

more or less complete disablement—as these figures indicate. We believe somebody once asked: "Is not the life of a man worth more than that of a sheep?" The story of killing which these statistics brings annually to our notice, almost leaves one in doubt as to what, in certain quarters, the answer might be. We are aware that automatic couplers have been introduced and made compulsory, largely with a view to preventing this loss of life; but in view of the fact that the railways are now so thoroughly equipped with them, we cannot help feeling disappointed that the casualty list shows so little signs of decrease. The United States people evidently do not realize the magnitude of this question. If they did, it would be agitated to the point at which some special inquiry would be made into the matter with a view to determining the cause of such a frightful loss of life, and the best means of preventing it. Fifty thousand injured and nearly 8,000 killed in a single year! We doubt whether the darkest records of the South African war would show a similar record in the same period of time.

**CHARLES SEDGWICK MINOT.**  
BY MARCUS BENJAMIN, Ph.D.

For the first time in its history the American Association for the Advancement of Science will hold its meeting in the Rocky Mountain region, and to preside over the sessions to be held this week in Denver, Professor Charles S. Minot has been chosen to succeed Professor Robert S. Woodward as presiding officer. Thus the time-honored rule of a representative of one of the natural sciences following a representative of the physical sciences again prevails.

Professor Minot was born in West Roxbury, now a part of Boston, on December 23, 1852. As a boy, he began collecting insects, showing special interest in butterflies. In course of time he entered the Massachusetts Institute of Technology, where he graduated in the chemical course in 1872. Meanwhile he had published several entomological papers in which were descriptions of several new species. This led to an interest in the structure of animals, and as that interest developed he determined to devote himself to the study of biology. Finding it impossible to obtain the desired training in the United States, he went abroad and followed special studies at the universities in Leipzig, Paris, and Wurzburg, receiving the degree of Doctor of Science from Harvard in 1878.

In 1880 he became lecturer on embryology in the Harvard Medical School, and also instructor in that institution in oral pathology and surgery. These appointments he held until 1883, when he became assistant professor of histology and human embryology in the Harvard Medical School, and full professor in 1892, which chair he still holds.

While still a student in Leipzig, where he worked under Professor Carl Ludwig, whom he considers the best scientific teacher he ever knew, he made the discovery that muscles can maintain their contraction without forming carbon dioxide.

Other physiological papers followed the results of experimental investigations, and it was his ambition at that time to take up experimental biology, investigating such topics as growth, heredity, differentiation of tissues, etc. Of his work on growth it may be said that he discovered two important laws, first, that aside from minor fluctuations the power of growth diminishes from birth upward, there being no period in animals of development as opposed to decline; second, that the decline in the rate of growth is correlated with the relation and differentiation of the protoplasm of the cells. Embryological investigations, however, have become, during the last twenty years, more predominant, and his many papers have given the results of his various researches.

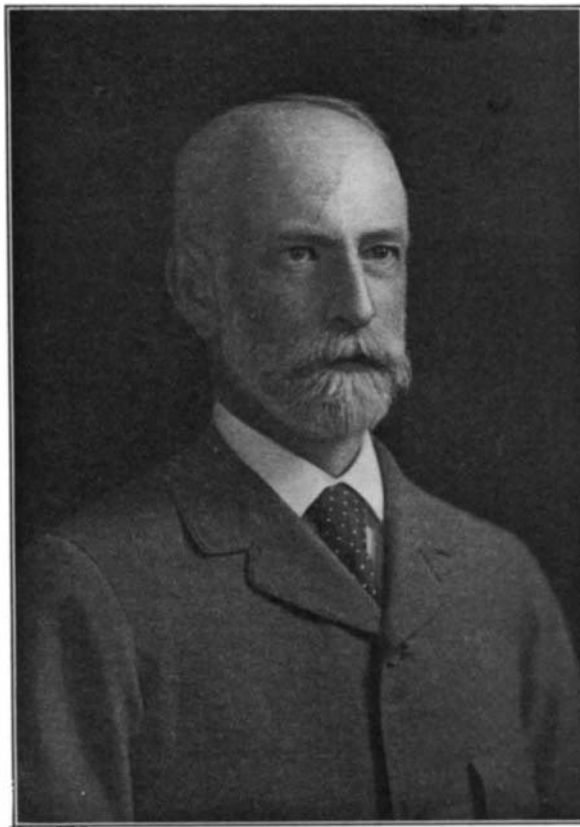
Another field of early study to which he devoted considerable attention was the structure of worms, and the most important general result of these investigations was his demonstration that the nemertean worms, which had always been classed with Plathelminths, formed a distinct class. He also devoted some attention to the microscopic anatomy of insects and invertebrates, publishing several papers on that subject, among which is an extended essay on the histology of the locust which appeared in one of the reports of the United States Entomological Commission.

