In Chapter VI., on the analysis of gaseous mixtures, especially by combustion, no directions or precautions are given necessary for a successful result, nor is the treatment of the analysis of illuminating gas at all satisfactory.

Chapter VII., on gas analytical apparatus, describes in a general way a number of the important forms of apparatus.

Chapter VIII., on the calorific power of gases, is especially disappointing, the only methods given being that of Mahler—by the bomb, and by calculation, no mention being made of the excellent apparatus of Junkers.

In conclusion, the work, so far from being 'essentiellement pratique,' as reviewed in the *Comptes Rendus*, appears to be superficial, better adapted to give a general idea of the subject than for a laboratory manual.

Augustus H. Gill.

SCIENTIFIC JOURNALS AND ARTICLES.

The American Naturalist for January begins with a list of 'Plants used by the Indians of Eastern North America,' by Lucia B. Chamberlain. The plants are arranged in alphabetic order under the name of each of the tribes considered and the uses of the plants are noted. R. W. Shufeldt has an article 'On the Systematic Position of the Sand Grouse (*Pterocletes; Syrrhaptes*),' concluding that they belong where they are usually placed, between the Galli and Columbæ. G. H. Parker discusses 'Correlated Abnormalites in the Scutes and Bony Plates of the Carapace of the Sculptured Tortoise,' concluding that there is a more intimate relation between the plates and scutes than has been generally admitted. Roswell H. Johnson describes, with outline and skiagraph illustrations 'Three Polymelous Frogs' and C. H. Eigenmann and Ulysses O. Cox consider 'Some Cases of Saltatory Variation.' James Perrin Smith treats of 'The Larval Coil of Baculites' and deduces that Baculites probably originated from *Lytoceras*, and some 'Variation Notes' are given, taken from the *Bulletin of the Société d'Anthropologie*. The Editor announces that the 'News' department will be discontinued as the same field is covered by Science more promptly, but that the record of appointments, retirements and deaths will be continued and that there will be added notices of gifts to educational institutions, all to be published quarterly.

SOCIETIES AND ACADEMIES.

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

A regular meeting of the Section was held at 12 West 31st Street, New York, on February 4, 1901. Professor George E. Hale, director of the Yerkes Observatory, gave a lecture on 'Astronomical Photography with a Visual Telescope.' The following is an abstract:

Photography was discovered in 1837, and the first astronomical photograph was taken in 1840 by Dr. Draper of New York. It was a photograph of the moon made on a daguerreotype plate, and gave great promise of future work. Bond in 1850 made the first photograph of the stars. Rutherfurd of New York, in 1858, made some remarkable photographs of the moon, and later some star photographs.

Photography has now become so valuable in astronomy that it is applied in every department. It is not true, however, that it will displace the eye. There are certain fields where the eye will be superior to the photographic plate, but in many other fields photography has led to results that never could have been obtained by visual observation. I shall speak tonight of work done at the Yerkes Observatory with a telescope designed for visual observation. It is fortunate that this telescope was not designed for photography alone, for by the use of methods recently devised it has been possible to use it for photography and the results are not at all inferior to what they might have been on a telescope designed for photography alone.

The forty inch telescope of the Yerkes Observatory can be considered as a long camera with a focal length of about sixty-four feet. Its field of view embraces a circle in the sky of only about five minutes of arc in diameter. In photographing groups and clusters of stars this long focal length makes it possible to separate stars which would have been run together into one mass with an instrument of shorter focal length. A means of counteracting the uncor-

rected chromatic aberration has been devised by Mr. Ritchie of the Yerkes Observatory. He employs a yellow collodion film in front of the photographic plate at the eye end of the instrument, by which the blue rays are cut off. Suitable isochromatic plates, such as can be found on the market, are used. This is a very inexpensive means of using the telescope for photography. A special form of guiding apparatus to keep the star image at the same point of the plate has to be employed. On account of the unavoidable flexure of the large telescope tube, an auxiliary telescope placed parallel to the telescope tube cannot be used. The image of another star just outside the photographic plate is made use of. By means of a little eyepiece with a fine pair of cross-hairs, attached to the plate holder which is adjustable in two directions at right angles to each other, the image of the guide star is kept on the intersection of the cross-hairs during the entire time of the exposure. The photographs taken at the Yerkes Observatory in this manner by Mr. Ritchie are much finer than those taken at Potsdam with a photographic telescope.

A most important application of photography with this telescope will be the determination of the parallax of stars, which has not yet been done to any extent by photographic means.

Photographs of the small planetary nebulæ taken with this telescope show more than can be actually seen with our eyes, as in some cases a radial structure.

The instrument can also be used to study stellar spectra and stellar evolution. We can pass by gradations from the type of hot and white stars like Sirius, to the more developed and colder ones like our sun, and then to the red stars. There are two types of red stars, and by the aid of their spectra photographed with this telescope, we have detected a relationship between the two types, through the presence of carbon bands. Even in the atmosphere of the sun there is a very thin layer of carbon vapor and above this the gases of the chromosphere. In the red stars we have this carbon vapor, which is very dense in one of the types.

Another important line of work is that of measuring the motion of stars in the line of sight. Professor Frost uses the titanium line for this purpose, and has just had a new spectrograph constructed for the work.

In photographing the spectrum of Saturn with its rings, we find a faint band in the red indicating the presence of a comparatively dense absorbing atmosphere on the planet which is absent from the rings.

