mean free path of its molecules at some particular pressure or pressures, may possibly afford the necessary conditions for fortuitous resonance, with development of some slight amount of heat by the increased violence of inter-molecular collisions. I have done much experimental work on these lines during the past year, but, notwithstanding refinement of method and manipulation, the results have thus far been unsatisfactory. The work is still in progress, however, and investigation of other phenomena is contemplated.

CHARLES F. BRUSH

CLEVELAND, OHIO

AMERICAN SOCIETY OF ZOOLOGISTS
EASTERN BRANCH

THE Eastern Branch of the American Society of Zoologists held its annual meeting on December 27–30, 1910, inclusive, at Cornell University, Ithaca, N. Y., in conjunction with the American Society of Naturalists, the American Association of Anatomists and the Society of American Bacteriologists.

The following officers were elected:

President—H. V. Wilson, University of North Carolina.

Vice-president—H. E. Crampton, Columbia University.

Secretary-treasurer—Raymond Pearl, Maine Agricultural Experiment Station.

Additional Member of Executive Committee—R. G. Harrison, Yale University.

The following persons were elected members of the American Society of Zoologists at this meeting: Dr. Alice M. Boring, University of Maine; Dr. O. A. Johannsen, Maine Agricultural Experiment Station; Professor R. E. Sheldon, University of Pittsburgh; Professor A. E. Lambert, State Normal School, Framingham, Mass.; Dr. R. C. Schiedt, Franklin and Marshall College; Dr. Sergius Morgulis, Harvard University; Professor E. W. Gudger, State Normal College, Greensboro, N. C.; Dr. A. M. Banta, Carnegie Institution, Station for Experimental Evolution; Professor G. G. Scott, College of the City of New York.

A committee was appointed to prepare a resolution on the death of Professor C. O. Whitman. This resolution will be published in a later number of SCIENCE.

The following papers were presented at the meeting, either in full, or by title:

The Spermatogenesis of the Opossum: H. E. JORDAN, University of Virginia.

An accessory chromosome and chondriosomes are the structures of special interest. Metaphase plates of dividing spermatogonia contain 17 rod-shaped chromosomes (diploid group; 16 autosomes, 1 monosome). A chromatin- (chromosome) nucleolus is present during the growth period (including synizesis and synapsis) invariably at that point near the nuclear membrane next the centrosphere. The first numerical reduction results from a pairing end to end (telosynapsis) of the 16 autosomes. The haploid chromosome group thus contains 9, the accessory recognizable by its larger size and bipartite form. During metakinesis (reduction division) the accessory chromosome passes undivided, and in advance of the ordinary chromosomes, to one pole. Two types of secondary spermatocytes result: one with 9, the other with 8 chromosomes. During the brief resting phase one type has a chromatin-nucleolus, the other lacks this structure. A second numerical reduction has occurred—a phenomenon previously described by Bardeleben (1898) for man, and quite recently by Guyer for certain birds—giving rise to hemioid groups containing 5 and 4 chromosomes, respectively. The ensuing division is equational. In the early spermatid-phase a resolution takes place giving 9 and 8 chromosomes, respectively. A dimorphism of spermatozoa thus results. Chondriosomes (mitochondria) appear in early postsynaptic stages (probably as chromidia passed out of the nucleus). A direct continuity is demonstrable between the chondriosomes and the spiral filament of the middle piece of the spermatozoon. No twin spermatozoa, such as Selenka described in the vas deferens of the opossum, appear in the testes studied.

The complete paper will appear in the *Archiv für Zellforschung.*

The Germ Cell Determinants of Beetles' Eggs: ROBERT W. HEGNER, University of Michigan.

This report is based on the results of experiments in killing parts of the eggs of some chrysomelid beetles. The posterior ends of freshly-laid eggs contain a disc-shaped mass of granules that stain like chromatin. These granules are taken up by the cleavage products that encounter them; these cleavage products later become germ cells. For this reason the granules have been called germ-cell determinants. When the posterior ends of freshly-laid eggs are killed with a hot needle, thus preventing the granules from taking part in

development, the resulting embryos do not develop germ cells. This evidence strengthens the hypothesis that these granules are really germ-cell determinants.

