These and other objections were duly communicated to both the writer and the editor of the paper, and if they had been cited in full I should not now refer to the subject.

N. C. NELSON

AMERICAN MUSEUM OF
NATURAL HISTORY

THE SEX RATIO OF ADULT TRICHINAE

THROUGHOUT the literature vague and contradictory statements prevail concerning the intestinal phases of the life-history of *Trichinella spiralis*. These relate especially to the sex ratio, and to data relative to the abundance and duration of the adult worms in the intestine of the host. They are due largely to the tedious and imperfect methods which have been employed for collecting the intestinal stages.

While engaged in experimental work on this parasite the writer evolved a simple and effective method of obtaining the adults in large numbers. This consists of stripping the contents of the intestine of the infected animal into a physiological salt solution and screening the adults from the débris with a small-mesh wire screen. By using this method it has been very easy to make exact observations on the intestinal worms.

White rats were fed heavy doses of trichinized flesh and beginning with the third day were killed and examined at short intervals. From one specimen, opened at the beginning of the third day, 2,176 worms were recovered; of these 1,196 were females and 980 were males. At the end of the third day 73 adults, of which 36 were males, were found in the intestine. The next rat, opened at the end of four days, had 12 adults, of which 8 were females and 4 were males, which would indicate a very light infection. At the end of six days 51 males and 63 females were found. The condition was about the same at the end of eleven days, when 73 males and 81 females were taken from the intestine. Thirteen days after feeding one of the rats contained 451 adult worms, of which 324 were females. At this time there seems to be a dropping off in the numbers of both sexes, for at the end of sixteen days only 4 adults were found, one of which was a living male. One of the females was dead and found in the feces. The diaphragm was well filled with the migrating larvae, indicating a very heavy infection. Subsequent examinations made at the end of eighteen, nineteen, twenty, twenty-one and thirty-four days did not yield any adults, while in each instance the migrating larvae or the encysted larvae (encystment beginning at the twentieth day) were found to verify the infection.

These data indicate that at the outset the males and the females are equal in numbers. There is a gradual decline in the proportions of the males up to the thirteenth day, and at this point the worms of both sexes begin to leave the intestine rapidly. This continues until the sixteenth day, when very few of either sex were found. The males and the females were both found in the intestine as late as the sixteenth day, which seems to be about the normal duration of the adults in the intestine.

REED O. CHRISTENSON

DEPARTMENT OF ZOOLOGY,
UNIVERSITY OF MINNESOTA

A NEW LOCALITY IN CHINA FOR LYTTONIA RICHTHOFENI KAYSER

DURING the years (1909–1915) that the undersigned, now of the Fifth Avenue High School, Pittsburgh, Pennsylvania, was stationed at the University of Nanking, China, as head of the department of biology and geology, he did much collecting from the Chihsia Limestone at Chihsia Shan. A representative collection of the material thus obtained was sent to the Carnegie Museum, Pittsburgh, where it has been studied. In November of 1926, Dr. Ichiro Hayasaka, head of the department of geology of the Japanese Imperial University of Formosa, visited the museum and went over this material with the undersigned. At that time it was discovered that two or three specimens of a brachiopod, tentatively identified as *Oldhamina decipiens* Waagen, were really small specimens of *Lyttonia richthofeni* Kayser.

Considerable interest attaches to this discovery because the finding of this diagnostic Permian fossil in the Chihsia limestone indicates that this limestone can no longer be classed as Dinantian, as placed by Dr. A. W. Grabau, of the Chinese Geological Survey of Peking, but instead must be regarded as Permian.

WILLIAM MILLWARD

RENNERDALE, PENNSYLVANIA

PHOTOMETRY

MR. IRWIN G. PRIEST has been good enough to send me a copy of his letter to you, dated June 21, concerning the description in my recent book "Photometry," of the instrument developed by him for heterochromatic photometry (pp. 244–5).

