subject, and that source is unreliable, then we have a queer situation. . . .

Professor Jennings waited two months and then wrote: "I felt that I had little or nothing to add that would help you, so that I have not hurried about replying."

The words "nothing to add" are a categorical acknowledgment that on March 14, 1923, Professor Jennings did not know of a thing on the face of the earth, other than my work, which was a proper answer to the question asked. When I gave out my quotations, I said that they were "simply those parts of the letters received which answer the questions asked—irrelevant matter being omitted."

The same letter of inquiry was also sent to the National Research Council, the Bussey Institution and to several other places. None of the other replies referred to Kammerer's work, or indicated any other person who had investigated the inheritance of "mental and physical benefits" obtained by training. As Professor Conklin put it: "I am sorry to have to tell you that there has been no satisfactory research of this character." No matter how unsatisfactory my work may be to any one, he can not deny that it is directed to the particular thing asked about in the question. Under these conditions I do not see any reasonable ground for the complaint of Professor Jennings in SCIENCE for January 11, 1924. I gave everything which was relevant, and the form of giving it did not change the meaning in the slightest degree.

CASPER L. REDFIELD

CHICAGO, ILL.

SINCE sending in my note in SCIENCE of January 11, the material there discussed has been published by Redfield. With relation to the above communication, two matters of fact require to be made clear:

(1) My letter to Herdman cited the paper (by Detlefsen) given at the scientific meetings in Toronto, but did not mention the author's name.

(2) Any one competent to discuss the inheritance of acquired characters knows that the experiments of Kammerer do deal with those effects of the environment that take the form of responses by the organism, including activities as well as structures. The same is true of the book by Semon, which was likewise cited.

The method employed in asserting that the words "nothing to add" are "a categorical acknowledgment" of what Redfield affirms, is a precious sample of the illuminating methods referred to in my former communication. One is at liberty to hold any opinions that suit his fancy, but to publish them over the signature of another who considers them preposterous is not scientific. The matter is without interest save as a study in the methods, reliability and competence of a man whose pronouncements on a difficult biological problem have in certain otherwise well-informed quarters been taken seriously.

H. S. JENNINGS

THE PROBLEM OF THE MONKEY AND THE WEIGHT

IN this *Journal* on February 15 last, page 164, Carl Hering states the problem in these words: "A supposedly weightless rope passing over a frictionless pulley has a 10 pound weight hanging on one end and a 10 pound monkey on the other. What will happen when the monkey climbs the rope?

As the proposer himself does not give a solution of his problem, it may be of interest to mention the practical test to which the writer put it a little over six years ago. A clockwork monkey driven by a spring and weighing 240 grams was counterpoised over the nine-inch pulley of a fine Atwood's machine. When the thread holding the last wheel in the train was burned, it climbed 80 cm in a minute, while the counterpoise remained stationary. An account of this was published in *School Science and Mathematics* in December, 1917, xvii, 821.

This statement remained unchallenged for two years, when in the same journal in December, 1919, xix, 815, Wilbert A. Stevens asserted that friction was to blame for the fact that the counterpoise did not rise with the monkey. This appeared rather doubtful because one fifth of a gram was sufficient to destroy the equilibrium, and when the pulley was replaced by a balance, 10 milligrams deflected the beam when the monkey and its counterpoise were attached. When the monkey started to climb, the counterpoise did go up for a moment, but it came down again and oscillated about its zero position with decreasing amplitudes.

The experiment was then repeated with the clockwork monkey climbing ten times as fast as before, and then both monkey and counterpoise went up together. This result was published in the same journal in February, 1920, xx, 172.

WILLIAM F. RIGGE

IN the discussion of this problem on page 164 of this volume of SCIENCE, a necessary condition has been omitted from the statement of the problem; that is, the relative distances of the monkey and the weight from the pulley.

Whatever this ratio may be, the effect of the action of the monkey in passing the rope through his hands must be precisely the same as that which would be produced by a shrinkage of the rope. That is, the tension will be the same in all parts of the rope. If the weight is five feet and the monkey ten feet from

the pulley at the start, the weight will reach the pulley while the monkey is still five feet from it. If both parties are ten feet from the pulley at the start, the monkey, when he reaches the pulley, will have passed twenty feet of rope through his hands, under a tension of ten pounds. That is, he will have expended twice the energy that would have been required, if the weight had been held motionless. As regards the influence of the inertia of the moving body (touched upon at the end of the article) it is evident that the energy expended at the beginning of the ascent to acquire velocity will be restored at the end of the trip as the velocity is gradually reduced to zero.