The complete paper will be published in the *Biological Bulletin.*

Heterochromosomes in Mosquitoes: N. M. STEVENS, Bryn Mawr College.

An unequal pair of heterochromosomes is found in the male germ cells of *Anopheles punctipennis,* and the heterochromosome differentiation can be seen in the resting spermatogonia and in the spermatids as well as in the spermatocytes. In *Culex pipiens, Culex tarsalis* and *Theobaldia incidens* no such differentiation of heterochromosomes is present. As the sex-determining mechanism is without doubt the same in the several species of mosquitoes, it is evident that heterochromosome differentiation is not a necessary factor in the determination of sex. In *Culex* and *Theobaldia* we certainly can not say two X chromosomes give a female and one X chromosome or an X and a Y chromosome give a male, for there are no X or Y chromosomes. However, it is evident that, although the heterochromosome differentiation may have nothing to do with sex-determination, the sex-determining factors must be closely correlated with it, and may in some cases be located in the heterochromosomes. The importance of a study of the origin and history of the heterochromosomes apart from the idea of sex-determination is urged. The complete paper will be published in the *Biological Bulletin.*

Origin and Significance of Mitochondria: T. H. MONTGOMERY, JR., University of Pennsylvania.

(An excerpt from a paper to be published in the *Journal of Morphology* on the spermatogenesis of *Euschistus.*)

The mitochondria undergo their chief growth and multiplication in the growth period of the germ cells, and are few or absent in the spermatogonia. Their mode of division in the reduction mitoses is irregular, and they become divided by the cell constriction. They do not arise as eliminated chromatin nor from the allosomes, but apparently as a chemical interaction of nucleus and idiosome. They represent part of the epigenetic history of the germ cells, and the chromosomes the preformistic.

The Method of Cell Division in Moniezia: A. RICHARDS, Princeton University. (Introduced by Ulric Dahlgren.)

A reinvestigation of the development of the female sex products of *Moniezia* has not substantiated the claim of Child that amitosis has a regular place in this development. Amitotic divisions were found at no stage in the growth of these products. On the other hand, mitoses occur at all stages in the development, although more rarely in the early oogenesis than might have been expected. Probably also periodicity of mitotic divisions is one reason for the relative scarcity of spindles at this stage. Cleavage divisions are positively mitotic for the spindle in each cell generation may be found. The complete paper will appear in the *Biological Bulletin.*

The Relation between the Formation of the Fertilization Membrane and the Initiation of the Development of the Echinoderm Egg: J. F. MCCLENDON, Cornell University Medical College.

Loeb observed that the sea urchin's egg may develop without the formation of a fertilization membrane, and I have confirmed this observation, and shown that Harvey is very probably wrong in his supposition that this is a case of failure in "pushing out" of the membrane. Therefore I concluded that "membrane formation" is not essential for the segmentation of the egg, although by furnishing protection it may insure the development of the embryo.

Loeb postulated that an osmotically active colloid exists in the unfertilized egg, but is so covered with lipoids that it does not absorb water until it is squeezed out or otherwise exposed at the surface of the egg, at the beginning of development (when it fills the so-called "perivitelline space"). I have shown[1] that this substance bears a positive charge (is basic) since it migrates toward the kathode when an electric current is passed through sea water containing the fertilized egg.

The unfertilized egg is imbedded in a mass of jelly which is probably mucin. This jelly bears a negative charge (is acid) since it combines with color bases.

