margined with black; between these and the margin is a bar, and two dark thin marginal lines."

These two species much resemble each other; but can be distinguished without difficulty by the marking of the underside of the hind-wings. *C. cardui* has five ocelli or eye-like spots beneath; while *C. huntera* has only two, but much larger.

As before stated, we have not seen the caterpillar, and the several authors describe it differently. Drury says it is green, with black rings round the body. According to Boisduval and Leconte it is blackish-grey, striped with yellow: while Abbot says it is brown with a yellow lateral line.

It occurs in most of the Southern and Western States, and is said to appear once in five or six years in great abundance, while at other times it is scarce.

As yet we have no published observations upon the natural history of the above two species of insects in any Canadian work. The foreign authors do not give many reliable details. In fact, with regard to all our Lepidoptera it may be stated that not one species is perfectly known. We need not be surprised at this, because even in England, where there are perhaps more enthusiastic collectors and more good observers than in any other part of the world of the same extent, the natural history of the sixty-five species of butterflies found in the country is not complete. Upon this subject Mr. Stainton, editor of the Entomologist's Annual, makes the following remarks:—

"A recent writer in the 'New Quarterly Review' has remarked:—'The metamorphoses of the British butterflies, of which there are only about sixty-five, are proportionably less known than those of the small moths! The books which describe our butterflies, it is true,' also give descriptions of their caterpillars and their food; but these cannot be depended upon; they are only copied from other books, and may be traced back from author to author, until they turn out to be the original descriptions of some old French, Dutch, or German entomologist, who looked at objects with a very different eye to that which we use. As such, they remind us rather of the astonishment expressed by Mr. John Robinson's friend on finding he was really alive:—

> 'Somebody told me that some one said
> That some other person had somewhere read,
> In some newspaper you where somehow dead!'

Our readers are therefore recommended to catechize themselves, by seeing how many of the following questions they can answer, with reference to those butterflies with which they may consider themselves best acquainted:—

1. Where is the egg laid?
2. How soon is it hatched?
3. How long does the larva live before changing its skin?
4. What change takes place in the form and markings of the larva when it changes its skin?
5. Is the larva gregarious or solitary?
6. Is it active or sluggish?
7. Does it feed by night or by day?
8. What is its principal food-plant?
9. On what other plants is it sometimes found?
10. At what period is the larva full fed?
11. What change takes place in the appearance of the larva when full fed?
12. Where does it change to pupa?
13. How is the pupa suspended or attached?
14. What is the form of the pupa?
15. How long does it remain in that state?
16. What are the motions of the perfect insect?
17. To what flowers is it most partial?
18. Does it hybernate or not?

When these questions can be answered with reference to each species of our butterflies, we may then admit that their natural history *is* known; and it would then become practicable to write a good monograph of the group.—*Canadian Naturalist.*

Dr. Smallwood's Observatory at St. Martin, near Montreal.

The following sketch of the general appearances of the building and instruments, from the pen of Dr. Hall, of Montreal, furnishes a very suitable introduction to Dr. Smallwood's account of the Observatory established by him at St. Martin, Isle Jésus.

A small wooden building, distant about twenty yards from the dwelling house of Dr. Smallwood, contains the whole of the apparatus which has for many years furnished such valuable results. A short distance from it, and on a level with the ground, is the snow gauge. Immediately in front of the entrance to the small building is a dial, with an index to point out the course of the clouds. Contiguous to the building again may be seen four erect staffs. The highest of which—80 feet—is intended for the elevation of a lighted lantern, to collect the electricity of the atmosphere, the copper wires from which lead through openings in the roof of the building to a table inside, on which a four-armed insulated conductor is placed. The lantern is made to ascend and descend on a species of railway, in order to obviate all jarring. On another pole is placed the wind-vane, which, by a series of wheels moved by a spindle, rotates a dial inside the building marked with the usual points of the compass. Another staff, about 30 feet high, contains the anemometer, or measurer of the force of the wind, which, by a like arrangement of apparatus, is made to register its changes inside. The last pole, 20 feet in height, contains the rain gauge, the contents of which are conducted by tubing, also into the interior of the building, in which, by a very ingenious contrivance, the commencement and ending of a fall of rain are self-marked.

At the door entrance on the right side is a screened place, exposed to the north, on which the thermometer and wet bulb thermometer are placed, four feet from the surface of the earth. A similar apartment on the left contains the scales with which experiments are conducted throughout the Winter to ascertain the proportional evaporation of ice.

On entering the door, in the centre of the apartment, is a transit instrument *in situ*, for the convenience of using which openings are made in the roof, usually kept closed by traps. This apparatus is not the most perfect of its kind, but is amply adequate for all its uses. On the left is a clock, the works of which, by means of a wheel, are made (while itself keeps proper time,) to move slips of paper along little railways, on which the anemometer by dots registers the velocity of the wind; the rain gauge, the commencement and end of showers; and the wind vane, the continually shifting currents of the wind. This is effected by a pencil, kept applied by a spring to a piece of paper on the dial previously alluded to, and as, by the clock-work, the dial and the two previously mentioned slips of paper move at the rate of one inch per hour, so it is easy to determine, in the most accurate manner, the direction and force of the wind at any hour of the day, or any period of the hour. With the exception of the clock, the whole of this miniature railway-work, with all its apparatus, wheels, &c., &c., is the work of Dr. Smallwood's own hands, and exhibits, on his part, a mechanical talent of the highest order.

At the extreme end of the room is a table, beneath which is an arrangement for a heating apparatus, and on which is the four arm conductor previously alluded to. To the two lateral and front arms hang, respectively, two of Volta's electrometers, and one of Bennet's, while beneath the knob on the anterior, there is a discharging apparatus, with an index playing over a graduated scale, to measure, during thunder storms, the force of the electric fluid, by the *length* of its spark. On this subject we cannot avoid a reflection on the fate of the unfortunate Richman. In this case such precautions are adopted as will obviate any casualties whatever; great precaution, however, is required in these experiments, and Dr. Smallwood, fully aware of it, has the whole placed in connection with the earth by means of a brass chain and iron rod. As another proof of Dr. Smallwood's ingenuity and mechanical skill, we may notice that the whole of this apparatus, even to the electrometers, is the result of his own handicraft; and the whole arrangements in the little room are a signal proof how much a man may do unaided, and how well he can effect an object when thrown entirely upon his own resources.

On the right wall of the apartment are suspended the barometers, of which there are three. 1. A standard of Newman's; 2. Another of Negretti's, but of different construction, and 3. One of Dr. Smallwood's own construction. The means of the three observations is the measure adopted for the observation.

The only other instrument deserving of notice is the one to determine the terrestrial radiation; and this also has been made by Dr. Smallwood. It consists of a mirror of speculum metal, (composed of copper, zinc, and tin,) of six inches in diameter, and wrought into the form of a parabolic surface, in the focus of which, at the distance of eight feet, a self-registering spirit thermometer is placed. The construction of this was a labor requiring great nicety in execution, and involving the sacrifice of much time; but perseverance even here conquered the difficulties, and we witnessed a mirror whose reflecting powers would not have disgraced Lord Rosse' telescope. In fact, placed in a telescope, it has, we are in-