

perature and great humidity succeeded during which time no beetles were observed, but on 2 June it became warm again and so continued, and these same beetles again occurred, but much less abundantly, and continued till 23 June, after which no more were observed. Mr. Klages collected during a few evenings at the electric lights suspended opposite the large plate-glass windows of some of the stores in Pittsburgh with such success, that he sent to Europe seven hundred specimens of *C. willcoxi* and three hundred of *C. scrutator* (his correspondents there write for more!).

Where these beetles came from is a matter of speculation, but it is scarcely supposable that all were raised in the city. The number of individuals must have been immense as the collecting done by Mr. Klages and myself was only at a few places, and for a very brief period, and that in face of the small boy, etc., etc., difficulty. Of *Calosoma calidum*, which has always been

moderately abundant, not over a dozen specimens were taken at light the whole season. *C. externum* yielded five specimens, *Diplochila major* four specimens, *Polymoechus brevipes* six specimens, *Erycyus puncticollis* four specimens, none of which had been taken elsewhere.

To show the great distances to which water beetles fly, I may state that at the same place on the evenings of May mentioned I picked up twenty-three ♀ and four ♂ *Cybister fimbriolatus*, one ♂ *Dytiscus fasciventris*, twenty-four ♀ and seven ♂ *Hydrophilus triangularis*. The great hemipteron, *Belostoma americanum* could have been taken by the peck. The nearest point to the river is more than three-fourths of a mile.

The number of coleoptera and insects of all orders that are attracted to the electric lights in these cities is beyond computation.

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#### EFFECT OF CONSANGUINITY IN LEPIDOPTERA.

The late M. Pierre Millière contributed an article, entitled, "Des résultats variés que donnent chez les lépidoptères les accouplements consanguins," to *Il naturalista siciliano* for May 1887, which contains facts interesting to the biologist. He writes:

"When, among lepidoptera bred in captivity, pairings continue from one generation to another, without interrupting the series of consanguineous unions by the introduc-

tion of new blood, there occurs for each species a particular result, in such manner that the consanguineous and successive unions not only do not produce, for the lepidoptera in general, identical results, but, on the contrary, each species conforms to an influence which is peculiar to itself."

As illustrating this variety of effect of consanguineous unions in lepidoptera the author obtained fertile eggs for two successive years from *Hadena solieri*; the third year only about half the eggs hatched, while the fourth

year, of an abundance of eggs from different females, none hatched. Ninety eggs of *Spilosoma zatima*, obtained after a consanguineous union failed to hatch. Of *Crocallis dardoinaria*, which has a single annual brood, the first year 480 eggs, and the second year about 500 eggs, all proved fertile, but the third year not an egg hatched out of a large number obtained.

*Eucrostis indigenata* and *Cidaria vittata* failed to produce fertile eggs with consanguineous parents.

He adds: "On the contrary *Nemoria auriaria* raised in captivity, has not, during more than ten years, ceased to be fertile, both for spring and fall generations."

"I could multiply these examples, but the facts which I give suffice to show the interest which pertains, from the point of view of the establishment of specific characters for lepidoptera, to the verifying that, in each species, the continuance of the reproductive power varies when the pairings are between consanguineous individuals and without the introduction of new blood.

As *Crocallis*, *Eucrostis*, *Cidaria*, and *Nemoria* all belong to the *geometridae*, the variability of reproductiveness in close-breeding in a single family is very marked. Experiments on such biological subjects need multiplication.

G: Dimmock.

#### PACKARD'S "ENTOMOLOGY FOR BEGINNERS."

In A. S. Packard's "Entomology for beginners" appears, for the first time from an American publisher, possibly the first time in the English language, a work on general entomology which presents the subject in accordance with modern scientific progress. Instead of being a systematical classification and enumeration of insects to which the study of their anatomy, physiology, and biology is subordinated or appended, as is generally the case with entomological works, the systematic part of this work occupies only about one-third of its pages, and is sprinkled with allusions to habits, and to

internal as well as to external anatomy. The great number of species of insects make it necessary to fill a larger proportion of the work with details of classification than would be the case in considering any other division of the animal kingdom. The chapter devoted to "insects injurious and beneficial to agriculture" is short, but contains as many details, proportionally to the size of the whole book, as seems necessary in a general entomological work.

Of special importance and value are the chapters devoted to modes of collecting, preserving, and rearing insects; to their dissection; and to the cutting and mounting of sections of insects, whole insects, or their organs, for microscopical study. Here Professor Packard has brought together a good number of methods from widely separated sources. The directions for dissection and for microscopical research must prove very useful to the younger students in America who are beginning to turn their attention from unwieldy entomological collections to the comparative anatomy and histology of insects. At first reading of Professor Packard's work, I was inclined to believe that these methods should have been revised and more thoroughly combined in his work, but a second examination convinced me that the nearer each description retained the words of the originator of the process the better, leaving the student or investigator to select for himself the method or parts of methods best suited to his special requirements.

The list of periodicals and works on entomology which occupies ten pages, near the end of the work, is well selected, but there is a lack of uniformity in typographical matters in this list, and in the numerous bibliographical references in the body of the work. Slight inaccuracies of statement are noticeable in places in the work, which is not wonderful when its scope and extent are considered, but it will prove most useful not only to beginners but to all entomologists.

G: Dimmock.



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