When the positively charged colloid is exposed at the surface and comes in contact with the negatively charged jelly, the two mutually precipitate at their surface of contact, thus forming the fertilization membrane. But if all of the jelly is washed off of the egg before the latter is caused to develop, no fertilization membrane is formed (as I have observed) because no two oppo-

[1] *Am. Jour. Physiol.,* 1910, XXVII., 240.

sitely charged colloids are brought in contact, but the basic colloid may with difficulty be seen as a refractive layer, which has been mistaken for a poorly developed "fertilization membrane."

The increased permeability of the egg surface, which releases the basic colloid, is one of the prerequisites to the increased oxidation of the developing egg, and in this way membrane formation and development are induced by the same change.

Evidence for the Transmission of the "Wound Stimulus" to Underlying Tissues and its Relation to Regeneration: J. F. McClendon, Cornell University Medical College.

The "current of injury" produced by the negative electric potential of a wounded surface is common to animal and plant tissues. The wounded cell acts as an electric generator and a current flows through neighboring cells. If a current is passed through living tissue, which is subsequently fixed and stained, basophile substances will be found displaced toward the anode. In sections of tissue adjacent to a wound the extent of the current is indicated by the displacement of basophile granules. The current affects first the cells in contact with the wounded cells, then extends in some directions more than others. Electric currents (currents of growth) continue for many days after the wound has healed. Since electric currents cause sea-urchin eggs and tissue cells to divide and proliferate, probably these bioelectric currents constitute the so-called "formative stimulus" of regeneration.

Maturing Reagents and those Inducing Segmentation in Artificial Parthenogenesis: Max Withrow Morse, Trinity College.

An extended series of experiments, continued throughout the summer at the Harpswell Laboratory upon the eggs of *Cerebratulus*, demonstrated that those reagents which induced maturation of this egg, would not cause development to proceed farther through the segmentation stages and indeed evidence for an inhibiting action to segmentation on the part of the solutions used in causing the egg to throw off the polar bodies, was obtained. The glucoside saponin, dibasic acids such as oxalic, hydrochloric and tartaric acid were used successfully to mature the egg, but no subsequent application of these reagents caused segmentation to proceed. It was found, however, that if every trace of these solutions was removed by careful washing and the eggs placed in a CO_2-sea-water solution, with a concentration of approximately 0.19 g. to the 100 g. sea water, segmentation proceeded. However, no method was found whereby the eggs could be carried beyond the later segmentation stages. Loeb and others have observed this antagonistic action of maturing and segmentation-producing reagents in other forms, and in such cases, as in the present one, the reactions are not reversible; CO_2 will not cause maturation. The experiments were checked against temperature, salinity, alkalinity and such external factors as might modify results.

Newly Found Odonate Larvæ of Special Interest from Costa Rica: P. P. Calvert, University of Pennsylvania.

The larva of *Cora* possesses two-branched mandibles, and paired ventral tracheal gills (= modified legs?) on abdominal segments 2–7, in addition to three thick caudal tracheal gills. A detailed account has appeared in *Entomological News* for February, 1911.

The larva of *Mecistogaster modestus* lives in the rain water between the leaf-bases of arboricolous bromeliads. The remarkable increase in length at transformation, from the larva measuring 24 mm. long to the adult 82 mm. long, occupying about one and a half hours, was illustrated by a series of lantern slides from life. The full description will probably be published in the journal quoted above.

The Chondrocranium of Eumeces (preliminary report): Edward L. Rice, Ohio Wesleyan University.

Preliminary comparison with chondrocranium of *Lacerta* as described by Gaupp. For most part these skulls are very similar, but with some striking differences. Particularly striking is enormous size in *Eumeces* of pars cochlearis of otic capsule. This extends far down into region of basal plate, displacing facialis foramen relatively upward between the two parts of otic capsule.

In no single stage is lateral wall of temporal region so complete as in *Lacerta*, although all the same elements may be recognized in a comparison of various stages, some parts being in regression while others are progressively developing. In earliest stages tænia parietalis media extends upward and backward to unite with tænia marginalis, thus dividing fenestra prootica into upper and lower portions, latter furnishing exit for trigeminal nerve.

