were used we might get something analogous to entropy, and which, nevertheless, would possess different and possibly interesting properties. Professor Durand has discussed two special forms which the integrating factor might take for a perfect gas. One of these is where it is a function of the pressure only, and the other in which it is a function of the volume only.

Books Reviewed: Frick, Physikalische Technik; Wilkinson, Submarine Cable Laying; Griesbach, Physikalische Propadeutik; Weldon, Physical Measurements.

SOCIETIES AND ACADEMIES.

ELEVENTH ANNUAL SESSION OF THE IOWA ACADEMY OF SCIENCES.

THE Iowa Academy of Sciences held its eleventh annual session in Des Moines December 29 and 30, 1896. In the absence of the President, Professor T. P. Hall, Professor W. S. Franklin, First Vice-President, occupied the chair. The following papers were presented:

'The State Quarry Limestone,' by Professor S. Calvin, describes a series of limestone ledges of Devonian age consisting of comminuted parts of brachiopods, crinoids, etc., some of which deserve to rank as a brachiopod coquina. As now known, limited to a few local deposits in Johnson county. It appears to be unconformable on the Cedar Valley limestone and laid down after an erosion period of considerable length. No such erosion period in the Devonian has hitherto been suspected. The fauna, in some respects unique, contains a remarkable fish bed including the common Devonian type Ptyctodus, but also the Carboniferous Psephodus. Some of the brachiopods also have Carboniferous affinities. It is probable the beds represent the closing stage of the Devonian.

'Stages of the Des Moines, or chief Coal-bearing Series of Kansas and Southwest Missouri and their equivalents in Iowa,' by C. R. Keyes.

'Natural Gas in the Drift of Iowa,' by A. G. Leonard, enumerates the different localities where natural gas has been noted and relation of these to drift sheets. The gas has two possible sources, the underlying coal-measure shales and the vegetable accumulations in the drift. The latter are supposed to be the source of the natural gas in Iowa.

'Results of Recent Geological Work in Madison County,' by J. L. Tilton, included discussion of the geological formations of the county, distribution of the loess, drift and alluvium, relation of present to preglacial drainage, and other features.

'A Drift Section at Oelwein,' by G. E. Finch; 'Evidence of a sub-Aftonian Drift in Northeastern Iowa,' by S. W. Beyer, and 'The Botany of a Pre-Kansan Peat-Bed,' by T. H MacBride, all dealt with some exposures recently studied in the northeastern part of the State which are of special interest as showing very clearly a distinct separation of glacial periods, at least five of which are now known to be well marked by deposits in Iowa.

'Additional Observations on the Surface Deposits of Iowa,' by B. Shimek, detailed results of a series of borings and evidence in support of the author's view that the loess deposits in western Iowa are of æolian origin.

'The Flora of the Sioux Quartzite,' in Iowa, by B. Shimek, included an annotated list of the plants observed by the author on the quartzite exposure in Iowa, with a discussion of its relation to the remaining flora of the State.

'Notes on the Aquatic Plants of Northern Iowa,' by the same author, included mention particularly of the flowering plants occurring in lakes and ponds.

'Spermaphyta of the Fayette, Iowa, Flora,' by Bruce Fink; a list including about 700 species of plants collected at or near Fayette.

'Notes on the Flora of Iowa,' by T. Z. Fitzpatrick; a short list of species new or little known to Iowa flora.

'The Mechanism for Securing Cross-fertilization in *Salvia lanceolata*,' by G. W. Newton; a description of the structure of blossom and means of pollination.

'Notes on some Introduced Plants in Iowa,' by L. H. Pammel; covering introduction, distribution and economic importance of a number of species.

'A Study of the Leaf Anatomy of some Species of the Genus Bromus,' by Emma Sirrine; giving details of the epidermis, especially the bulliform cells, stereome and mestome.

'A Comparative Study of the Leaves of *Lolium*, *Festuca* and *Bromus*,' by Emma Pammel. In *Festuca tenella* the bulliform cells are wanting, while well developed in *Lolium perenne* and but slightly in *Bromus racemosus*.

'Anatomical Study of the Leaves of Certain Species of the Genus *Andropogon*,' by C. B. Weaver. In the species studied there appeared to be characters of specific value.

'Some Anatomical Studies of the Leaves of *Eragrostis*,' by C. R. Ball. In this genus the anatomical characters appear to be insufficient for specific characterizations.

'The Uses of Formaldehyde in Animal Morphology,' by Gilbert L. Houser, discussed the peculiar properties of this reagent, its disadvantages and the advantages in its use in certain fixing agents and its value in neurological work.

'The Nerve Cells of the Shark's Brain,' by Gilbert L. Houser. Morphological value, general features of structure and results attained by use of the Golgi method.

'Some Manitoba Cladocera,' with description of one new species, by L. S. Ross, included notes on the author's collecting and the description of a new species of *Ceriodaphnia*.

The same author presented papers on 'A New Species of *Daphnia* and Notes on Other Cladocera of Iowa,' and a description of 'The Illinois Biological Station.'

