

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

Coloured covers/
Couverture de couleur

Coloured pages/
Pages de couleur

Covers damaged/
Couverture endommagée

Pages damaged/
Pages endommagées

Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée

Pages restored and/or laminated/
Pages restaurées et/ou pelliculées

Cover title missing/
Le titre de couverture manque

Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées

Coloured maps/
Cartes géographiques en couleur

Pages detached/
Pages détachées

Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)

Showthrough/
Transparence

Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur

Quality of print varies/
Qualité inégale de l'impression

Bound with other material/
Relié avec d'autres documents

Continuous pagination/
Pagination continue

Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure

Includes index(es)/
Comprend un (des) index

Title on header taken from: /
Le titre de l'en-tête provient:

Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

Title page of issue/
Page de titre de la livraison

Caption of issue/
Titre de départ de la livraison

Masthead/
Générique (périodiques) de la livraison

Additional comments: /
Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below /
Ce document est filmé au taux de réduction indiqué ci-dessous.

| | | | | | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 10X | 12X | 14X | 16X | 18X | 20X | 22X | 24X | 26X | 28X | 30X | 32X |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The Canadian Entomologist.

VOL. XXI.

LONDON, MARCH, 1889.

No. 3.

DESCRIPTION OF THE PREPARATORY STAGES OF COLIAS MEADII, EDWARDS.

BY W. H. EDWARDS, COALBURGH, W. VA.

EGG.—Fusiform, thick in the middle, tapering to a small rounded summit, the base small, flat; ribbed longitudinally after the manner of the genus; colour yellow-green. Duration of this stage four to five days.

YOUNG LARVA.—Length, at 24 hours from egg, .06 inch; cylindrical, even; colour brown-green; thickly covered with black points, from each of which a short fine hair; head rounded, blackish-brown. Duration of this stage five days.

After First Moulting.—Length at 12 hours .11 inch; colour dull brown-green; the ridges thickly set with black points, each with short grey hair; head brown-yellow. To next moult six days.

After Second Moulting.—Length at 12 hours .16 inch; colour dark green, covered with yellow points so thickly as to give a yellow hue to the whole surface, each point with hair; a mid-dorsal dark stripe; a faint indication of a yellow sub-dorsal line; so also of a basal stripe; head green-brown with many fine tubercles and hairs. To next moult about six days.

After Third Moulting.—Length at 12 hours, .22 inch; along the under-side of the indistinct sub-dorsal yellow line is an ill-defined row of black spots, one to each segment from 3 to 11; the basal ridge yellowish, but not yet showing a clear band. Later in the stage the black spots show clearly, those on 3 and 4 largest, the rest diminishing regularly to a very small one on 11; head as before. To next moult five to seven days.

After Fourth Moulting.—Length at 6 hours .46 inch; at 24 hours .52 inch.

MATURE LARVA.—Length .7 inch; cylindrical; nearly even; on the flattened ridges are many points, each giving a short black hair; colour

dark yellow-green, the effect of the black hairs being to make the body darker than in most species of the genus; a pale yellow narrow sub-dorsal stripe, under which from 2 or 3 to 12 is a black spot on each segment, the anterior ones largest, the others gradually lessening in size to the last; along base a narrow white stripe; under side, feet and pro-legs green; head rounded, a little depressed at top; colour green, lighter than *bo*, much covered with black tubercles with black hairs. From fourth moult to pupation five days.

CHRYSLIS.—Length .66 inch; breadth across mesonotum .16 inch, across abdomen .18 inch; greatest depth .22 inch; shape of the genus; compressed laterally, the thorax on ventral side prominent; head case pointed, beak-like, the projection less prolonged than in some or most species observed; mesonotum rounded, carinated, the sides sloping, a little convex; followed by a shallow depression; abdomen conical; colour green-yellow, all the ventral side being brighter than the dorsal, and the projection at head quite yellow; a mid-dorsal darker line, and a faint sub-dorsal line; all the dorsal side and the ventral of abdomen dotted and mottled whitish, the wing cases and ventral side to head finely granulated. Duration of this stage, in the only case where the butterfly appeared the same season in which the egg was laid, six days.

