in the cell-cytoplasm and karyoplasm rather than in the glycogen as a substance by itself. It seems to the writer that the physiologist must demand very conclusive evidence before he can accept the view that "glycogen plays the part of a carrier to the tissues; that it contributes somewhat to the building up without losing its own molecular identity; that it is present at the formation of tissues and employed therein without becoming part of them."

In conclusion, it must be stated that the volume contains a record of most careful observations and that it is replete with interesting and important facts bearing upon the distribution of glycogen in embryonic tissues. Further, due weight must be given to Dr. Creighton's conclusions, although, as already stated, it appears to the writer that physiologists will have some difficulty in accepting them in their entirety.

R. H. CHITTENDEN.

YALE UNIVERSITY.

Analytic keys to the genera and species of North American Mosses. By C. R. BARNES. Revised and extended by F. D. HEALD, with the cooperation of the author. Bull. Univ. Wis. Sci. ser. I., 5, pp. 157–368, 1897.

This bulletin is the 3d edition of analytical keys of mosses published by the author. The first edition, published in 1886, included only the genera recognized in Lesquereux and James' Manual. To this was added in 1890 keys to the species, including descriptions of those published since the issue of the Manual. During the past decade there has been great activity in the study of North American mosses, which is shown in the description of 603 species and varieties since the publication of the Manual and up to January 1, 1896. The present bulletin includes besides the analytical keys descriptive of these 603 species and varieties as an appendix.

As a basis for the nomenclature used in the work the author has followed Renauld and Cardot's *Musci Americæ Septentrionalis*, preferring to do this rather than make new combinations which would necessitate the citation of the 'Analytical Keys' in future taxonomic work. The former keys have been very useful to bryologists in this country, and students of the mosses have been further placed in debt to the author by this comprehensive revision of the work.

GEO. F. ATKINSON.

CORNELL UNIVERSITY.

SCIENTIFIC JOURNALS.

JOURNAL OF GEOLOGY, FEBRUARY–MARCH, 1897.

Professor Geikie's Classification of the North European Glacial Deposits: By K. KEILHACK. The classification proposed in this *Journal* by Professor James Geikie, in which six glacial epochs separated by five interglacial epochs are recognized, is criticised. In its place is offered an unofficial announcement of the results of the detailed mapping carried on by the Royal Prussian Geological Survey.

The Average Specific Gravity of Meteorites: By O. C. FARRINGTON. Account is taken of both the weight and the specific gravity of 142 specimens which give an average of 3.69.

Drift Phenomena in the Vicinity of Devil's Lake and Baraboo, Wisconsin: By R. D. SALISBURY and W. W. ATWOOD. The region studied is on the eastern edge of the Driftless Area where the Wisconsin ice pushed out over certain high quartzite ridges. The rough topography (900–1600 A. D.) lead to certain exceptional phenomena in connection with the drift border. The ice mounted the high ridges but halted on the summits in a most peculiar manner. The edge of the ice is marked by a moraine of the character known as 'Endmoräne' by the Germans. Where it crossed the 'Devil's Nose' the slope of the upper surface of the edge of the ice was measured and found to be about 320 feet per mile. This measurement has the exceptional interest of being the first recorded measurement at the extreme margin of the ice. Skillett creek was diverted by the filling up of its lower course by the overwash; the Baraboo was dammed and a temporary lake was formed, and on the east quartzite bluff a smaller lake was formed which finally became extinct by the complete filling up of its basin.

Comparison of the Carboniferous and Permian Formation of Nebraska and Kansas, II.: By CHARLES S. PROSSER. A continuation of the author's paper in the preceding number of the *Journal*. The Nebraska City section is quite

fully discussed and the exposures of Cass county are treated in detail.

The Geology of the San Francisco Peninsula: By Andrew C. Lawson. A retort to the criticism appearing in the preceding number of the *Journal*, of the author's paper, by H. W. Fairbanks.

Note on the Geology of Southwestern New England: By Wm. H. Hobbs. The structure of the apparently anticlinal ridges of Berkshire schist was studied in the ridge of schist immediately to the south of the east Twin Lake in the township of Salisbury and in the mass of Tom Ball near Housatonic village. The observations obtained have been sufficiently numerous and reliable to show that the folds are either overturned anticlines with easterly dipping axial planes or nearly recumbent *fanned* synclines with the axial planes inclined to the eastward. The ridge south of Twin Lakes was followed southward into Watewanchu Mountain, where the limestone can be seen to pass under the schist on the end of the fold. This latter locality is, therefore, a crucial one and shows that the apparent anticlines of schist are nearly recumbent synclinal folds with the necks compressed so as to produce a fan structure.

