heavy, full of eggs, motionless, having not even an embryonic trace of wings. The larvae which are to become males, beside some differences in colors, are much smaller as pupae than those which are to become females. As soon as the perfect stage arrives, the males commence their flight, while the females simply emerge from their cocoon, on which they remain, attracting the males by an odor which they emit, inappreciable to our senses, but shown to exist by the fact that the males will enter an apartment in which a female is imprisoned in a tin or wooden box. The males move their antennae vigorously during flight, often bending them forward, and approach the windows. If these be closed, they go around the house in search of an entrance: they have even been known to descend the chimney.

Pairing is accomplished in a very rough manner. Among many Sphingidae the males approach gently, attract attention, departing and returning in circles, gradually diminishing, until union takes place; but in these the contact is rude, almost brutal, and the female, after the departure of the male, remains motionless, and begins to lay her eggs on the cocoon. O. antiqua, of France, lays its eggs near the cocoon, where they become attached by a secretion which covers them as they are laid. O. gonostigma lays her eggs near the cocoon, taking hairs from its body to make a bed for them, in alternate layers of hairs and eggs, till all are deposited, to the number of about three hundred. The New York species covers the eggs with a white viscid secretion, solidifying in the air, resembling the mucus of the snail and slug. The eggs are generally pretty, at first round, then indented at the top like a goblet or cup, sometimes with a rose-colored ring (in O. antiqua), sometimes of a porcelain-white tint (in O. vetusta).

The larvae escape from the egg by eating through the bottom, where the holes for fecundation are placed. They do not disperse themselves widely. As they live on trees and shrubs, are not large, and eat little individually, they may be numerous upon a single plant. Moreover, almost all are polyphagous, or will eat many different kinds of plants. In France, however, the O. ericaea lives only upon heaths, and the O. trigotephras on a species of oak.

Some species have several broods a year. The O. antiqua, in Paris, like the New York species, appears in June, and sometimes in October; others have only a single brood; but this cannot be made use of in classification or physiology. A given species may have but one brood in the north of Europe and America, and two in the south; and even in Paris and New York, when September is very warm, a second brood may appear, which would not occur in many other Lepidoptera. In captivity, also, the absence of cold nights changes the epochs of their appearance, besides favoring the development of a second brood.

Linnaeus says that the male of the Orgyia, knowing by instinct that the wingless female is powerless to move far, when he finds her on a wall or plant, flies away with her during pairing, and carries her to a place where the young may obtain food. This we have never seen, and never expect to, as the males are entirely too small and feeble to carry off the much greater bulk of the female. We need not say any thing here of the O. detrita, which resembles much the O. vetusta or leucostigma, and may be the same species. Le Metayer de Guichainville.

New York, March 22.

Fossils from Kicking Horse Pass.

I have to-day received the following very interesting communication from Professor Lapworth, on the result of an examination he has kindly made for the survey, of a collection of graptolites from the Rocky Mountains, in the vicinity of the Kicking Horse Pass.

Alfred R. C. Selwyn.

Geol. surv. Can., March 15.

I have recently examined the fossils collected by R. G. McConnell, geological survey of Canada (1886), from the dark, slaty shales of the Kicking Horse Pass, Rocky Mountains. There are few species in the fairly large collection, but the forms are generally well preserved, and the fauna represented is a distinctly typical one. The following are the species I have identified: —

(A) Family Dichograptidae.
  (1) Didymograptus, sp. nov., allied to Didymograptus enodus Lapworth from the Llandeilo beds of Abersiddy Bay, South Wales (see *Quart. journ. geol. soc.*, 1875, plate 35, figs. 1*a*, 1*b*).
(B) Family Glossograptidae.
  (2) Glossograptus ciliatus Emmons.
  (3) Glossograptus spinulosus Hall.
(C) Family Diplograptidae.
  (4) Cryptograptus tricornis Carr or C. marcidus Hall.
  (5) Diplograptus angustifolius Hall.
  (6) Diplograptus rugosus Emmons.
  (7) Climacograptus coelatus Lapworth.

There are also a few other forms, doubtful.

Species of Phyllograptus or Lasiograptus, etc.

The fact that these graptolites have been obtained from the distant region of the Rocky Mountains gives them an especial interest, as few graptolites have hitherto been noticed from that region. The only notice of graptolites from the western states known to me is that given by Dr. Charles White in vol. iv. ('Palaeontology') of the 'Report of the geological survey of the hundredth meridian.' Four forms are described by him (*loc. cit.*, pp. 9, 10, *et seq.*) as having been obtained from some beds of partially metamorphosed shale five miles north of Belmont, Nev. No fossils were found associated with them that might assist in the determination of their exact age; and they were provisionally referred to the geological date of the Utica slate of New York state.

These graptolites from the Kicking Horse Pass, under notice, may also be referred to the age of the Utica slate, or at any rate to the Trenton. In the Utica fauna of the United States and Canada the association of forms is just such as occurs in the Llandeilo (lower and middle) of Britain, and some of the forms are common to both sides of the Atlantic.

. . . . . .

It is curious that none of the family of the Dicranograptidae (Dicranograptus and Dicellograptus) are represented in this little collection. It is just possible that it may therefore be somewhat older than the typical Norman's Kiln beds, where the Dicranograptidae are exceedingly abundant. Neither have we any of the peculiar genera of the Leptograptidae (Coenograptus and Leptograptus, etc.) so prevalent in the Norman's Kiln horizon everywhere. Thus it is by no means unlikely, judging from the evidences at present at our disposal, that the fauna of the shales of the Kicking Horse Pass come from strata answering broadly to the British lower Llandeilo: they are distinctly newer than the Point Levis beds, and belong to the second Ordovician fauna, but in all probability to the oldest zones of that fauna.

Chas. Lapworth.

Mason college, Birmingham, March 7.