THE LOWER SONORAN COCHINEAL.

IT is well known to residents and travellers in the Southwest that the cacti of that region furnish a kind of cochineal, but whether it was identical with the commercial insect long remained in doubt. The purpose of the present note is to separate and define the Lower Sonoran form, which has hitherto remained nameless. Four kinds of cochineal have came to my notice, as follows:

(1) *Coccus cacti*, L., of tropical Mexico and southward. The type locality is Surinam.

(2) *Coccus tomentosus*, Lam. (*opuntiæ*, Licht.) of the Mexican tableland south of the Tropic of Cancer.

(3) *Coccus tomentosus* subsp. *newsteadi*, subsp. nov.' of the Lower Sonoran in Arizona, Texas and northern Mexico.

(4) *Coccus tomentosus* subsp. *confusus*, Ckll., of the Upper Sonoran in New Mexico and Colorado.

The subsp. *newsteadi* was first described by Mr. R. Newstead in the *Entomologists' Monthly Magazine*, April, 1897, pp. 75–76, from specimens imported to Kew Gardens on *Opuntia fulgida* from Arizona. He intended at first to name it as distinct, but finally treated it as *tomentosus*. It is a fair intermediate between *tomentosus* and *confusus*, both structurally and geographically. It has the spines and glands about as in *tomentosus*, but averages smaller, with the antennæ usually 6-segmented, and the cottony secretion abundant, much as in *confusus*. It occurs in Wabash Creek Cañon, near Flagstaff, Arizona (*Ehrhorn*), La Puerta Rancho, in Tamaulipas (*Townsend*), Point Isabel, Texas *Townsend*), etc.

There is no probability that either *newsteadi* or *confusus* can be used commercially. (See Bull. 3, Tech. Sec., Div. Ent., Dept. Agriculture, p. 35.)

T. D. A. COCKERELL.

MESILLA PARK, N. M., October 8, 1898.

THE ENDOWMENT OF AMERICAN ARCHÆOLOGY.

TO THE EDITOR OF SCIENCE: I should like to make a suggestion through SCIENCE to all the universities and organized societies of the United States that a strong and systematic effort be made to celebrate that point in the age of the world called the year 2000 A. D. by a fund of $2,000,000, whose interest would be devoted to a study of the archæology of America. The money and the willingness to give and to use it are in plenty, and among scientific needs there is nothing that can compare. The splendid monuments of antiquity, rapidly fading away, especially in Mexico, Central America and Peru, offer the greatest rewards.

Two strong expeditions or parties ought to be kept in the field constantly. A committee of the schools and colleges should plan the work systematically, and arrange a method for making results accessible to all the public, by descriptions, models, photographs, etc. The suggestion is respectfully submitted.

W. S. PROSSER.

AUBURN, CAL.

THE SENSE OF SOLIDITY.

TO THE EDITOR OF SCIENCE: Having had frequently the following experience, I record it with the hope that it may call forth either analogous experiences from others or some explanation.

On falling asleep with any weight in my arms I have noticed that on waking at a certain stage of drowsiness the feeling of solidity has entirely vanished. It is not only that the sensation of weight is very much dulled, but the sense of continuity in the held body is gone. Indeed, it often seems as if the hole between the parts whose contact is actually experienced could be felt. The contrast with ordinary experience is so great that it serves to bring out very effectually the fact that ordinarily in holding an object we have not only a sense of contact and of weight, but also a sense of 'filling-in,' of tactile solidity or continuous extension. In the experience referred to, the contact sensations also appear to have a granular rather than a continuous character.

JOHN DEWEY.

UNIVERSITY OF CHICAGO,
October 21, 1898.

SCIENTIFIC LITERATURE.

The Free Expansion of Gases. Edited by J. S. AMES, PH.D. Scientific Memoirs. New York, Harper & Brothers.

A few months ago the pleasing announcement

was made that the publication of a series of 'Scientific Memoirs' would shortly be commenced by Harper & Brothers, under the editorial direction of Professor Ames, of Johns Hopkins University. They were to relate mostly to physical science, and were to include only memoirs of first importance, and generally only such as are not very easy of access, or which are found only in some language other than English, or in a form otherwise inconvenient. Professor Ames has secured the editorial assistance of a number of well-known students of physical science, and it is gratifying to know that in the near future many of the most important memoirs relating to this great department of human knowledge, many of which have marked epochs in the history of science, will be available in a convenient and comparatively inexpensive form.

The plan will now be better understood after an examination of the first volume of the series, which bears the title given above and is edited by Professor Ames himself. It is a very attractive-looking octavo of about one hundred pages. A preface of one page is followed by Gay-Lussac's paper, read at the Institute on September 15, 1807, on a 'First Attempt to Determine the Changes in Temperature which Gases experience owing to Changes of Density, and Considerations on their Capacity for Heat.' This is an extremely interesting and important memoir, not hitherto easily accessible, although it was reprinted in Leipzig in 1896. Its principal interest is in the evidence of Gay-Lussac's anticipation of some of the most important conclusions of Joule and Thomson, which they worked out with great skill and originality nearly half a century later. Twenty years ago and earlier there was much bitter controversy over the credit due Mayer for his share in the development of the principle of the Conservation of Energy. The importance of his work is greatly enhanced by the recognition of his acquaintance with Gay-Lussac's experiments, which, says Professor Ames, is now generally admitted.

This memoir is followed by a paper upon the same subject, published in 1845, and by several others on the Thermal Effects of Fluids in Motion, the joint work of Joule and Thomson. These constitute the most important literature on the subject and have been the foundation of the modern thermodynamics.

The editor, while adhering closely to the original, has found condensation necessary and possible in portions of the reproduction. Brief biographical sketches of Gay-Lussac and Joule are given, and, when the interest which always attaches to the personality of men who do great things is considered, it seems a pity that a page or two was not given to each of these, instead of a brief paragraph. The mere dates of birth and death, and such like, are not usually the most interesting facts relating to a human life.

This and other volumes of the series soon to appear will undoubtedly meet with a hearty welcome, for they will make it easy for all students to possess the essence of what is of the very highest importance in the literature of exact science, either current or classic.

M.

Thermodynamics of the Steam-Engine and Other Heat-Engines. By Cecil H. Peabody, Professor of Marine Engineering and Naval Architecture, Massachusetts Institute of Technology, Boston, Massachusetts. New York, J. Wiley & Sons; London, Chapman & Hall. 4th ed. Rewritten and reset 8vo. Pp. 522. Price, $5.00.

This is a new and revised, rearranged and extended issue of the well-known work of Professor Peabody, now ten years old. The book has been carefully and completely revised, to bring it up to date in theory and in current practice. Considerable new matter has been introduced and the whole has been reconstructed in such a manner as to make it substantially such as its author would have prepared as a new treatise on its subject at the present time. It is an excellent piece of technical work and undoubtedly will more than sustain the reputation which it has already acquired. This volume is a standard treatise on Clausiusian thermodynamics in our technical schools and among engineers, and, so far as the reviewer is informed, the only treatise of that school which presents any satisfactory discussion of applied thermodynamics having value for the engineer engaged in professional work relating to the heat-en-