chair.

Mr. F. G. Nutting presented by invitation a paper on 'The Electron Theory of the Radiation of Gases,' pointing out how this theory explains various peculiarities in the spectra of gases.

Mr. C. G. Abbot then described work of the past two years at the Smithsonian Astrophys-

ical Observatory, consisting in measures of the transparency of the air, the rate of receipt of solar energy at the earth's surface, and computations therefrom of the 'solar constant' of radiation and of the probable temperature of the sun.

The transparency of the air, measured at many different wave-lengths by the aid of the spectro-bolometer, had appeared to vary greatly, so that the means for the first eight months of 1903 fell below the means for 1901–2 by amounts ranging from five per cent. in the infra-red, to twenty per cent. in the blue. During the latter four months of 1903 the transparency had again risen, and approached within two or three per cent. of its values for the year before.

Results were given of some twenty separate determinations of the solar constant, but these depended directly on the constants and theory of the mercury pyrheliometer, so that they may later be subject to amendment. In response to questions Mr. Abbot described a new form of pyrheliometer capable of exact checks on its results, and now being tried with most promising results at the Astrophysical Observatory.

A curve was shown giving the mean of five days' determinations of the distribution of solar radiation outside the atmosphere. From this the position of maximum radiation appeared at a wave-length of 0.49μ, corresponding, according to Wien's law, to a solar temperature of from 5800° to 5900°.

Dr. Day remarked that the mean value of the solar constant, as given by Mr. Abbot—2.167 calories per cm.^{2} per minute—would yield by Stefan's law a solar temperature of 5700° to 5800°.

Charles K. Wead,
Secretary.

NEW YORK ACADEMY OF SCIENCES.
SECTION OF ASTRONOMY, PHYSICS AND CHEMISTRY.

The regular meeting of the section was held on January 4 at the American Museum of Natural History. The officers of the section for the year 1904, who were elected at the last regular meeting of the section, are:

Chairman—Professor Charles Lane Poor.
Secretary—Mr. Charles C. Trowbridge.

The first paper of the evening was read by Professor Herschel C. Parker and was entitled 'Altitude Observations with the Hypsometer in the Canadian Rockies.'

A brief outline of the various methods used in altitude determinations was first presented, showing that all are based on two general methods, triangulation or measurement of atmospheric pressure. In the latter method the determinations are made either by means of the several forms of barometer or by the hypsometer. The difficulties attending the use of all of the different forms of barometer were pointed out and the advantages of portability and accuracy of the hypsometer shown. Examples were then given illustrating the extremely satisfactory results obtained with the hypsometer during mountaineering expeditions in the Canadian Rockies last summer.

Professor Parker has had many years' experience in mountain work, making numerous 'first ascents' in British Columbia and Alberta, and he gave as his conclusion that the hypsometer is by far the most convenient and accurate instrument for the determination of altitudes under ordinary mountaineering conditions.

The second paper was read by Dr. George F. Kunz and Professor Charles Baskerville on 'Phosphorescence in Diamonds Produced by Pitchblende.' They stated that a naturally fractured piece of pitchblende (uraninite), weighing 800 grams, from Pribram, Bohemia, caused the 14$\frac{11}{32}$ carat diamond (tiffanyite) * to phosphoresce when laid upon it, or even when a piece of window glass or a board three fourths of an inch thick was interposed. The diamond glowed, although more than one inch of space intervened between it and the pitchblende. We have in this instance a substance with a radio-activity of only 2 or 2$\frac{1}{2}$ affecting a radio-actively responsive substance, proving that there exists a body of the latter character in this case that responds almost to the unit one of radio-activity. The same specimen of pitchblende did not affect a platinum-barium cyanide screen. Another specimen of pitchblende from Pribram, and others from

* Science, December 18, 1903.

Johanngeorgenstadt, Saxony, and Central City, Colorado, caused the diamond to phosphoresce. It was further shown that if either kunzite (a variety of spodumene), pectolite or wollastonite, pulverized, were mixed with radium-barium carbonate, of 240 activity, the mixed powder became permanently luminous. When these mixtures were put in a Bologna flask and held on a metal plate, hot but not showing any color, they immediately became very luminous and remained so for a long time. Kunzite, pectolite and wollastonite became phosphorescent by heating alone, the kunzite showing an orange glow. When a kunzite crystal 5 cm. square and 5 cm. thick was exposed to the passage of an oscillating current, the entire crystal glowed an orange pink, losing its lilac color, a well-defined line through the center in the path of the current being much more brilliant; this phosphorescence lasted for quite a time after exposure. Further experiments were made with the same sensitive diamond mentioned above as to its tribo-luminescence. Prints were obtained from negatives made by laying the diamond face downward directly upon the photographic plate, and rubbing the back of the diamond with a stick coated with wool, in one instance for a quarter of a minute, in another for one half minute, the tribo-luminescence induced causing the printing. The same type of diamond from British Guiana, when heated on a metal plate below redness, phosphoresced distinctly, as also did pectolite and wollastonite. We have here, therefore, luminescence of the tiffanyite body in diamond, produced by radio-active pitchblende, by friction and by heat.

