THE TEACHING OF ELEMENTARY DYNAMICS

To THE EDITOR OF SCIENCE: Will you please note that the following typographical errors should be corrected in my article in SCIENCE of December 24, page 901:

First column, after (4) "Impulse = Momentum" should be raised two lines, and "From (3)" should be brought down to the line containing $T = 2S/V$.

After (5) "Work done = Kinetic energy" should likewise be raised and "In (4) let" lowered.

Sixth line from bottom, for $A = M/F$ read $A = F/M$.

Second column, third line, for $Wg/32.1740$ read $Wg_1/32.1740$.

WM. KENT

MONTCLAIR, N. J.

## SCIENTIFIC BOOKS

*Medical and Veterinary Entomology: A Textbook for use in Schools and Colleges, as well as a Handbook for the use of Physicians, Veterinarians and Public Health Officials.* By WILLIAM B. HERMS, Associate Professor of Parasitology in the University of California. The Macmillan Company, 1915. Price $4.00.

This is a time in the history of the world when "long-felt wants" are rapidly being filled. A year ago an up-to-date handbook of medical entomology did not exist in printed form, and now we have two excellent works on this subject. The first to appear, "A Handbook of Medical Entomology," by Dr. W. A. Riley and Dr. O. A. Johannsen, of Cornell University, was reviewed in SCIENCE, October 15, 1915. The second, which has just appeared, is a large, well-illustrated and competent book of about four hundred pages, and has been written by a man who has been investigating and teaching the general subject for six years or more at Berkeley. Much of the matter contained in the book was prepared for the press some six years ago, but owing to the very many advances which are constantly being made in the field covered by the book it was withheld until this time, much revised and added to, and now appears at a moment when it is very welcome. Although the author states that his book is not intended to be a comprehensive treatise, but is rather an attempt to systematize the subject and to assist in securing for it a place among the applied biological sciences, it has greatly the appearance of comprehensiveness. The whole field is included in the treatment, and of course for the purposes of the volume the ticks and mites are among the subjects treated. There is also a chapter on venomous insects and Arachnids.

A thoroughly good compilation arranged in a natural and systematic manner would have been a most useful book for the teacher and student as well as the practitioner, but in addition to being such a compilation this book includes a large amount of new material based upon the researches of Professor Herms and his assistants. For example, he details specific experiments in the transmission of bacteria by cockroaches and gives counts of the bacteria of the different parts of the body of the croton bug. His chapters on organization and cost of mosquito control work and on organization and control work against the house fly are especially strong from the very fact that they are based upon extended experience and upon very many experiments. Professor Herms himself has been the adviser in nearly all of the organization and control work of this kind which has been carried out on the Pacific coast, and what he says in this direction is in the highest degree authoritative. His chapter on the stable fly (*Stomoxys calcitrans*) is also strong, and his conclusion to the effect that it is doubtful that this species is the usual agent in spreading polyomyelitis in nature is based upon a careful series of experimental laboratory work with this species and monkeys. The treatment of the important group of fleas and ticks is noticeably full, and his consideration of bee stings, and especially of the morphology and operation of the sting, is very welcome.

In his generalizations concerning mosquito life history, on page 91 and the following, he does not sufficiently point out, it seems to the writer, the enormous differences that exist in the life histories of different species, which

are in fact so great that it is difficult to generalize except in the broadest way. There are very few slips in the book, but it is misleading to read on page 113 that Surgeon-General Sternberg established in 1899 a commission "to study the yellow-fever mosquito theory in Cuba." As a matter of fact the commission was established "for the purpose of pursuing scientific investigations with reference to the infectious diseases prevalent on the Island of Cuba," and it was, as is shown in Agramonte's important article in the last number of *The Scientific Monthly*, the commission's idea experimentally to test Finlay's theory. In this error Professor Herms probably followed the writer's early book "Mosquitoes" (New York, 1901), but it has been several times corrected.

There is much to be said in favor of the rapidly growing substitution of half-tones from good clear photographs for photo-engravings of line and stipple drawings, but it is possible to carry this to an extreme. For example, the illustration of the two-spotted corsair (*Rasahus biguttatus*), page 78, can by no means be considered as a competent illustration of this species, unless it were stated to be a specimen crushed by a violent slap when engaged in sucking the blood of the author! This, however, is an exception, and the great majority of the figures are very good.

Very many students in the universities and colleges and in the medical colleges as well are turning their attention to medical entomology, and perhaps the most rapid advances in the whole field of economic entomology in the immediate future will be in this direction. The timeliness and usefulness of Professor Herm's book under these circumstances can not be doubted, and both he and his department at Berkeley are to be congratulated.

L. O. Howard

*Senescence and Rejuvenescence.* By C. M. Child. Chicago, The University of Chicago Press. Pp. xi + 481. 201 figures.

A number of biologists have attempted to solve the problem of rejuvenescence by denying its existence. Living substance, they say, grows old, but can never grow young. In each individual some part remains young and it is this that supplies the substance for the process of senescence. Professor Child is not of this belief. To him "growing young" is as real a phase of development as "growing old." This is natural to one who has seen and described the formation of sex-cells from tissue cells and to whom structure is merely a product of function. For some time he has been making a study of rate of metabolism as a criterion of senescence and rejuvenescence and the present volume is largely an exposition of the results of these experiments with a discussion of their significance for the problem of development.

A considerable mass of evidence, according to the author, proves that susceptibility to the cyanides, ethyl alcohol, ethyl ether and similar substances is directly proportional to the rate of metabolism when the strength of the solution is sufficient to kill within a few hours. On the other hand, if the solution is so weak that there is an acclimation effect the animals with the higher rate live longer than those with the lower rate. Starving animals form an exception to the latter rule.

These methods show that increase in age is in general accompanied by decrease in rate of metabolism, but that there are one or more periods in each life cycle that are accompanied by an increase in rate. According to Child these are the periods of rejuvenescence and are found not only in the early cleavage stages following the union of the egg and spermatozoon, but also in the early period of regeneration, in starving animals and under other conditions. He concludes from these considerations that rejuvenescence is a fundamental phenomenon in development and is by no means confined to sexual reproduction. As a matter of fact the changes in metabolism due to amount and character of food and to other environmental factors are according to him in no essential respect different from the others. This attempt to prove fundamental similarity between minor metabolic changes and the major processes of the life cycle may be criticized, but Child considers it to be one of the principal virtues of his discussion. When put in physio-