Studies for Students. Deformation of Rocks V. Supplementary Notes: By C. R. Van Hise. Notes supplementary to the author's recent papers with reference especially to the following topics are given: Separation of the outer crust of the earth into zones; Plastic flow produces folding; Complex folds; Monoclinal anticlines and synclines; Position of cleavage in anticlines and synclines; Relations of cleavage produced by shearing and shortening; Relations of cleavage and fissility to faults; Relations of joints to bedding; and Relations of joints to folds.

H. F. B.

AMERICAN CHEMICAL JOURNAL, MARCH.

On the Decomposition of Diazo Compounds: By John J. Griffin. The author has studied the reaction of ethyl and methyl alcohols with paradiazometatoluenesulphonic acid in the presence of various substances, as sodium methylate, sodium carbonate, sodium hydroxide, zinc dust, calcium carbonate, sodium ethylate and ammonia. When diazo compounds are decomposed by alcohols, one of the products formed contains either hydrogen or an alkoxy group in place of the diazo group. The influence of temperature and pressure on this reaction has been studied with a number of diazo compounds, and the present research was a continuation in this line. When the substance under investigation was decomposed in alcohol in the presence of an excess of some alkali and zinc dust, only the hydrogen reaction took place; that is, the diazo group was in all cases replaced by hydrogen, the nature of the alcohol in these cases having little, if any, influence on the reaction. When the decomposition took place in alcohol saturated with ammonia, the ammonium salt of paratoluidinemetasulphonic acid was formed. The product in each case was converted into the amide and separated by crystallization. The properties of this amide were studied, and some of it was oxidized to metasulphaminebenzoic acid, and its properties and those of its salts were also studied. The only exception noted was with calcium carbonate, which had no influence on the diazo decomposition.

The fact that pure metatoluenesulphonamide could be made in any desired quantity by these reactions suggested transforming it into the acid, to settle the contradictory statements which have been made about its properties. The pure acid and a number of its salts were prepared, and the results indicated that the substances hitherto obtained had not been pure.

On the Colored Compounds Obtained from Sodic Ethylate and Certain Aromatic Nitro Compounds: By C. Loring Jackson and M. H. Ittner. A number of investigators have observed and studied the strikingly colored substances formed by the action of alkaline solutions on certain aromatic nitro compounds. Some of these colored substances have been isolated and analyzed and some light has been thrown on the conditions governing their formation. The authors have prepared and studied the action of about fifteen complex nitro compounds. The duration of the color varied from a few seconds to hours, related substances behaving in general alike. The explanation advanced by Victor Meyer, that these compounds are salts formed

by the replacement of an atom of hydrogen of the benzol ring by the metal, is not applicable here, as he considered the hydrogen replaced to be the one between the the nitro groups. In the compounds here studied this position is occupied by other groups, but it is perhaps the hydrogen between the nitro and carboxyl groups which is replaced. The evidence, however, is not conclusive, as there are facts which support this theory and others which are against it. One of these colored compounds was isolated and studied and some derivatives prepared.

On the Action of Chlorcarbonic Ethyl Ester on Formanilide: By H. L. WHEELER and H. F. METCALF. The authors have given in a recent number of this *Journal* the method of preparation of formylphenylurethane. According to some authors this breaks up, giving an amidine and other products. The authors show that the oil obtained by Freer and Sherman in this reaction was not, as they stated, ethylisoformanilide, but a mixture of several compounds. They also succeeded in isolating a number of other final reaction products. The structure of formanilide is represented in two ways, either as an anilide or as an imido compound, phenylimidoformic acid. The structure cannot be determined by the final reaction products, as the formation of all the compounds can be readily explained by either structure. According to the authors the weight of evidence from recent work favors the imido-acid structure.

Notes of Student Work from the Laboratory of Analytical Chemistry, University of Virginia: By F. P. DUNNINGTON. Analyses are given of a variety of Ilmenite; of 'Mineral Tallow' from Vermont; of Marble from Texas, Md.; of Alum Water from Lee county, Va., and of Infusorial Earth. A number of determinations were also made of the power of certain calcium and magnesium salts to absorb and retain water. No regularity in the amount lost in certain time could be detected, different salts requiring different times to be dehydrated. The formation of definite hydrates by absorption of water could not be established by a study of the amount taken up.