The next paper on the program was the first of a series of papers on 'Recent Progress in Physical Science,' and was delivered by Dr. Bergen Davis, who spoke on 'The Latest Theories Relating to the Discharge of Electricity in High Vacua, and Ionization of Gases.' Account was given of Dr. H. A. Wilson's investigation of the distribution of electrical intensity along the striated positive column, and his theory for the electrical intensity in a uniform positive column. An outline was also given of Professor J. J. Thompson's theory of the discharge through Geissler tubes. Dr. Davis also reviewed Professor J. S. Townsend's theory of the sparking potential, Professor Townsend having showed that the ionization is due to impact of both positive and negative ions with the neutral molecule. The theoretical sparking potential thus deduced agrees very closely with the experimental value.

CHARLES C. TROWBRIDGE,
Secretary.

THE AMERICAN CHEMICAL SOCIETY.
NEW YORK SECTION.

AT the meeting held on January 8 at the Chemists' Club, 108 West 55th Street, the program was as follows:

The Dietetic Value of Patent Foods: W. D. HALLIBURTON.

Professor Halliburton, who was present as the guest of the section, spoke especially of the conditions influencing the digestibility of various foods and dietetic preparations, the relative importance of nitrogenous and non-nitrogenous nutrients, the disadvantages of separating a single nutrient from the other constituents of the food in which it occurs, and the question of the nutritive values of meat extracts and proteolytic products. It was pointed out that while the meat extracts are practically devoid of food value, the preparations which consist of proteolytic products, such as proteoses and peptones, have practically the same nutritive effect, 'nitrogen for nitrogen,' as the original proteids, being synthesized to proteids in the body, probably in the epithelial cells. In conclusion Professor Halliburton urged the cooperation of chemists with physiologists and physicians in the education of the public, and the prevention of fraud in the matter of artificially prepared and 'patent' foods.

Notes on the Preparation of Standard Alkalimetric Solutions: F. D. DODGE.

Dr. Dodge reviewed the principal methods employed and discussed especially the merits of various acid and alkaline substances which have been suggested as standards for use in the direct methods of standardizing. For this purpose he proposes the use of salicylic acid

for titration in alcoholic solutions, and of the acid phthalates where aqueous solutions are to be used. In the discussion following the reading of this paper, Professor Coblentz spoke highly of tartaric acid and acid potassium tartrate as standards for titration in aqueous solutions.

On the Structure of Metals and Alloys; Aluminium Alloys: William Campbell.

Dr. Campbell, after describing the microstructure of the whole series of alloys of copper and aluminium, and the change in structure due to casting, dwelt at some length on the change which takes place in the solid state in alloys containing over 84 per cent. copper. It appears that the alloys solidify as solid solutions, and at a lower temperature rearrange themselves in a manner similar to that of the alloys of copper and tin between 68 and 75 per cent. copper, or of the carbon-iron alloys containing up to 1.8 per cent. carbon. Photographs of the alloys which had cooled slowly were contrasted with those of alloys which had been quenched from above the critical temperatures. On annealing the quenched specimens, the original structure was restored. The paper was illustrated by lantern slides.

The Determination of Molybdenum in Steel: F. V. D. Cruser.

Mr. Cruser described the analytical separation of molybdenum from iron and the rarer metals now added in making steel, such as chromium, tungsten, uranium and vanadium, and the various methods used for the determination of molybdenum. In the course of the work it was found that the separation of iron from molybdenum by caustic alkali was inaccurate, due to the formation of small but variable quantities of ferric molybdate which was soluble in alkali. A method was worked out which is believed to be entirely accurate; it is in brief as follows: Dissolve the steel in nitrosulphuric acid; separate the molybdenum as MoS_3 by hydrogen sulphide under pressure; dissolve the sulphide and convert to sulphate; reduce the molybdenum by zinc and reoxidize by a standard solution of permanganate. If tungsten is present the addition of three to four grams of tartaric acid prevents its contaminating the molybdenum sulphide. This method was tested on a number of steels and molybdenum alloys, and none of the metals present was found to interfere, while by the methods recently published the results were unreliable in many cases, especially when tungsten or vanadium was present.

On the Determination of Nitrogen in Food Materials and Physiological Products: H. C. Sherman. Read by title.

H. C. Sherman,
Secretary.

DISCUSSION AND CORRESPONDENCE.

CONVOCATION WEEK.

The multiplication of scientific and learned societies is the normal outcome of the enormous expansion in the fields of learning during the past few decades. The farther one pursues a single branch, say of science, the more he becomes separated from those following other branches of science. The scientific society represents, like all other societies, the grouping of those of similar tastes for mutual profit and entertainment. As soon as a society covers a field so large that many of the matters brought before it are uninteresting or unprofitable to any considerable number, the society breaks up, either into new societies or into sections, each with its own gatherings. This fact was recognized early in the history of the American Association.

But specialization can be carried too far. I do not mean merely that the man, mining so industriously at the bottom of his own shaft, is of little account to the rest of the world, indeed, often forgets that there is any world outside of his own hole. He himself may recognize that this is true and not care a whit, so that he discovers the truth for which he is searching. What is of far more importance is that in losing his sense of perspective he greatly hampers his own work. He needs to know what others are doing that he may gain a better conception of what he himself is doing.

We need the meetings of the special societies, and we need also the meetings of a general society, where men come in contact with