In the practice of his work in the medical laboratory he has invented several important instruments, chiefly two microtomes originally described by him in 1897, but since improved, one of which he has designated as an "automatic wheel microtome" and the other as the "precision microtome," both of which have received favorable recognition among his colleagues.

To attempt any extended consideration of his bibliography would carry us beyond the limits of this brief sketch, and we must content ourselves with mentioning a few of the more important of his recent papers. Of these the "Work of the Naturalist in the World" was a presidential address delivered before

the American Society of Naturalists at the annual meeting in Baltimore in 1894. In this he discussed the conditions of success in research, the effect of the naturalist's career on his character, and finally the influence of the naturalist on mankind. The subject of "Heredity and Rejuvenation" was attractively presented by him in the American Naturalist for January and February, 1896. He treated it under the following headings: The formative force of organisms, the conception of death, a comparison of larva and embryo, contending in conclusion that "heredity exists in all cells, but its display is inhibited by the organization of the living substance and can be complete only in embryonic cells, and that embryonic cells arise under very various conditions." Besides the foregoing he delivered the Yale University Medical Commencement discourse in June, 1899, on which occasion he addressed the students on the important subject of "Knowledge and Practice." In March of the present year he gave the Middleton-Goldsmith lecture before the New York Pathological Society, choosing as his subject the "Embryological Basis of Pathology." His entire bibliography numbers considerably over a hundred titles, and he is the author of a single book published in 1892 on "Human Embryology."

He has been actively connected with many scientific societies, being one of the founders of the Society of Naturalists in the United States, and for many years he has been a member of the Boston Society of Natural History, of which he became president in 1897. It was largely through his exertions that the American Society for Psychical Research was organized, and to the proceedings of which he has contributed a num-



CHARLES SEDGWICK MINOT.

ber of papers, resulting in his becoming satisfied that "there is no valid evidence for telepathy phantasms, or spirit communications." He is also a member of the American Academy of Arts and Sciences, of the New York Academy of Sciences, of the American Philosophical Society, and a corresponding member of the British Association for the Advancement of Science. In 1897 he received an election to the National Academy of Sciences, which is the highest honor that can be given to an American scientist by his associates.

Doctor Minot became a member of the American Association at the Saratoga meeting in 1879. A year later he was made a fellow, and in 1885 was general secretary of the association. He affiliated himself with the section on biology, of which in 1890 he became vice-president, delivering at the Indianapolis meeting an address on "Certain Phenomena of Growing Old," in which he contended that the growth of protoplasm was the most characteristic peculiarity of advancing age, drawing his facts almost entirely from the study of vertebrates. At the New York meeting, held last year, he was the unanimous choice of the Council for the presidency.

**EXPORTS TO PORTO RICO.**

Exports of American products to Porto Rico in the fiscal year just ended were, according to the figures of the Treasury Bureau of Statistics, more than three times as great as they averaged when Porto Rico was under the Spanish flag, and more than 50 per cent in excess of those prior to the enactment of the Porto Rican tariff law which went into effect May 1, 1900. The total domestic exports from the United States to Porto Rico in the fiscal year 1897, which entirely preceded the beginning of hostilities with Spain, were

\$1,964,850. In the fiscal year 1900, ten months of which preceded the date at which the Porto Rican tariff went into effect, our domestic exports to Porto Rico were \$4,260,892. In the fiscal year ending June 30, 1901, all of which was under the Porto Rican act which levied 15 per cent of the regular Dingley law rates on goods passing into that island from this country, the total domestic exports from the United States to Porto Rico were \$6,861,917. These figures include only exports of domestic merchandise, and do not include foreign merchandise brought into the United States and re-exported to Porto Rico, which presumably amounted to about a half million dollars, since the Porto Rican statement of imports from the United States for the fiscal year ending June 30, 1901, shows the grand total, including domestic and foreign, to be \$7,414,502.