This alpine species is found in the Rocky Mountains, in Colorado, and probable throughout the range to British America. Certainly it is if *Elis*, Strecker, is synonymous with it, as I believe to be the case. Mr. Mead first took this *Colias* on top of the "divide" between the Platte and Arkansas valleys, about 12,000 feet elevation, and says he took none lower than at 10,000 feet. Mr. Bruce says the proper habitat is from 11,000 to 12,000 feet, though, when the butterflies get into the narrow canons, they will follow the track down to 9,000 feet at least, and mentions (CAN. ENT., xix., 228) having taken several at Webster, at 9,000.

I received a number of young larvæ, 23rd July, 1888, from Mr. W. S. Foster, at Salida, Col., which had hatched en route. The female was taken on Marshall Peak, 11,000 feet, 15th July, and confined over *Astragalus*. One of these larvæ passed first moult 27th July, the third moult 9th August (the second not observed), the fourth moult 14th August, pupated on 19th, and a female imago came forth 25th August. But the other larvæ, by 28th August, were in lethargy, and soon after

were sent to Clifton Springs, New York, to go in the refrigerating house, and there they are at this writing.

I had previously had eggs of the species from Mr. David Bruce, 25th July, 1886, laid on 21st and 22nd July, and which hatched 26th. On 31st July several of the larvæ passed first moult; on 6th August began to pass second; on 15th, the third. None of these went to pupæ, but all were asleep early in September, and were sent to New York, but were dead when I received them the following March.

The egg and pupa are like the same stages of *Philodice* in shape; the larva is darker than any *Colias* I know of, and there is no red in the basal stripe. The sub-dorsal line is not very distinct, but its place is indicated by the row of black spots next it on lower side.

I had no difficulty in rearing these larvæ on white clover, but at same time, in 1888, could not induce larvæ of *C. Scudderii* to eat clover or any other plant, and all died. The same was the case with *C. interior*. Mr. Fletcher and Mr. Scudder both also found it impossible to get larvæ of *interior* to eat of any plant, though they offered everything any *Colias* is known to eat that was procurable. These two larvæ are the only *Colias* known to me that will not freely eat white clover or else *Amorpha*.

COLIAS CÆSONIA, STOLL.

BY JEROME M'NEILL, MOLINE, ILL.

Somewhat to my surprise I found this species not uncommon here during the collecting season of 1887. Although my entomological interest lies in another direction, and I have, consequently, made no special effort to obtain Lepidoptera, I find I have ten specimens of this striking *Colias* in my collection, all of which I have taken during the summer and fall of 1887. On looking over the collection I discover that these specimens were taken at three different times. One—a very much worn specimen, with one hind wing gone—was captured the sixth of June, on Rock Island; six specimens were taken on the twenty-third of July in an upland clover field, two miles south-west of Moline. They are all fresh and bright, and were found in company with *C. philodice*, *Papilio chresphontes*, *P. turnus* and *Danaïis archippus*. The last three were taken September the sixteenth, in a low-lying field, on the banks of the Mississippi, three miles

east of Moline. These specimens are, if possible, fresher than those taken July twenty-third. This species would, therefore, seem to be three brooded in this latitude. There are also certain marked differences in coloration, which may or may not be distinguishing characteristics of seasonal varieties. The spring form, as it is represented by the single specimen referred to, is distinguished by the absence of any indication of the sub-marginal row of spots or points on the underside of the wings or any trace of orange, except the two spots on the upper surface of the hind wings; the rose pink ray extending outwards from the body on the hind wings is present. The summer form, as it is represented by the six individuals in my collection, is marked as follows:—The sub-marginal row of spots on the under surface of the wings are none of them pink; those in the interspaces of the first and second, and second and third ediman veinlets, being black, the others brown; the pink stripe on the under side of the hind wings is entirely wanting, and there is on the upper surface of the hind wings a sub-marginal area of orange, bright or faint, which sometimes extends from the marginal black band nearly to the orange discal spot. There is also in all of these specimens a clearly defined oblong raised patch of scales of peculiar form extending along the upper side of the sub-costal vein of the hind wing, from the costal vein to the branching of the first sub-costal veinlet. These scales seem to stand on end, and although I have not satisfied myself of the fact, I think it is probably that these scale-like bodies, are excrescences on the true scales. This patch of scales seems to be confined to the males. It varies in colour from yellow to reddish-orange. When it is yellow it is concolorous with the adjacent surface, and not conspicuous, although the raised margin of the outer edge is always very distinct on a closer examination. In the single specimen of mine in which this area is reddish-orange, it is scarcely less conspicuous than the "dog's head" when the anterior wings are pulled forward far enough to expose it. Since it is present in all the males and absent in all the females I have collected, I take for granted it is a sexual mark. If this character has been described before, I have no knowledge of the description, though it seems strange that it should have been overlooked. Its presence would support Mr. Strecker and others in removing the species from *Colias*. In the fall form, as represented by the three specimens taken September sixteenth, the brown spots on the under sides of the wings are replaced by pink; the two black spots between the first and second, and second and third median veinlets, remaining unchanged; the