Cartilage of interorbital septum continuous in younger specimens; progressively fenestrated in later stages.

Nasal capsule in general less complete than in

Lacerta; but large fenestra lateralis nasi, emphasized by Gaupp, wanting in all stages.

Considerable individual variation in arrangement of nerve foramina. Without reference to age, hypoglossus foramina may be either three or two on each side, or three on one side and two on other. Also irregularities in course of abducens.

Discussion of columella auris deferred.

The Taxonomic Value of the Brain: B. G. WILDER, Cornell University.

That the brain presents distinctive characters in certain teleostean families was claimed by L. Agassiz in 1844.[2] The taxonomic value of encephalic characters has been maintained at different times by Owen, Gill and the writer. Nevertheless, recent revisions of various groups do not even mention the brain, and four years ago a review[3] by a former secretary and vice-president of the zoologic section of the American Association for the Advancement of Science declares that the study of the nervous system has no value from any other point of view than that of function. The present paper mentioned instances of generally accepted groupings that might have been based upon the brain alone; recalled malassignments (*e. g.*, of the Sirenia with the Cetacea, of ganoids and selachians as *Palæichthyes*) that might have been averted by due consideration of the brain; and held that such consideration forbade the association of ganoids and dipnoans as a "ganoid-dipnoan phylum," warranted the separation of lampreys and hags as coordinate groups of class grade, and showed that *Pristiophorus* is a primitive type not nearly related to *Pristis*. Standard treatises evince indifference toward the brain or ignorance of it, and are open to criticisms comparable with those in the *American Journal of Science*, Vol. 20, July, 1880, p. 76; likewise the commingling of constant and peculiar characters with others not really distinctive, as deprecated in 1885[4] and in 1894.[5]

The Histology of the Oviduct of the Domestic Fowl: FRANK M. SURFACE, Kentucky Agricultural Experiment Station.

This paper will be published in the Annual Report of the Maine Agricultural Experiment Station for 1911.

[2] *Bull. Soc. Sci. Nat. Neuchatél*, December 4, p. 147.

[3] SCIENCE, Vol. XXIV., p. 846.

[4] SCIENCE, Vol. VI., p. 223, September 11.

[5] *Asso. Amer. Anat., Proceedings*, 7th session, p. 19.

The Lampreys of the Cayuga Lake Basin: Fate of Lampreys after Spawning; Non-parasitism of the Brook Lamprey: SIMON H. GAGE, Cornell University.

After spawning, lake lampreys were put into wire cages with live cat-fish. The cages were kept in the running water of the stream where they spawned, and in the lake water at the Limnological Station. The spent lampreys never fed upon the cat-fish, and soon died. Dead bodies of lampreys were found in great abundance along the stream. The discovery was made that the notochord is very persistent, enduring in full perfection after all the rest of the animal had decayed. There seems great probability that under favorable conditions the notochords might become fossilized; if so they would puzzle the paleontologist.

The non-parasitism of the brook lamprey was first reported by me in 1898. The demonstration has been repeated during the years 1907, 1908 and 1909, by keeping the transforming animals over winter in an aquarium. They live under the sand like the ammocœte, and only emerge in the spring when their sexual products are ripe. Lake lampreys when they transform attack fish with great ferocity, and suck their blood, but the brook lamprey never attacks fish under the most favorable conditions. When they emerge from the sand they lay their eggs and die. From their structural adaptation to parasitism it is believed that they were once parasitic, but have lost that habit.

Protective Coloration in Poultry: RAYMOND PEARL, Maine Agricultural Experiment Station.

This paper has appeared in the *American Naturalist* for February, 1911, under the title: "Data on the Relative Conspicuousness of Barred and Self-colored Fowls."

Adaptive Color Changes in Flounders: F. B. SUMNER, U. S. Bureau of Fisheries.

The author described the results of some inquiries, conducted at Naples and Woods Hole, into the relation between the visible background and the color-shade and pigment-pattern assumed by the fish.

