and a transverse temperature difference is developed (the Righi-Leduc effect).

These effects have an important bearing on the theories (electron and atomic theories) of electric and thermal conduction in metals. Important work, experimental and theoretical, has been done in this field very recently by Professor E. H. Hall (who discovered the Hall effect in 1879) and by Professor P. W. Bridgman; and Professor Hall is now able to calculate the magnitudes of the Ettinghausen, Nernst and Righi-Leduc effects from the Hall effect.

The present active interest in the theories of metallic conduction (electric and thermal) is indicated by the program which has been recently announced for the fourth International Physics Conference under the auspices of the "Institut International de Physique Solvay." This conference will be devoted exclusively to "Le mechanisme de la conductibilité metallique." Professor E. H. Hall and Professor P. W. Bridgman were invited to attend this conference which was held in Brussels, April 24 to 29.

Sir J. J. Thomson and Dr. Frank Horton are rendering important service in editing the *Monographs on Physics,* and Dr. L. L. Campbell's volume is up to the high standard of the series. It is an important piece of work well done.

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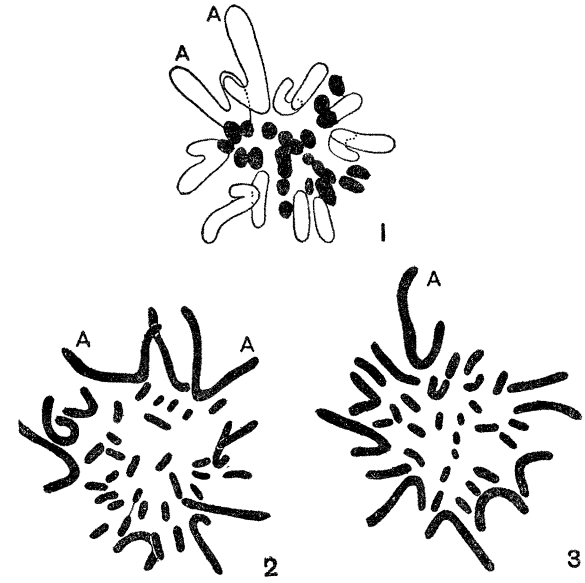
## SPECIAL ARTICLES

### THE SOMATIC CHROMOSOMES OF THE CHICK AND THEIR POSSIBLE SEX RELATIONS

SINCE 1917 observations have been carried on more or less intermittently on the chromosomes of the chick with the devotion of the writer's entire time to the subject for the last few months. As the study of the spermatogenesis will not be completed for a few months and as some interest has been shown in the results so far obtained this note was prepared to describe briefly the general cytological situation as found in the soma.

The very small size of the cells in the chick make it rather unfavorable material for chromosome study and calls for the utmost refinement in the technique used in preparing the tissues. Tissue cultures are very valuable additions to the sectioned material, as the cells in them, released from their usual confinement, become somewhat larger and flatten out markedly against the cover-glass. Owing to the extremely small size of the shorter chromosomes the total number of these bodies in the cells of the chick is difficult to determine exactly. Contributing to the uncertainty of enumeration is the tendency of the chromosomes to first appear in prophase in number considerably in excess of the metaphase count. As mitosis proceeds, the number is seemingly reduced by the union of individual chromatin particles. The number of the chromosomes found in the metaphase plate as nearly as can be determined lies between 35 and 40. The larger chromosomes of the complex are quite big enough for satisfactory observation, and a study of their size and shape relations in somatic cells, embryonic gonads and tissue cultures has shown the largest chromosome in the female to be unmated, while the chromosome corresponding in size and shape in the male is present in duplicate. Although satisfactory material for the study of the adult testes is not as yet at hand, Dr. Stevens's figures published by Dr. Boring[1] show two chromosomes of similar size and shape in the spermatogonia which correspond to the largest in my series. This indicates that the largest chromosome in the adult male cells is paired as I found it in the embryonic male gonad. Miss




Stevens's figure (No. 1), together with a complex taken from an embryonic male (Fig. 2) and female gonad (Fig. 3), is shown in the illustration. In these figures the largest chromosomes are labeled A. As is evident, they are of the same general size and shape in all the complexes. They are paired in the cells of male origin, Figures 1 and 2, while Figure 3, from an embryonic female gonad, shows but one such chromosome. The difference in the diameter of the chromosomes in Figure 1 may possibly be due to the fact that Miss Stevens frequently used aceto-carmine as fixative and stain, which tends to swell chromosomes.