pink stripe on the under side of the hind wings is prominent, and both pairs of wings are margined with a narrow stripe, in some places a mere line of pink extending on the primaries from near the base along the costal and outer margins to the anal angle, and on the secondaries along the anterior and outer margins to the anal angle. On the upper side of the hind wings the distribution of orange is very similar to that in the summer form, but the marginal band of black, which in the latter is comparatively broad and dentated within in the fall form, is narrow and interrupted by the veinlets, so that it is really composed of a series of spots, sub-triangular in shape, with the apex acute and sometimes prolonged into a narrow line which extends into the orange as much as three-sixteenths of an inch. The coloration of the female of this series is so remarkable that it seems to deserve a name, as apparently a dimorphic or at least an aberrant form, and I propose that it be called *rosa*, if it should be found to be a constant variation. The upper surface of the primaries does not differ essentially from the type. The whole upper surface of the secondaries is powdered with brownish-black and orange scales. The black scales are more thickly clustered between the discal orange spot, which is partially obscured by them, and the outer margin. This very much broadened band only partially and unequally obscures the yellow ground colour so that it includes within it a sub-marginal row of large, round, yellow spots, about four in number. The under side of the primaries have the "bright yellow" of the apical portion replaced by bright, deep-rose pink. The under sides of the secondaries are completely suffused with pink, the greenish-yellow scales of the ground colour being partially exposed only along the veins and veinlets. The silvered "pupils" are all that remain of the discal spot and its accompanying spot without the cell. The pink of the under surface is so prevalent that when the butterfly is at rest no other colour is visible, and it looks like a pink blossom. My attention was first called to it by seeing a large *Colias* a few yards in front of me disappear just when I expected to see it at rest on a clover head, as it would fly up at intervals I followed hoping to catch it resting but always puzzled to see it apparently dive head first into the clover. At last, growing impatient, I attempted to "force the fighting," and although I missed my game I so disturbed its flight that I caught a glimpse for the first time of the pink under surface. I was now thoroughly interested and I employed all my arts in vain to decoy or force the wary butterfly into my net. In a few minutes after I had given up the pursuit I caught

in the same field the same butterfly, or more probably, considering the ease with which the capture was made, another similarly coloured. As soon as I had assured myself that the specimen was as pink as I had supposed, I promised myself three or four, remembering that I had seen two within half an hour, but although there were hundreds of *philodice* I saw no more *cæsonia* that day, and more pressing business prevented me from returning to the locality as I had hoped.

ON THE CITATION OF LOCALITIES.

BY T. D. A. COCKERELL, WEST CLIFF, CUSTER CO., COL.