Sense of Smell in Selachians: R. E. SHELDON, University of Pittsburgh. (Introduced by S. H. Gage.)

1. A current of water, caused by the respiratory movements, and augmented by the forward motion of the fish in swimming, courses through the nasal capsules of the dogfish.

2. By this means substances in solution in the water come in contact with the olfactory mucous membrane.

3. Dogfish recognize and determine the location of food substances through a chemical sense.

4. This power is lost when the olfactory capsules are filled with loose cotton. It is regained when the cotton is removed.

5. The plugging of one nostril only does not seriously affect this power.

6. The dogfish obtains its food almost, if not entirely, through the use of the sense of smell.

7. The selachians possess a true sense of smell, comparable to that of the terrestrial vertebrates.

The complete paper will appear in the *Journal of Experimental Zoology*.

Habits and Reactions of the Ciliate, Lacrymaria: S. O. MAST, Goucher College.

Lacrymaria is usually found with the body well concealed in débris while the head stretches out in all directions and moves rapidly about forward and backward and from side to side apparently exploring every nook and crevice within its reach which often extends to a distance equal to eight times the length of the body. In this way the creature captures other organisms on which it feeds. It never swallows dead particles, showing that it exercises the power of selection in the process of feeding.

It is usually assumed that the movements are regulated by the contraction of tissue in the neck and body, but this is not true. The head is not thrust out; it is pulled out. Nearly all of its actions are due to the activity of a band of powerful cilia which extends around the mouth. Thus *Lacrymaria* is much like an organism composed of two independent parts united by means of an extremely elastic substance far more elastic than any known lifeless material. When the neck is fully extended it is frequently fifty times as long as when contracted.

There is no indication of orientation in *Lacrymaria* under any condition. It does not respond to light. None of its reactions fulfil the demands of any of Loeb's definitions of tropisms. The movement of the entire organism is almost entirely regulated by the reactions of the head, and the direction of movement of the head is regulated almost entirely by internal factors; it is practically independent of the location of the stimulus. We assume that all of the reactions in this animal are definitely determined by physico-chemical processes, but whether they are or not has by no means been demonstrated.

The complete paper will probably be published in the *Journal of Animal Behavior*.

The Reaction System of the Flagellate, Peranema: S. O. MAST, Goucher College.

Under natural conditions *Peranema* rarely swims. It ordinarily moves in contact with the substratum without rotating. Only the tip of the flagellum is active. This is bent at right angles to the rest and strikes strongly backward. When the organism is stimulated no matter by what means or at what point it responds by turning the anterior end with the flagellum sharply, always toward the same side. Then it straightens out and proceeds on a new course usually at an angle of about 90° with the old. If the stimulus does not cease the same reaction is repeated until it does. This is the only method which *Peranema* has for changing its course in its usual method of locomotion. The action of the flagellum is not functional in this. If strongly and repeatedly stimulated a larger portion of the flagellum may be brought into action and there may be peristaltic contractions in the body. Both of these processes affect the rate of motion but not the direction. The direction of turning is entirely dependent upon internal factors; it is independent of the location of the stimulus on the body. The direction of movement is not definitely determined by external factors. It is dependent upon "trial" positions which are assumed by turning the anterior end in response to a stimulus; only such as do away with the action of the stimulus are followed up.

The complete paper will probably be published in the *Journal of Animal Behavior*.

The Behavior of Certain Arthropods in Relation to Color Environment: A. S. PEARSE, University of Michigan.

As a result of experiments with crayfishes, caddis-fly larvæ, spider-crabs and spiders the conclusion is drawn that protectively colored arthropods do not select an environment similar to their own; at least they do not make such selection on account of color.

The complete paper will be published in the *Journal of Animal Behavior*, Vol. I., pp. 79–110.

On the Regenerative Power of the Dissociated Cells in Hydroids: H. V. WILSON, University of North Carolina.