The Proteose of Wheat: By T. B. OSBORNE. The author calls attention to certain wrong assumptions which Mr. G. E. Teller had made in a recent article in this *Journal*, and also to a fact he had overlooked in quoting the author's work. The following books are reviewed: An Introductory Course of Quantitative Chemical Analysis, with Explanatory Notes and Stoichiometrical Problems, H. P. Talbot; A Simple Method of Water Analysis, Especially Designed for the Use of Medical Officers of Health, J. C. Thresh; The Gases of the Atmosphere, The History of their Discovery, W. Ramsay; A Manual of Quantitative Chemical Analysis for the Use of Students, F. A. Cairns. An obituary notice of Eugene Baumann is also contained in this number.

J. ELLIOTT GILPIN.

THE ASTROPHYSICAL JOURNAL, NOVEMBER, 1896.

A Further Study of the effect of Pressure on the Wave-lengths of the Lines in the Arc Spectra of Certain Elements: By W. J. HUMPHREYS. In their previous work along this line* Messrs. Mohler and Humphreys investigated the spectra of twenty-three elements. The present paper covers experiments upon some twenty-three more. With some exceptions, the results of the previous investigations were verified. In particular, the law that the shift is proportional to the pressure into the wave-length of the line considered was found to hold. In this connection it was found necessary to divide the strontium and barium lines into two groups, as had been done with calcium. The relation of the shift to the position of the element in its Mendelejeff group is also discussed.

Prominences Observed August 8, 1896: By J. FÉNYI. Observations of the prominences are given as being of possible interest in connection with the solar eclipse of the above date.

Notes on a Method of Determining the Value of the Light Ratio: By ALEXANDER W. ROBERTS. A discussion of a method of determining the light ratio for a system of magnitudes. That is if the magnitudes of a number of stars are given, with an unknown light ratio between the magnitudes, a method is suggested by which from an estimation of the magnitude of two superimposed star discs the ratio may be determined. A discussion of algol variables follows.

*Ap. J. February, 1896.

The Modern Spectroscope XX. On a New Fluid Prism Without Solid Walls and its Use in an Objective Spectroscope: By F. L. O. WADSWORTH. The writer suggests that a plane mirror slanting downward at the proper angle be introduced into the dispersing fluid, and that the level surface be made to form the face of the prism. The arrangement is similar to that in the Lettrow form of spectroscope.

Preliminary Table of Solar Spectrum Wavelengths: By HENRY A. ROWLAND. One of the regular series of tables.

Researches on the Arc Spectra of the Metals III. Cobalt and Nickel I. One of the regular series of papers by B. HASSELBERG. The measurements of the wave-length are discussed and probable impurity lines eliminated.

Minor Contributions and Notes—Recent Astrophysical Publications.

DECEMBER, 1896.

Oxygen in the Sun: By C. RUNGE and F. PASCHEN. In the oxgen vacuum tube there exists a triplet: λ 7772.26, 74.30, 75.97, which is also found in the solar spectum. As the solar spectrum is comparatively weak in lines in this region (which is on the outside edge of the red) the chance of coincidence with lines of foreign origin is less than elsewhere. It is therefore suggested by the writers that observations upon these lines be made, to determine their solar or telluric origin, whichever it may be. If the origin be solar the writers believe the existence of oxygen in the sun will be proved.*

The Algol Variable + 17°4367; *W. Delphini:* By EDWARD C. PICKERING. An ephemeris and light curve for the star.

The Determination of the Various Quantities of Aqueous Vapor in the Atmosphere by Means of the Absorption Lines of the Spectrum: By L. E. JEWELL. An investigation of the relative intensities of the water vapor lines on the red side of the D lines, in connection with meteorological readings.

* Recent observations by Mr. L. E. Jewell at Johns Hopkins University show that the triplet varies in intensity upon different days in the same manner in which the water vapor lines do, thereby indicating that it is due to that substance in the earth's atmosphere and not to oxygen either here or in the sun.

Researches on the Arc Spectra of the Metals III. Cobalt and Nickel II: By B. HASSELBERG. A continuation of the details of comparison by which impurity lines are eliminated from the spectra of these elements.

Minor Contributions and Notes. Including H. C. O. circulars No. 12, 13 and 14. No. 13 contains a description of the spectrum of Puppis. This spectrum in addition to dark hydrogen lines and the line K contains a series of dark lines that are satisfied by Balmer's formula less a constant term.*

JANUARY, 1897.

On the Spectroscopic Binary α^1 Geminorum: By A. BELOPOLSKY. Containing an account of the detection of the binary character of the principal component of castor. A general discussion of the elements is also included.