If these observations are confirmed by the conditions found in the adult testes another case can be

[1] SCIENCE, N. S., Vol. 58, July 27, 1923.

added to the already large list of agreements between genetic behavior and cytological phenomena. If the analysis of the chromosomes and their sex relations as found in the soma proves correct, then the male, possessing two X chromosomes, will produce sperm of only one kind, while the female, being heterozygous for the X, will produce two types of eggs—one with and one without the X. This would agree with the genetic results obtained with the domestic fowl which has indicated these birds to be just opposite to mammals in their sex linkage phenomena.

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## THE WASHINGTON MEETING OF THE AMERICAN CHEMICAL SOCIETY

THE sixty-seventh general meeting of the American Chemical Society was held at Washington, D. C., from Monday, April 21, to Saturday, April 26, 1924, inclusive. The council meeting was held on the twenty-first, the general meeting on the morning of the twenty-second, special divisional meetings on the afternoon of the twenty-second, and divisional meetings on Wednesday and Thursday mornings and all day Friday. Excursions to government laboratories took up Wednesday and Friday afternoons. Thursday afternoon was enjoyed by all of the members in a mass boat excursion to Mt. Vernon. President Coolidge received the members at 12:30 Thursday. Full details of the meeting will be found in the May issue of *Industrial and Engineering Chemistry* and in the May 10th *News Edition*.

The registration was 1934 of whom 401 were ladies. In addition 200 more members went to Edgewood who did not register. This was, accordingly, the largest meeting the American Chemical Society has ever held. The general meeting on Tuesday morning was made noteworthy by two important papers; first, by Robert A. Millikan on "The atom as seen by the physicist," and second by Gilbert N. Lewis on "The atom as seen by the chemist." An audience of over 1,700 people was present.

On Tuesday evening a general reception and entertainment was held in the National Museum, music being furnished by the United States Marine Band, and on Wednesday evening the society and the public to the number of 1,700 were addressed by Edwin E. Slosson, on the subject "The expansion of chemistry." At the general meeting on Tuesday morning, S. P. L. Sorenson was elected an honorary member of the society.

A dinner dance with 300 present was held at the Wardman Park Hotel on Friday evening. The excursion to Edgewood Arsenal on Saturday was a noteworthy occasion with over 1,000 members and guests present. During the forenoon the following plants of the Chemical Warfare Service were visited: Phosphorous Filling Plant, Physical Laboratory, Toxicological Laboratory, Phosgene plant, ($CO_2$, CO an $O_2$ Plants), Phosgene Filling Plant, Ethylene Plant, Brombenzylcyanide Plant and Mustard Gas Plant. After luncheon, served at the Arsenal, a field demonstration of chemical warfare service and equipment was of particular interest to all who were present, especially the sprinkling, under the latest conditions, of an impervious smoke screen, which is considered one of the most important developments since the close of the war.

The four general programs by divisions held on Tuesday afternoon were under the auspices of the Division of Physical and Inorganic Chemistry joint with the Division of Biological Chemistry, the Division of Industrial and Engineering Chemistry, the Division of Chemistry of Medicinal Products and the Division of Organic Chemistry. All other divisions and sections held meetings with the exception of the Fertilizer Division. The Paint and Varnish Section held its first meeting with an attendance of 200, this being the largest first meeting of any section ever held. Further details of these meetings will be found in the May and June issues of *Industrial and Engineering Chemistry*.

The Council of the American Chemical Society met at the Willard Hotel, on April 21, at 2:30 p. m., with President Baekeland in the chair.

It was voted to charter a local section to be known as the Northwestern Utah Section, with headquarters at Salt Lake City, and a local section to be known as the Arizona Section, with headquarters at Tucson.

An invitation was received from the Southern California Section for the general meeting of the society to be held at Los Angeles, California, in the summer of 1925, the exact date to be determined later. The three councilors from the Southern California Section spoke of the desire of the section to have the Chemical Society come to Los Angeles, and although it was impossible, under the constitution, to definitely vote at this meeting to accept this invitation, a unanimous expression of opinion was received from the councilors present that it was desirable to hold the 1925 summer meeting in Los Angeles.

It was voted that the suggestion of the Rochester Section for the erection of an office building in Washington, D. C., as a home for the society be referred to a committee to be appointed by the executive committee, this committee to investigate the proposition and report back to the council in September.

A proposal for the election of S. P. L. Sorenson as an honorary member of the American Chemical Society submitted to the council and signed by a