It is the custom nowadays to look down with great contempt on those old authorities, who considered "North America," or even "America," a sufficiently accurate locality to give when describing a species; but, perhaps, we of the present age are not quite blameless of similar and (with our means of obtaining information) less excusable carelessness in, that we often think it enough to give the name of the state or region only. Of late, I have been going carefully through as much of the literature of North American Entomology as I could get a sight of out here in the wilderness, in order to catalogue the recorded Colorado insects for the Colorado Biological Association, and I have been astonished at the number of new species described with the localities given indefinitely, "Colorado," "Texas," and so on. Taking eighty-four species of moths at random, mostly new, and recorded from Colorado of late years, I find only twenty-six have the locality indicated nearer than "Colorado"—and I think this is a very fair sample of the whole. Now, do these describers of species ever stop to consider what "Colorado" may mean? That it may refer to any altitude from below 4,000 to over 14,000 feet, and to anywhere in an area of no less than 103,948 square miles? That "Colorado" may mean snowy peaks, mountain forests or valleys, or level treeless plains, each presenting a distinct fauna of its own? Perhaps they do not stop to consider these points, possibly they do not care, so long as the species has been properly classified and named, and is henceforth recognizable in the cabinet. Well, we cannot all be systematic entomologists, students of geographical distribution, biologists and the rest, but, surely we may be precise in touching on departments not our own, and, if we are giving localities, there is no reason why they should not be sufficiently accurate

and detailed to be useful. It may, perhaps, be answered that most of the species are not collected by the writers themselves, and the collectors sent no exact localities. Probably not, but were they asked for them? Collectors will supply proper localities, and often very interesting details if they are given to understand that these are wanted—as is plainly evident from the fact, that some few careful authors always manage to know where their species come from, and a good deal about them besides.

My own idea in the matter is, that every description of new species ought, if possible, to have the collector's own notes appended thereto, so that we might have some idea of what the *living* insect was like, and not only have an account of its dried remains impaled on a pin. Fancy, if someone undertook to write an account of the human race, founded entirely upon information obtained in the post-mortem room and anatomical museums! But, if we cannot have biological notes, let us at least have localities—they can be got when they are wanted, and indeed, I have known some instances in which names of localities have been duly sent in, but never mentioned by the describing author.

Sometimes authors take it for granted that because they write from a certain place, it will be understood that the species were captured there, but I could easily demonstrate that such an assumption, in all cases in which the locality is not given, would lead us into quite ridiculous errors, and this being so, how are we to discriminate? One usually precise author, who has described a very large number of new species of late years, has given for most of them only the name of the state in which he resides, and for many no locality at all. Now, according to Packard, this state embraces two distinct Zoö-geographical regions, so it becomes of especial importance to know exactly where the insects in question came from. So I wrote to this author, expostulating with him on this point, and he replied that he quite agreed with me that localities should be properly defined, and all the species I alluded to were to be understood to come from the vicinity of the town in which he resided. Now, this is excellent, provided that the lacking or indefinite localities *are* so understood; but on the face of it, until I had this information from the author, this fact was not always evident. Perhaps it has been stated somewhere in his writings; but this hardly better matters for the student, who naturally takes one paper at a time, and considers it on its own merits, unless referred back to previous remarks bearing upon it.

Fortunately, there are some systematists who do appreciate the value

of precision in localities, and I was pleasantly surprised a short time ago at receiving the following from a well-known naturalist, to whom I had sent a list of mammalia, with their distribution given by counties:—"I hope you keep the exact localities as well as the counties. Most of the counties in Colorado are so large that they include great variations in altitude and physiographic conditions, and hence embrace widely different fauna characteristics." With this quotation I close the subject, commending it to all describers of Colorado and other insects, and drawing their attention to the fact, that after all it expresses the views of all really competent Vertebrate Zoölogists, Conchologists, and Botanists, and hoping that in the future they also will give proper attention to the citation of localities.

One other matter may deserve a passing notice—that of giving credit to collectors. I have nothing to complain of under this head myself, and so can speak more freely. It seems to me, that a systematist who receives specimens from a collector, who, we may assume, has gone to considerable trouble to collect them, and fails to credit him with the captures when describing, does about as discourteous a thing as is possible in Entomological literature. It would be very easy to show that from a scientific point of view, it is always useful to know who collected the specimens in question, and at the risk of being called egotistical, I do not mind saying that I desire and expect that new species I may have collected shall be duly credited to me in publication, and I am sure all other collectors must feel the same. I do not wish to be personal, but very many quite recent cases, in which no collector's name has been given, will occur to everyone*—I need not enumerate them. Some authors seem to think that if they have obtained specimens from professional collectors, they are then, at anyrate, at liberty to omit the collector's name. It seems to me that they are, if anything, under increased obligation to give it. Fancy what an author would say if the editor of a magazine refused to publish his name to an article because he had paid for it! This matter of crediting collectors† is, I think, a serious one, but collectors can easily put it right if they will make a point of only sending specimens to those who will give them credit.