Mr. Charles Carter remarked upon 'The Odonata of Iowa,' and requested specimens and correspondence relating to the insects of this order, with a view to presenting a complete catalogue of the species of the State.

'Notes on the Orthopterous Fauna of Iowa,' by E. D. Ball, lists the known species of the State and includes remarks on distribution and life histories.

'The Ophidia of Iowa,' by A. H. Conrad, calls attention to the desirability of a study of the State fauna before many of the species become entirely extinct. The author desires material for study.

'Contributions to the Hemipterous Fauna of Iowa,' by Herbert Osborn, gives a list of about 100 species not hitherto recorded for the State, and notes on the life histories of certain species.

The following papers were read by title: 'Vertical Range of Fossils at Louisiana,' by C. R. Keyes and R. R. Rowley, and 'The Probable Life History of *Crepidodera cucumeris*, by F. A. Sirrine.

In business sessions the Academy adopted strong resolutions against the passage of anti-vivisection laws for the District of Columbia, voted a contribution to the Pasteur Monument Fund and elected the following officers for the ensuing year: President, W. S. Franklin; First Vice-President, T. H. MacBride; Second Vice-President, B. Fink; Secretary-Treasurer, Herbert Osborn; Elective Members of Executive Committee, L. S. Ross, J. L. Tilton and C. O. Bates.

Herbert Osborn,
Secretary.

THE SCIENTIFC ASSOCIATION OF THE JOHNS HOPKINS UNIVERSITY.

The one hundred and thirtieth regular meeting was held January 21, 1897, Vice-President Howell in the chair.

The papers presented and read were:

The Stratification of Glaciers and the Origin of Some Moraines: By Harry Fielding Reid. Observations were begun last summer to determine the actual direction of the motion of the ice of the Forno glacier in Switzerland. They will be completed next summer. The vertical as well as the horizontal components of the motion in different parts of the glacier will be determined. This is to test a theory published in the *Journal of Geology*, Vol. IV., p. 913, in which it is shown that the vertical component of the movement should be downward above the névé-line and upward below it. If this is true, then material dropped from the cliffs in the reservoir of the glacier should disappear and emerge again at the surface below the névé-line. Such moraines were found and were seen to be intimately connected with the stratification. All the observations on the Forno glacier indicate that what Forbes called the 'ribboned structure' is, as Agassiz contended, the outcrop of the strata. The very bad weather last summer interfered so much with the work that this conclusion could not be finally confirmed or disproved.

Some Recent Advances in Spectrum Analysis: By JOSEPH S. AMES. Attention was called to the fact that the supposed discovery of oxygen in the sun was disproved by observations of Mr. Jewell; that as yet there was no spectroscopic evidence of the presence of *two* elementary gases in clevite gas; that for the formula connecting lines in the series so often observed in spectra Balmer has recently suggested

$$\frac{1}{\lambda} = a - \frac{b}{n^2 + c}$$

where $n = 3, 4, 5$, etc.; that series of this kind have been discovered in the spectrum of oxygen; that a most important mathematical relation has been found to exist between the series observed in the spectrum of any one element. The importance of the study of these series with reference to molecular theories was touched upon.

CHAS. LANE POOR,
Secretary.

BIOLOGICAL SOCIETY OF WASHINGTON.—271ST MEETING, SATURDAY, JANUARY 30.

DR. C. HART MERRIAM spoke of 'The Pribilof Island Hair Seal,' stating that it differed from the Eastern Harbor seal, *Phoca vitulina*, in its greater size, in the simpler character of the true molars and in the greater extent of the articulation of the premaxillaries with the nasals. As specimens were lacking between Greenland and Bering Sea, it was uncertain whether the Pribilof seal was a species or subspecies, although it was probably the latter. Several names had been applied to hair seals from the North Pacific, but the one which would probably stand was *Phoca larga*.

Mr. C. H. Townsend presented a paper on 'The Origin of the Alaskan Live Mammoth Story,' saying that of late years many reports had appeared in newspapers to the effect that Indians declared that the mammoth was still living in Alaska. The speaker stated that in 1885 he visited Cape Prince of Wales in the Corwin, and, in reply to questions of the natives concerning the bones of the mammoth with which they were familiar, showed them figures of the skeleton and drew a restoration of the animal. These figures were copied by the natives, and, as the natives of widely separated regions have communication with each other by canoes and dog teams, he had no doubt that in this manner the figure and information had become widely spread. Being subsequently related and shown to visitors these had given rise to the reports of living mammoths.

Mr. Frank Benton spoke at some length on 'The Giant Bee of India,' saying that apiarians were much interested in introducing this species into the United States, owing to the increasing demand for wax in the arts. The species built a large comb on the under side of a limb or overhanging rock, and was much sought for by the natives of the regions where it is found. Mr. Benton described his efforts to obtain specimens and bring them to the United States and said that, although these first attempts had not succeeded, he thought that the bee could be successfully introduced into the southern United States.