Porto Rico imported in the fiscal year ending June 30, 1901, goods amounting to \$9,367,230 in value, and of this, \$7,414,502 came from the United States, the total from other countries being \$1,952,728. Of this \$1,952,728 imported from countries other than the United States, the value of \$808,441 was from Spain; \$374,837 from the United Kingdom; \$294,067 from Canada; \$166,723 from France; \$152,201 from Germany, and \$61,838 from the Netherlands.

The total exports of the island during the fiscal year 1901 were \$8,663,816, of which the value of \$5,661,137 was sent to the United States, and \$3,002,679 to other countries. Of the latter sum, the value of \$1,110,048 was to Cuba; \$596,023 to Spain; \$473,070 to France; \$341,699 to Canada; \$140,772 to Germany, and \$88,935 to the Netherlands.

The growth in exports from the United States to Porto Rico has been in nearly all the articles entering into that commerce, but especially in manufactures. Exports of cotton cloth increased from 5,500,000 yards to over 22,000,000; boots and shoes, from 23,000 pairs to 48,000; books, maps and engravings, from \$14,000 to over \$40,000; candles, from 111,000 to 375,000 pounds; chemicals, drugs and medicine, from \$59,000 to \$89,000; wearing apparel, from \$23,000 to \$101,000; vegetable oils, from \$53,000 to \$66,000; soap, from \$17,000 to \$27,000; the manufactures of wood, from \$49,000 to \$100,000. There was a slight reduction in exports of flour, probably due to the very heavy increased exportation of rice from this country, which advanced from less than 5,000,000 pounds to over 36,000,000 pounds. Provisions increased nearly \$100,000 during the year, the exports during 1900 having been \$870,897, and those of 1901, \$961,001, and refined sugar increased in exportation from \$6,211 in 1900 to \$14,684 in 1901.

**ADVANTAGES OF PAPER NEGATIVES.**

The use of bromide paper for the direct production of negatives is one which recommends itself to the amateur for various reasons. Prints made with such negatives are sharper than might be supposed. The lines are softened and many small details are suppressed, while the paper gives a slight grain to the print. While in many cases this would be a disadvantage for landscapes or portraits and such subjects not requiring great sharpness, it answers very well, especially for the larger sizes, from 5 x 7 inches and upward; in the larger prints the grain appears smaller, and the softening of the image in many cases adds to the effect. This is especially so in the case of a platinum print. The paper negative, besides, presents several decided advantages: First, it costs three or four times less than a plate, giving an economy which will be appreciated; second, it is easier to retouch, either on the front or back, without any special preparation, varnishing, etc., as in the case of a plate; third, halation of the negative is suppressed. Besides, the production of such negatives presents no difficulty. The paper is placed with the back against a clear glass plate, and the whole is put in the holder; in most cases the paper will keep itself in place, or in others it may be put between two glass plates. The exposure is, of course, somewhat longer than for a rapid plate; this may be easily found by one or two trials. As to the development, it should be somewhat pushed, as the opacity of the paper makes it rather difficult to examine by transference, and it cannot, of course, be examined from the back; but this is a minor difficulty. To make the print, the paper should be oiled, which increases its transference and diminishes the grain; vaseline or nearly any oil will suffice. In this way some very fine prints have been made which have an artistic character resembling photogravures. The process is such a simple one that it is well worth a trial.

Dr. Doty's crusade against mosquitoes on Staten Island is succeeding very well. A little oil is sprinkled on the grass or weeds about 10 feet away from the houses. The inhabitants in the mosquito-ridden district claim that for the first time in weeks they were able to enjoy a good night's rest. The treatment of the ponds with petroleum seems to have also lessened the evil.