On an Automatic Arrangement for Giving Breadth to Stellar Spectra on a Photographic Plate: By WILLIAM HUGGINS. Dr. Huggins suggests in this article that an eccentric gear wheel be put in the clock mechanism so as to produce an oscillation of the telescope during exposure. This will cause the stellar image to move back and forth over the desired length of slit. The advantage claimed for this method, over the one ordinarily in use (that of changing the rate of the clock, which was also due to the writer), is the saving of time ordinarily wasted in the resetting, and in general convenience.

On the Application of Interference Methods to the Determination of the Effective Wave-length of Starlight: By GEO. C. COMSTOCK. An investigation taken up in connection with the effect of refraction upon the apparent places of stars. The author claims that for physiological reasons the effective wave-length can not be determined by matching the apparent color of the stars with the spectrum. The following device was adopted. The objective of the equatorial was covered by a diaphragm having two parallel slits cut out of it. When the telescope was pointed at a star there resulted the usual dif-

* More recent investigations by Professor Pickering, and Professor Kayser, indicate that this second series is also due to hydrogen under physical conditions different from those under which it has been previously observed.

fraction pattern, consisting of a central band with a series of fainter ones ranged symmetrically on each side. The most distant of these resembled faint stars, and were of course due to the more intense part of the stars' spectrum. The distance of one of these bands from that symmetrically situated on the other side gave the data for the determination of the wavelength. The measurements were made directly with a micrometer.

Remarks on the Articles of Mr. E. J. Wilczynski: By PAUL HARGER. Being rather a spirited attack upon the validity of some of Mr. Wilczynski's assumptions in connection with his work on Solar Rotation.

Researches on the Arc Spectra of the Metals III. Cobalt and Nickel III: By B. HASSELBERG. One of the regular series of papers dealing with the measurement of lines and the elimination of impurities.

Preliminary Table of Solar Spectrum Wavelengths: By HENRY A. ROWLAND. Minor Contributions and Notes. Reviews of Recent Astrophysical Literature. Bibliography of Recent Astrophysical Literature.

SOCIETIES AND ACADEMIES.

TORREY BOTANICAL CLUB.

AT the regular meeting of February 9th, about 200 persons present, the scientific program consisted of a lecture by Mr. Henry A. Siebrecht, entitled 'Orchids; Their Habitat, Manner of Collecting and Cultivation,' handsomely illustrated with lantern slides by Mr. Cornelius Van Brunt, colored by Mrs. Van Brunt.

Mr. Siebrecht in his paper referred to the hardships undergone by the orchid collector, and paid a tribute to the energy displayed by three friends of the speaker, Carmiole, an Italian, who had come to New York when the speaker was a boy; Föstermann, who died about two years ago, the victim, like most collectors, of disease contracted in that enterprise; and Thieme, who had made three trips for Mr. Siebrecht, and who went last to Brazil in search of the *Cattleya autumnalis*, but was never heard from.

Mr. Siebrecht referred also to three trips of his own in quest of orchids, to the West Indies, Venezuela, Brazil and Central America. He then exhibited the lantern views, which were of remarkable beauty and evoked frequent applause. They included numerous representatives of the chief tropical genera cultivated, also with views of interiors showing the Cattleya house in full blossom, etc. Slides showing numerous species native to the Eastern United States followed.

Mr. Siebrecht then described the culture of orchids and classed their diseases, as chiefly because too wet, when the 'spot' closes the stomata, or too dry, when they collect insects. He referred to their insect enemies at home, the 'Jack-Spaniard,' which eats the marrow from the bulb, and Cattleya-fly, now introduced into English houses. He mentioned the ravages of *Cladosporium* and the great difficulty with which orchids of the genus *Phalænopsis* are preserved from fungal diseases.

The subject was further discussed by the President, Dr. Britton, Mr. Samuel Henshaw and Mr. Livingston, the latter referring to his recent experience as an orchid collector. A slide was exhibited, made from a photograph taken by Mr. Livingston, showing his orchids packed upon oxen and so carried down from the mountains to Magdalena.

Mr. Henshaw spoke of his visit to Mr. Siebrecht's nursery in Trinidad, and of the growth made there by Crotons, as much in one year as here in four or five. In those gardens they divide their plants by rows and edges of Crotons, which are sheared off as we would trim a privet-hedge. Mr. Henshaw also paid a deserved tribute to Mrs. Van Brunt for the wonderful success of her coloring of the orchid slides.

EDWARD S. BURGESS,
Secretary.

SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

AT the meeting on February 22, 1897, Professor F. H. King, in a paper 'The Movements of Ground Waters,' referred first to a world-wide zone, probably extending as deeply below the surface of the earth as rock fissures exist, and which is interpenetrated with water incessantly in motion. These movements were classified as