Mr. L. O. Howard presented a communication entitled 'Parasites of Shade-tree Insects in Washington,' in which he showed the exact details of the reduction of *Orgyia leucostigma*, which appeared in extraordinary numbers in the District of Columbia in the summer of 1895, to perfect harmlessness in the summer of 1896. Thirty-seven species of parasitic insects were engaged in this work; 17 species were primary Hymenopterous parasites, 6 primary Dipterous parasites and 14 Hymenopterous hyperparasites. Among the hyperparasites 12 were secondary, 2 tertiary and one of the latter probably also quaternary. The speaker generalized at some length on the subject of insect parasitism as illustrated by this rather striking instance.

F. A. LUCAS,
Secretary.

NEW YORK ACADEMY OF SCIENCES, BIOLOGICAL SECTION, JANUARY 11, 1897.

DR. G. S. HUNTINGTON read a paper entitled 'A Contribution to the Myology of *Lemur bruneus*.'

The paper deals with some of the ventral trunk muscles and the appendicular muscles of the forelimb and pectoral girdle. A comparison of the structure of these muscles with the corresponding parts in other members of the sub-

order shows *L. bruneus* to possess marked primate characters in the arrangement of the pectoral girdle muscles and the muscles of the proximal segment of the anterior limb. This is especially evident in the lateral recession of the pectorales; the compound character of the ectopectoral insertion, the junctions of a pectoralis abdominalis with the typical entopectoral insertion, and the presence of an axillary muscular arch, derived from the tendons of the Latissimus dorsi and connected with the deep plane of insertion of the ectopectoral tendon.

The presence of a third or inferior portion of the coraco-brachialis is noted in addition to the upper and middle portion usually present in Lemuroidia.

The ventral trunk muscles present a distinct carnivore type in their arrangement, instanced by the high thoracic extension of the rectus abdominalis, the occurrence of a well-developed supra costalis, the union of levator scapulæ and serratus magnus, the thoracic extension of the scalenus group; interlocking both with the serratus magnus and obliquus externus.

The aponeurosis of the obliquus externuus presents a well-developed division of the internal pillar of the external abdominal ring, dove-tailing with the one from the opposite side and forming the triangular ligament of the same.

Mr. H. E. Crampton, Jr., reported some of his 'Observations upon Fertilization in Gasteropods.'

The observations were made upon the eggs of a species of *Doris*, collected last summer on the Pacific Coast by Mr. Calkins, and upon a species of *Bulla* which deposited eggs at Woods Holl during the months of August and September. The results may best be summarized by stating that a complete confirmation was obtained of the accounts of fertilization given by Wilson and Mathews, Boveri, Hill for sea-urchins, Meade on *Chetopterus Kostanecki* and Wiejyewski upon *Physa*, etc. The sperm nucleus is preceded by the divided centrosome, an aster, however, not being found till the union of the germ-nuclei. The first polar spindle lies at each pole a double centrosome, the second maturation spindle but one. These are of great size, however, and the one remaining in the egg finally disintegrates, the centrosomes of the first cleavage spindle being derived from the sperm. The germ-nuclei do not fuse, but lie very close to one another, in contact.

Mr. N. R. Harrrington gave an account of the life history of Entoconcha, a mollusc parasitic in a Holothurian. His paper was illustrated by photographs.

The following paper was read by title:

N. R. Harrington and B. B. Griffin: 'Notes on the Distribution, Habits and Habitat of some Puget Sound Invertebrates.'

C. L. Bristol,
Secretary.

NEW BOOKS.

Travels in West Africa. Mary H. Kingsley. London and New York, The Macmillan Company. 1897. Pp. xvi+736. $6.50.

Experimental Morphology. Charles Benedict Davenport. New York and London, The Macmillan Company. 1897. Part I. Pp. xiv+280. $2.60.

Microscopic Researches on the Formative Property of Glycogen. Charles Creighton. London, Adam and Charles Black. 1896. Part I. Pp. viii+152 and Five Plates.

Traité élémentaire de méchanique chemique. P. Duhem. Paris, A. Hermann. 1897. Pp. viii+299.

Vorlesungen über die electromagnetische Theorie des Lichts. H. von Helmholtz. Hamburg and Leipzig, Leopold Voss. V. Pp. xii+370. M. 14.

Elementary Human Physiology. John Gray McKendrick. London, W. & R. Chambers, Ltd. 1896. Pp. 240+xvi.

A Laboratory Note-Book of Elementary Practical Physics. L. R. Wilberforce and T. C. Fitzpatrick. Cambridge University Press. 1896. Part I., pp. 31. Part II., pp. 46. Part III., pp. 39. 3s.

Untersuchungen über die Sinnesfunctionens der Menschlichen Haut. May von Frey. Leipzig, S. Hirzel. 1896. No. III. Pp. 175–266. Einzelpreis. 5 M.

Spectralanalytische Untersuchung des Argons. J. M. Eder and E. Valenta. Gerold, Vienna. 1896. Pp. 39.