LAUNCELOT ANDREWS

WILLIAMSTOWN, MASS.

THIS problem to which Dr. Hering has called attention in SCIENCE, February 15, was invented by Lewis Carroll (C. L. Dodgson) in 1893. In the *American Mathematical Monthly,* volume 28, 1921, pp. 399–402, may be found a history of the problem, and solutions by Professors E. V. Huntington, of Harvard University, and L. M. Hoskins, of Stanford University. Neglecting also the weight of the pulley, the monkey and weight will move upwards at the same rate.

R. C. ARCHIBALD

BROWN UNIVERSITY

SCIENTIFIC BOOKS

The Conservation of Wild Life in Canada. By DR. C. GORDON HEWITT, Dominion Entomologist and Consulting Zoologist. Charles Scribner's Sons, New York, pp. 1–344, 1921.

THE late Dr. C. Gordon Hewitt's volume on Canadian wild life gives us for the first time a thoroughly comprehensive account of the larger mammals and birds of Canada from the conservation point of view. A distinctive feature of the book is its clear recognition of the fact that in Canada the wild life problem is, economically considered, largely a question of the proper utilization of the non-agricultural forest lands. He says:

> Not all lands are suitable for agriculture. Even in the best agricultural sections of the country areas unsuited to agriculture occur. In some cases, as will be shown later, such areas have been set apart as forest reserves; in other cases a struggling population endeavors to eke out a meager existence on the sparse products of the unfertile soil. The problem of the best method of dealing with such non-agricultural lands has already received some consideration by our governments. In the future it will demand more attention than we have hitherto thought necessary. And it is here primarily that the practical application of the principles of wild-life conservation should receive serious attention, for it will afford one of the most important methods by which the unproductive or scarcely productive areas can be rendered productive.

Northern Canada is so barren, in spite of Stefánsson to the contrary, that only detailed and extensive investigations will provide plans for a proper use of its resources. Dr. Hewitt remarks:

> The economic development of northern Canada is dependent upon the proper conservation of the wild life of that section of the Dominion. If adequate measures are adopted to conserve upon proper lines the game and fur-bearing animals of those portions of the Northwest Territories unsuited to agriculture, and such portions constitute by far the greater part, there is no reason why the whole of that area should not be productive and contribute to the wealth of the country. The possession of such territories would become a matter of pride rather than of reproach. . . . This country contains the greatest variety of valuable fur-bearing animals, for the possession of which men risked everything, including their own lives. Now our agricultural lands constitute that lure, but the remnant of those fur-bearing animals is still with us. Conservation of our natural resources is taking the place of exploitation. We should apply the doctrine to the fur-bearing animals and thus secure their full value to the community. And it can not be stated too often that conservation means the protection of natural resources from injudicious exploitation and their provident utilization. Our northern territories, under proper administration, could become not only a valuable source of food supply, but also one of the chief fur-producing areas of the world.

The chapter devoted to the enemies of wild life and the method of controlling predatory animals contains much interesting data on Canadian conditions and gives considerable additional evidence of the failure of the bounty system as a satisfactory method of controlling these animals. Hewitt states:

> And while the complete extermination of such predatory species is not possible, desirable, or necessary, a degree of control must be exercised to prevent such an increase in numbers as would affect the abundance of the non-predatory species.

One of the most valuable parts of the book is the chapter on the periodic fluctuation in the number of fur-bearing animals. He furnishes graphs showing the fur returns of the Hudson's Bay Company from 1821 to 1914 and thus summarizes his conclusions:

> First, the herbivorous rodents such as mice and rabbits, which are very prolific and increase in numbers until they reach an abundance which causes overcrowding, when an epidemic of disease almost wipes them out and their numbers rapidly decrease to a minimum. Second, we have the numerous predatory animals which depend for their subsistence either directly or indirectly upon the mice and rabbits. These animals exhibit fairly regular periodic fluctuations in numbers, their abundance being