It had been shown that when certain sponges are broken up into their constituent cells, the cells will reunite and form masses capable of differentiation into functional sponges. Two hydroids, *Pennaria* and *Eudendrium*, were found to possess the same power. The dissociated cells

and small cell aggregates fuse and give rise to lumps, which become smooth and secrete a perisarc. Their size and shape are within control. Such bodies are solid masses in which cell limits exist, although the structure may be in part syncytial. They show at first but little change and are subject to great mortality. After two or three days many throw out one or more cylindrical outgrowths in which ectoderm and entoderm are differentiated. In the case of some of these, growth and differentiation continue until the end of the outgrowth is transformed into a perfect hydranth.

Masses resembling those just described were obtained in a similar way from an alcyonarian, *Leptogorgia*, and when the immature gonad of *Asterias* was broken up, the cells quickly fused, forming lumps and plates. Probably the power to fuse resident in the cells and cell aggregates into which a body (in the case of lower metazoan) or tissue (in case of higher form) may be broken up, is wide spread. What degrees of regenerative power may be resident in such masses is a matter for investigation. (Paper to appear in the *Journal of Experimental Zoology*.)

The Problem of Form in Hydra: HERBERT W. RAND, Harvard University.

In the problem of form as presented in ontogenesis we have progressed so far as to be able to state confidently that the essential form-determining factors are within the organism itself. We must now discover to what extent and where in the organism these formative agencies are localized. The line of attack upon this problem lies in experiments involving various derangements of the normal form of relatively simple organisms. The available morphogenetic data upon *Hydra* probably exceed in quantity and diversity those upon any other equally simple organism.

An examination of the total evidence afforded by *Hydra* leads to the conclusion that in the normal adult the peristome is the seat of some peculiarity by virtue of which that region exercises formative control over column substance, whether it be substance of the column to which the peristome originally belonged, or of any other column with which the peristome material comes into relation by transplantation. When a piece of column regenerates a head, this form-controlling condition is established in the prospective peristome material in advance of the visible formation of oral organs and as a prerequisite of it (Browne, 1909). *This localizing of the formative agencies is a function of the whole of the regenerating piece.* In the normal hydra, therefore, heads are not, in any direct sense, preformed at various levels of the column.

In graft-compounds having two or more heads, the regulatory changes may, without exception, be interpreted as dependent upon competition of the several peristomes for control of the column substance.

The phenomena of regeneration and regulation fairly compel the assumption of the existence of a specific formative force-system for which those particular chemical complexes which constitute hydra substance serve as the vehicle; and, together with the phenomena of polarity, they afford ground for some conception of the distribution and mode of operation of such a force-system. (A full treatment of the subject is being prepared for publication.)

The Proportion of Male-producers in Hydatina senta as Affected by External and Internal Factors: A. FRANKLIN SHULL, Columbia University.

The proportion of male-producers in the rotifer *Hydatina senta* can be reduced by rearing the animals in weak solutions of urea, several ammonium compounds, beef extract or creatin. Since some of these substances exist in the food cultures used in the experiments, starvation may appear to increase the proportion of male-producers because smaller quantities of these substances are administered with the food.

Different pure lines of rotifers obtained from widely separated localities yielded different proportions of male-producers when reared under the same conditions; this indicates the existence of an internal factor that plays a rôle in determining the proportion of male-producers. When individuals belonging to distinct pure lines were crossed, the offspring gave rise to pure lines (F_1) yielding more male-producers than either parent line. When a member of one of these F_1 lines was crossed with an individual from one of the parent lines, the zygote gave rise to a line (F_2) producing a proportion of male-producers intermediate between those of its two parent lines. The explanation of these results is not yet clear. (To be published in the *Journal of Experimental Zoology*.)

Evolution of Hectocotylism among Cephalopods: G. A. DREW, University of Maine.

The paper read will be included in a paper bearing the following title: "Sexual Activities of the Squid, *Loligo pealii* (Les.)—1. Copulation, Egg-laying and Fertilization." It is to be pub-

lished in the *Journal of Morphology* during the year of 1911.