With the help of a spectroheliograph we are able to photograph solar phenomena. These photographs show that the mottling of the sun's surface persists throughout the minimum period of sun spots as well as through the maximum. Prominences can be photographed nearly as well with it as at times of total solar eclipse.

Mr. W. G. Levison presented a 'Note on a Cause of the Deterioration of Gelatin Photographic Dry Plates.' The author suggests that there is some emanation, probably Becquerel rays, from the pasteboard of the boxes in which the plates are packed for the market, which causes their deterioration. He found that if he cut a star from the pasteboard of a plate box and laid it on the sensitive side of a plate, the whole then being enclosed in a box for a week, when he developed the plate he obtained an image of the star. This would explain the deterioration at the edges of plates where they come nearly in contact with the box, or the deterioration due to the pasteboard separators at the edges of the plates. The author's experiments led him to the suggestion that metal boxes would be better for the plates than the pasteboard boxes. Wrapping with paraffine paper might also have the same effect.

WILLIAM S. DAY,
Secretary.

TORREY BOTANICAL CLUB.

AT the annual meeting, January 8, 1901, the Secretary, Professor E. S. Burgess, reported 15 meetings held during the year, with an average attendance of 38; 19 active members were elected. The active membership is now 238, the total membership 383; 20 papers have been presented, with addition of 26 brief notes of collections or of botanical progress.

The editor, Professor L. M. Underwood, reported a continued increase in the number of pages and of plates in the Club's publications,

including in Volume 27 of the *Bulletin*, 666 pages and 33 plates, and including Volume 9 of the *Memoirs*, with 292 pages and 9 plates. The articles printed in the *Bulletin* have numbered 63, by 48 different persons; 19 articles have contained descriptions of new species among the higher plants.

The Club voted to begin the publication of an additional monthly of about 12 pages, to include botanical notes and jottings, with reference to the local flora and to other subjects, and to bear the name *Torreya*, in honor of Dr. John Torrey, founder of the Club. Dr. M. A. Howe was made editor. The pressure of more extended technical matter upon the pages of the *Torrey Bulletin* has so far developed as to crowd out minor and more popular notes, and it was thought desirable to provide an opportunity for them by the establishment of this new journal, *Torreya*, which will be sent free to all Club members; to others at one dollar.

The officers elected for 1901 include the following: *President*, Hon. Addison Brown; *Treasurer*, Dr. H. B. Ferguson; *Recording Secretary*, Professor E. S. Burgess; *Editor*, Professor L. M. Underwood; *Associate Editors*, Dr. C. C. Curtis, Dr. M. A. Howe, Professor F. L. Lloyd, Dr. D. T. MacDougal, Dr. H. M. Richards, Miss Anna Murray Vail, Dr. N. L. Britton.

Recent papers read include Mr. J. E. Kirkwood's studies on the embryology of the Cucurbitaceae, the types selected for comparison being *Sicyos angulatus*, L., *Micrampelis lobata* (Michx.) Greene, and *Mornordica charanta*, L. These three types resemble one another in some features of their earlier development; in each case a cup-like structure is formed on the inner side of which the ovules are differentiated. In each case the normal definite embroyo-sac is a typical one. Some ovules of *Sicyos* exhibited an embryo-sac abnormally developed. Endosperm is formed soon after fertilization, and seems to have the function of digesting the tissue of the nucellus and supplying the young embryo with food material. No suspensor was found in *Sicyos*, but in *Micrampelis* and *Mornordica* it is usually formed with two or three cells.

Edward S. Burgess,
Secretary.

DISCUSSION AND CORRESPONDENCE.

THE SUPPOSED TERTIARY SEA OF SOUTHERN BRAZIL.

In an article entitled 'The History of the Neotropical Region,' published in No. 310 (Dec. 7, 1900) of Science, Dr. H. von Ihering, in order to account for certain zoogeographical facts reported by him, proposes the somewhat startling hypothesis of a tertiary sea separating two faunal sub-regions that he denominates 'Archiplata' and 'Archamazonia,' and gives the purely zoological evidence as sufficient, in his opinion, to positively establish the existence of this important geological feature. As the boundaries of these faunal sub-regions are not clearly defined the position of this sea remains doubtful, but from the context it is clear that it must have tied in with the known marine tertiary deposits of the Argentine province of Entre Rios and extended across the present mass of Brazilian highlands in such a way as to leave in the southern division a great part, if not all, of the States of Rio Grande do Sul and Santa Catharina, that is to say, in some part of the present basin of the Rio Uruguay.

Unfortunately our knowledge of the geological structure of this portion of Braziliian territory is extremely defective, but enough is known to make it certain that a presumably pre-tertiary formation stretches entirely across the region in question and thus far no geological observations or topographical features are known that suggest the slightest suspicion of any important break in its continuity. This is a formation characterized, like the triassic belt of eastern North America which it much resembles, by dykes, intercallated sheets and outflows of trappean rocks (diabase-porphyrite of Rosenbusch) of very uniform mineralogical composition, but very varied physical structure and aspect, by means of which it can readily be traced. Its geological age is undetermined, except that it is almost certainly post-paleozoic, since it overlies permian beds containing the Glossopteris flora. From this circumstance and from the strong resemblance to the above mentioned North American region, it has generally been referred to the triassic, though there is nothing to prove that it might not be cretaceous