in the meantime I have some rather strange-looking monarch specimens.

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THE TERMINATION OF SATURNIIDS' DIAPAUSE

COLLEEN SEELEY
47 Woodside Ave., Oneonta, New York

Each spring for five years I have been forcing moths to emerge from their cocoons months before their normal time by bringing them into a warm room, spraying them with water, and wishing they would emerge. Last fall, 1964, because I had several hundred cocoons that I had produced through rearing during the summer, I decided to find out just what factor, or combination of things, made moths emerge. I also wanted to know exactly how long it took.

I set up the experiment by checking the time of the year when saturniids normally terminate their diapause, to see what conditions ordinarily exist at that time.

I used *Antheraea polyphemus* (Cramer), *Hyalophora cecropia* (L.), *H. gloveri* (Strecker),[1] and *Callosamia promethea* (Drury). These emerge the last two weeks in June, here in New York. At that time there is plenty of rain and the ground is damp, there are 17 hours of light, and the temperature ranges from 68° to 80° F. All these moths diapause in the pupal stage and would normally be exposed to several months of cold.

I ran two pretests on about 80 cocoons of 11 different saturniids, then set up the following tests on a more accurate basis.[2]

One hundred cocoons of the above four saturniids were divided into five groups of 20 cocoons each. All had been stored in the refrigerator for about five months. All were sprayed with water occasionally.

Group I: Cocoons were kept in darkness and temperature about 40° (in refrigerator). This group was my control. No moths emerged.

Group II: Cocoons were placed in an emergence box with a tight-fitted lid and taped to give total darkness, with the temperature 68°–75° F. Between the 20th and 30th day 85% emerged; 100% of the *cecropia*, *gloveri*, and *polyphemus* emerged. Over 50% emerged between 20 and 23 days.

Group III: Cocoons were placed in a screened box and given exactly

[1] The *Hyalophora gloveri* stock originally came from North Dakota.

[2] Science Congress Project 1965, Albany Science Congress, Biology Intermediate Group—First Award, also Grand Prize.

17 hours of light from a 100-watt bulb each day.[3] The temperature was 68°–75° F. Between the 20th and 30th day 85% emerged; 100% of the *cecropia*, *gloveri*, and *polyphemus* emerged. Over 50% emerged between 27 and 30 days.

Group IV: Cocoons were placed in screened box with continuous artificial light from a 100-watt bulb. The temperature was 68°–75° F. Between the 20th and 30th day 90% emerged; 100% of the *cecropia*, *gloveri*, and *polyphemus*. Over 50% emerged between 22 and 25 days.

Group V: Cocoons were placed in a screened box, with only natural light, and in the basement where the temperature was below 65° F. None emerged.

It is unusual to have this high a percentage emerge in any experiment. Two prometheas were parasitized and others were still viable. They emerged four to six weeks later.

I conclude the key to the termination of saturniids diapause is temperature. Termination of saturniids diapause can be induced in 20 to 30 days by temperature 68°–75° F.

Other interesting information from the experiment:

(1) Total darkness or 24 hours of light sped up the termination slightly.

(2) Males emerged in the first part of the week, females in the latter.

(3) Half of the moths that emerged were males.

(4) Cocoons can be stored in temperatures under 65° F regardless of hours of light. Termination can be delayed with low temperatures.

(5) I found *cecropia*, *polyphemus*, and *gloveri* dependable subjects to work with.

These moths usually have a set time of the day to emerge. Moths emerging in total darkness or 24 hours of light emerged at odd hours. The *cecropia* were coming out at 10:00 P.M. and 9 to 10:00 A.M. They also mated at odd times. One male *cecropia* even copulated with a promethea. She deposited a few eggs (fertility unknown now).

This experiment held a surprise for me as I didn't expect to find any would emerge in the dark box. I might have expected it, though, because many shipments of moths have emerged in tight dark boxes en route.

This information should aid classroom teachers and science teachers in the use of the moth for teaching. The scientist can store his cocoons below 65° to use at his convenience. Students experimenting on moths can see the results without waiting for the normal termination. More broods can be grown in a year, and so on.

[3] A time switch was used for accuracy.