While agreeing, of course, that his instrument is in no wise identical, either in principle or in use with Helmholtz's "Leucoscope" it still appears to me that "Leucoscope Photometer" is a not inappropriate description of the instrument which is, in essence, a photometer in which a color match is obtained by means of the rotatory dispersion of quartz, and a brightness match by means of polarization prisms. Nevertheless it is clear that as Mr. Priest is the in-

ventor of the instrument he must necessarily be entitled to object to having any name attached to it which, in his opinion, is liable to lead to misunderstanding. I can, therefore, assure him that should a further edition of my book be called for, the alteration will certainly be made. In the meantime I feel sure Mr. Priest will agree that the description of the instrument which I have given in the text of my book is in no way misleading.

JOHN W. T. WALSH

QUOTATIONS

RESEARCH IN MEDICAL PRACTICE

RATHER more than a year ago the Ministry of Health submitted to the British Medical Association a scheme for cooperative research by panel doctors. This scheme has now been considered by the Insurance Acts Committee of the association in consultation with representatives of the Ministry of Health, and certain conclusions have been arrived at which are likely to exercise an important influence on the future of research work in general practice. Research work by general practitioners, it is felt, should not be restricted either to panel doctors or to panel patients, but should be open to all medical men who may desire to undertake it. It should be voluntary and it should be unpaid. Moreover, the subject or subjects "should be capable of being dealt with by the individual practitioner in a simple manner." This last recommendation is likely to meet with the approval of all who understand the difficulties attending any research work in general practice; it is, moreover, justified fully by the nature of the information of which the profession stands at present in need. The late Sir James Mackenzie, who was the first man in this country to recognize the necessity of continuous research work in general practice, emphasized again and again the fact that knowledge is still lacking about the most simple of human ailments. He was wont, for example, to insist that the nature of pain and the mechanism of its production are unknown, and to ask how, in these circumstances, physicians could hope to deal successfully with this commonplace symptom. His challenge still stands; but the new proposals suggest that it is about to be taken up in the spirit in which it was delivered.

The British Medical Association takes the view that the organization of the investigations to be carried out should be entrusted to itself, and proposes to make use of its machinery of divisions and branches to facilitate the work. There can be no reasonable objection to that plan provided that care is exercised to prevent research work being reduced to the level of a mere *questionnaire*. True research, as Sir Ronald Ross has so often pointed out, springs from the spirit of curiosity and the spirit of wonder and is, consequently, difficult to organize. Research workers are born, not appointed. Thus it may be hoped that there is room in the new scheme for the encouragement and assistance of individuals or groups of individuals who have, in the vast field of general practice, begun to cultivate plots of their own. Such workers have, in all periods, been the real architects of progress. They submit, as a rule impatiently, to the restrictions of "inquiries" which are addressed to them by others, but they possess always great funds of patience and of self-denial for use in their chosen labors. To discover such workers and to help them is a task of no little difficulty and delicacy, but it is a task well worth carrying out. There is room, indeed, in any liberal scheme of medical research for the individual as well as for the group or team. Information which can be obtained in the form of answers to set questions ranks by common consent lower in point of value than that kind of knowledge which inspiration and devotion are able to win.—*The London Times.*

SCIENTIFIC BOOKS

Introduction to the History of Science. Volume I, from Homer to Omar Khayyam. By GEORGE SARTON, Associate in the History of Science, Carnegie Institution of Washington. Published for the Carnegie Institution of Washington by The Williams and Wilkins Company, Baltimore, 1927. p. i–xi, 1–839.

THIS large volume is the first of several volumes in preparation which mark the most comprehensive synthesis in the history of science thus far conceived. It registers an epoch in the writing of history. Sarton defines science as "systematized positive knowledge" and to this definition gives a broad interpretation to include not only physical science, mathematics and medicine, but also the early history of philology, for "the discovery of the logical structure of language was as much a scientific discovery as, for example, the discovery of the anatomical structure of the body," also the history of religion, for "until relatively modern times, theology was an intrinsic part of science, and not only that, but, in the opinion of most men, all other sciences were subordinated to it." The clash between Greek ideals and the oriental religions (chiefly Judaism and Christianity) is "one of the greatest intellectual conflicts of history." The author includes also parts of the history of music—"indeed the theory of music was considered a part of mathematics almost until modern times." Some attention is