book for foreign visitors, in which I have pasted photographs taken at the time of registration. Lately, I have devised a scheme for a permanent collection which I think will be of interest.

On strong cardboards (8 by 10 inches) I have mounted the photographs, and at the top of each card is printed the name, the locality, the date, the name of the photographer, the name of the donor and the corresponding number of the negative. These mounts are then arranged alphabetically in permanent filing cases on the card-catalog system, so that they can be readily looked over. The back of each card is furnished with transverse lines for remarks which are frequently full and relate to the career of the worker shown in the photograph.

In this way I have already accumulated for the Bureau of Entomology a collection of more than 700 photographs of entomologists of all times and of all countries, and it is growing rapidly.

The advantages of the system are compactness, ready reference and practically impossible fading. The collection often includes several photographs of the same man, taken at different periods of his life, and frequently at his desk or in the laboratory.

The interest of such a collection to students and other workers is very great, as every one must realize.

Wherever possible, I have adopted Dr. Marcus Benjamin's idea, as shown in his collection of past presidents of the American Association for the Advancement of Sicence and in his other collection of bishops of the Episcopal Church, adding samples of the handwriting of the person photographed. Entomologists are urged to send me their photographs for this collection.

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FRANK H. BIGELOW

WHEN death claims a friend the first note is personal. Dr. Bigelow was my classmate at Harvard. He entered the Episcopal ministry and was assistant pastor at St. John's here in Washington. He was also attached to the Weather Bureau and stressed the mathematical problems of meteorology. He soon realized that he was a mathematician and not a clergyman. His work became known internationally. He accepted a call from Argentina to organize the weather service of that country. He never came back to Washington. He retired at 70 and went to Vienna to continue studies in mathematical research. At the time he was in Argentina we kept up occasional correspondence. Just a short time ago he showed his customary interest in my family. He sent my boys, who are keen philatelists, some rare postage stamps. He had just spent a few weeks in Berlin, and I venture to quote a few observations on our fiftieth anniversary of the class of '73:

In the name of old '73 I salute you again. I wish very much I could have been there to see the 36 faithful once more.[1] Their group pictures are so changed that I can hardly make out half a dozen. The names call up the fires of 50 years ago, and that is better after all. I infer that you are very well and flourishing, and I wish to send greetings to Mrs. Wiley and those two boys, wishing you all joy and happiness for their coming years.

My absence from the United States is for longer than I anticipated when we sailed away in 1910. My work went on without interruption till 1921, and then I had to knock off on account of diabetes which played havoc with my eyes. Enough of them is left to make life agreeable, and with margin for some study in science, as you can see from No. 5.[2] We have been in Europe nearly three years and find more diversion here than in Washington. We have put in some 60 operas and concerts in Vienna, where music is religion. This was a wonderful experience. It is amazing to see the operas, concerts and restaurants crammed with people every day in the year. I can see no sign of poverty. We had a rousing month in Southwest Germany, in August, 1923, and I could see no sign of distress or preoccupation of any sort. Nearly all the precepts of political economy which I learned at Harvard are now in the fat, and your boys may have a try at the johnnie cakes being cooked.

Amice, vale.

HARVEY W. WILEY

WASHINGTON, D. C.

SCIENTIFIC BOOKS

Galvano-magnetic and Thermo-magnetic Effects. By L. L. CAMPBELL. Number seven of *Monographs on Physics,* edited by Sir J. J. Thomson and Frank Horton, Sc.D. Longmans, Green & Co., New York, 1923. 307 pages, 8vo.

THIS monograph brings together historical, experimental and theoretical accounts of the Hall effect, the Ettinghausen effect, the Nernst effect and the Righi-Leduc effect.

A thin sheet of metal is placed in and normal to a strong magnetic field. When an electric current flows through the sheet of metal a transverse electric potential-difference is developed (the Hall effect) and a transverse temperature difference is developed (the Ettinghausen effect). When a flow of heat takes place along the sheet of metal a transverse electric potential-difference is developed (the Nernst effect)

[1] The number of classmen attending the fiftieth reunion.

[2] He refers to his last published paper, "Atmospheric physics—as applied to a reformed meteorology," 61 pages, printed in Vienna, in April, 1923.

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.

WM. S. FRANKLIN

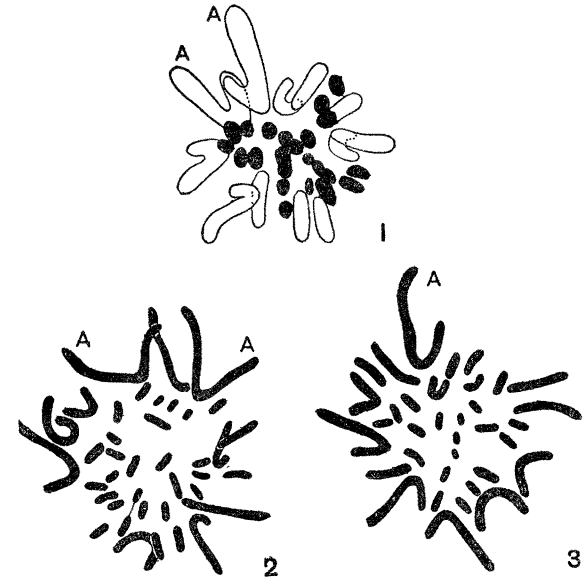
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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.