

due more to the method of application than to defects of the principles involved; for, as stated, by the use of dried blood, as in our experiments, it is not possible to make the test with constant and accurate, or even approximately accurate, dilutions of the serum. Our irregularities may be in part due to this defect. We therefore lay less stress upon this than upon the other features of our work.

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THE VIRGINIA COLONY OF *HELIX NEMORALIS*.

THE now well-known colony of the European *Helix nemoralis* at Lexington, Va., has twice before been the subject of articles by the present writer. (*Nautilus*, November, 1889, and December, 1894.) It was shown in these articles that many new variations, different from those observed in Europe, had occurred; and the colony consequently became of great interest to students of evolution. Unfortunately, Professor Morrison, who was studying these snails, removed from Lexington in 1890, and, having the misfortune to lose his collection by fire, paid no further attention to the matter. It is only now that I am, through the kindness of Mrs. John M. Brooke, of Lexington, in a position to give some account of the colony subsequent to the date mentioned.

In order that every reader may understand what follows, I will explain the system of band-formulæ used for recording the variations. The typical shell has five bands and the formula is 12345. The absence of a band is indicated by 0, thus 10345. Two or more bands united are bracketed together as (12)345. A rudimentary band is expressed by a small figure below the line, as 1,345. A split band is expressed by doubling the number, as 123345. An extra

band, not assignable to any of the normal five, is expressed by a \times , as 123 \times 45.

Mrs. Brooke sends me a series of shells gathered by herself at Lexington in 1896 and 1897. They are as follows:

A. With a yellow ground-color = *libellula*.

- libellula* 12345.....70.
- “ 123(45).....21.
- “ 10345.....10.
- “ 1,345.....9.
- “ 12045.....6.
- “ 00000.....5 sent, but Mrs. Brooke says they are plentiful.
- “ 12,345.....4.
- “ 1,0345.....3.
- *“ 12,3(45) nov. formula.. 2, the formula shows only near the mouth of the shell.
- “ 12,345.....2.
- “ (123)(45).....2, juv.
- “ (12)3(45).....2, one is juv.
- **libellula* (12)₂3₃₄45 nov. formula,..1, the formula shows only near the mouth.
- “ 12,3(45).....1.
- “ 00345.....1, juv.
- “ 1,045.....1.
- “ 02345.....1.
- “ 123_{xx}(45).....1.
- “ 00300.....1.
- “ 1,0300.....1.
- “ 123_x(45).....1, juv.
- *“ 1(22)045 nov. formula..1.

B. With fawn-colored ground = *petiveria*.

- petiveria* 12345.....1. = *brissonia*, Moquin-Tandon.
- “ 123(45).....1. = *arcelinia* Locard.
- “ (12)3(45).....1. = *brookea*, n. n.

C. With pink ground = *rubella*.

- rubella* 00000.....2. Quite pale. Mrs. Brooke says they are extremely scarce.

The three forms above marked with an asterisk are new to the Lexington list, and are all new formulæ of the split-band type, like the previously found new variations in the colony. All of the rest were formerly obtained by Professor Morrison.

The examination of the above list brings out the apparent fact that the new split-band variations are now comparatively rare in the colony, though still much more fre-

quent than such forms are in Europe. On the face of things, it certainly appears as if the colony were reverting to the European type. At the same time, it must be remembered that Morrison's remarkable variations were picked out of a very large number of shells—a far larger number than those sent by Mrs. Brooke. Unfortunately Professor Morrison never published the detailed statistics he had accumulated, but from data he sent me I gather that there were about 100 split-band shells to 2100 others, *i. e.*, about 4.8%. The split-band forms in Mrs. Brooke's lot above are about 4%, and are not nearly so remarkable as many of Morrison's. But Mrs. Brooke probably put aside the best variations; in fact, she sends for my inspection the following, taken by her at Lexington at various times, and new to the list for that locality, three being new formulæ:

rubella 12045. I have taken a young example of this in England—at Beckenham, Kent. The formula was recorded before from Lexington with a different ground-color.

rubella 003,0. The formula was recorded from Europe by Roebuck.

“ 10045. Very pale ground color. A new combination.

petiveria 1 (23)(45). = *goupilia* Moquin-Tandon
Also in France.

“ 00305 = *gabillotia*, Locard. Also in France.

“ (123)(45). = *lowea*. Moquin-Tandon.
Also in France, England and Ireland.

“ 1(23)(45).

libellula 00(3x)00. nov. formula

“ 00305 = *bruguieria*, Moquin-Tandon. Also in France and England (Kent).

“ (12)₃3(33)3(45) nov. formula. This is the most remarkable shell sent by Mrs. Brooke. It seems to have been found dead, and so may date back to earlier times.

“ 003055. The formula has been recorded from Europe by Kreglinger.

“ (12)_x3(45) nov. formula.

While the percentage of split-band forms may seem small, European collectors will appreciate their *relative* abundance in the Virginia colony, and the large number of different formulæ in the latter which have not yet been seen in Europe. Very many more split-band formulæ are now on record from the Virginia colony than from the British Islands all together, notwithstanding the collecting that has been done in the latter country.

I regret that it is not possible to definitely assert as yet whether the peculiar variations of the Virginia colony are losing ground, but such seems to be the case to a slight degree at least. Certainly there is no evidence of their increase. Probably Mrs. Brooke will be able at a later date to give us more conclusive statistics.

The reader will observe the names (as *goupilia*, *lowea*, &c.) given to the different combinations of color and banding. These were first introduced by Moquin-Tandon; and many were added by Locard, but a very large number of combinations have no such names. I find that they are rather useful, as they can be remembered better, and are not so easily written or printed wrongly as the formulæ, etc., they represent. If I were writing a large treatise on the variation of *H. nemoralis*, I should be inclined to prefer names to formulæ when discussing distribution and other matters.

The colony of *H. nemoralis* at Burlington, N. J., is very different from the Virginia one, and so far as known contains nothing peculiar. Specimens sent to me by Mr. W. G. Binney belonged to *rubella*, *guettardia* and *cuvieria*.

T. D. A. COCKERELL,

N. M. AGR. EXP. STA.

MESILLA, N. M., April 20, 1897.

CURRENT NOTES ON METEOROLOGY.

NAVIGATION IN FOG.

A PAPER by Prof. E. C. Pickering, on