The Idiochromosomes in Ascaris felis: C. L. Edwards, 661 East 170th St., New York City.

Effect of Conjugation on the Stock in Paramecium: H. S. Jennings, Johns Hopkins University.

The Organs of Equilibration in Pelecypod Molluscs: Ulric Dahlgren, Princeton University.

The Anatomical Basis of Mulatto Color: H. E. Jordan, University of Virginia.

This paper will appear in the *American Naturalist.*

Variation in the Embryos of the Hagfish, Homea (Bdellostoma) stouti: Bashford Dean, Columbia University.

A New Phase of the Question of the Irritability of the Skin of Vertebrates to Chemical Stimuli: G. E. Coghill, Denison University.

The Comparative Toxicity of a Series of Electrolytic and Non-electrolytic Compounds with Respect to Fundulus heteroclitus: R. E. Sheldon, University of Pittsburgh. (Introduced by S. H. Gage.)

The Senses, Courtship and Mating in Tarantulas: A. Petrunkevitch, Yale University.

A Case of Regeneration in Tarantulas: A. Petrunkevitch, Yale University.

The Origin and Heredity of Four Wing Mutations in Drosophila: T. H. Morgan, Columbia University.

The Heredity of Red Eyes, White Eyes and Pink Eyes in Drosophila: T. H. Morgan, Columbia University.

The University of Michigan Biological Station: A. S. Pease, University of Michigan.

In addition to the papers read the following exhibits and demonstrations were presented:

Specimens of the 2100th Generation of Paramecium aurelia, attained without Conjugation or Artificial Stimulation: L. L. Woodruff, Yale University. (Presented by title only.)

On the Senses, Courtship and Mating in Tarantulas—Regeneration in Tarantulas: A. Petrunkevitch, Yale University.

Inheritance of Color in Colias philodice: J. H. Gerould, Dartmouth College.

Regeneration in Hydroids: H. V. Wilson, University of North Carolina.

Raymond Pearl,
Secretary

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SECTION D—MINNEAPOLIS MEETING

The section held its meetings on Thursday and Friday of convocation week. The Thursday morning session was devoted to the routine business connected with election of officers and fellows and to a program of papers, ten in number, of which eight were devoted to road and highway problems. These papers were interesting and valuable contributions and should have been heard by a much larger audience than were in attendance.

Thursday afternoon the section met in joint session with Section B and listened to the address of retiring Vice-president Hayford of Section D on the subject "The Relation of Isostasy to Geodesy, Geology and Geophysics" and to that of Vice-president L. A. Bauer, entitled, "The Broader Aspects of Research in Terrestrial Magnetism." Both addresses have been published in full in Science and are well worth reading by those who heard them at the meeting as well as by others interested in the subjects. These sections have ever been fortunate in their vice-presidential addresses.

Thursday evening was given over to a dinner and smoker for the members of Sections A, B and D and the Chicago Section of the American Mathematical Society. The dinner was served by the Commercial Club of Minneapolis. The post-prandial remarks were enjoyed and enjoyable.

Friday morning Section D held a session devoted to Aeronautics at which nine papers were read by or for the authors. Quite appropriately the program opened with an appreciation of Dr. Octave Chanute written by James Means, of Boston, and presented by Professor A. Lawrence Rotch, vice-president of the section. This contribution will be printed in full in Science. On Friday afternoon, Sections A, D and the Chicago Section of the American Mathematical Society met in joint session for a symposium on engineering-mathematics, the same being a discussion of a preliminary report on the subject prepared by a committee appointed at the time of the Chicago meeting of the American Association for the Advancement of Science. Printed copies of the report had been prepared by the chairman of the committee, Professor E. V. Huntington, of Howard University, who opened the discussion, which was continued with spirit during the entire session with profit to all present.

Professor A. Lawrence Rotch, vice-president of