* In some of these cases, however, the authors are probably blameless. It is not always possible to ascertain who was the collector.

† One kind of "crediting," however, I do think unwise. If Tompkinson discovers a new insect, I cannot myself see that that is any reason why the poor creature should ever after be burdened with the name "*Tompkinsoni*" !!

LENGTH OF LIFE IN BUTTERFLIES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Aurelians are frequently asked how long butterflies live. By this is generally meant what is the length of life of the mature insect. As is generally known, each species passes through one cycle of its existence once a year, though it very frequently happens that two, three, or even more generations succeed one another during a single season, and it has been supposed (though never proven) to be the case with some that two or more years are required for this cycle; as is known to be true of some other insects. But with regard to the length of life of the butterfly itself, there is not a little variety; when the disappearance of a given butterfly is in consequence of the approaching cold season it may well be and often is the case that the butterfly has merely gone into winter quarters to appear again on the wing the ensuing spring. In cases like these, the duration of life of a butterfly may be as long as eight or nine months or even more, for there are hibernating butterflies which emerge from the chrysalis by the beginning of August or even in July, but which do not go into winter quarters until September, October or even November, then appear again the next season as soon as advancing spring has begun to make itself felt, and continue upon the wing sometimes through June, sometimes even into July. It is impossible to say certainly whether or not the individuals flying latest in the spring number among them any which were earliest to escape from the chrysalis in the preceding season. But setting aside the chances of capture by their enemies, there is no reason to believe it impossible, and that they may spend and probably in many instances do spend fully ten months of the year in the winged condition.

This conclusion may be reached also in another way. We may add together the ordinary life period of the egg, the time it takes the caterpillar to reach maturity, and the period of the chrysalis, and in these hibernating butterflies we shall rarely find that these stages together occupy on the average more than two months. The remaining ten months must therefore be the average time spent upon the wing. That many may live eleven months or even twelve seems probable, for a butterfly may continue to fly for some time after the first eggs are laid, especially in the case of those which lay but one at a time, where the eggs do not develop in the

ovaries at once, but slowly and by degrees, and so are deposited in succession over a considerable period of time.

In an article in the CAN. ENT. (xiii., 205-214) on this subject, Mr. W. H. Edwards has laboured to show that eggs are almost invariably laid by butterflies fresh from the chrysalis, and that the butterfly dies soon after the laying of the eggs. This proves quite too much, for if it were so, a butterfly would hardly fly more than a week. That eggs are often laid by butterflies soon after eclosion from the chrysalis is doubtless true, but there are quite as many cases where egg laying is delayed for a considerable length of time,—two, three or four weeks; an examination of the ovaries of butterflies will show that it is rarely the case that all the eggs are laid even within two or three days of each other, but that they mature by degrees too slowly for such rapid oviposition. There are of course some, in which the eggs are laid in masses, when a greater number are laid in a single day, but the cases are far more numerous when egg laying is continued over many days, and sometimes probably over several weeks.

It is possible that the duration of the life of butterflies is greater in the north than in the south. As one approaches the tropics, insectivorous birds and other creatures are far more destructive of butterfly life than with us, and the chance of long life upon the wing must be greatly lessened with the numerous liabilities to disaster which overtake the poor butterfly in the warmer regions. There may even be a difference in this respect between districts so near each other as West Virginia and New England. For certainly my own experience of the overlapping of broods of different butterflies as seen by me in New England is very different from that reported by Mr. Edwards in West Virginia, and inasmuch as these broods follow each other with greater rapidity in Virginia than with us, the difference is thereby exaggerated.

To judge from the statistics that I have collected from observations made in the field both by myself and numerous correspondents, I am inclined to think that, in the case of those butterflies which are born and die the same season, the average length of life of the mass of them, that is, omitting mention of those which, cut off early, come to an untimely end, to be not far from four or five weeks, varying in different species from three to six or seven. Of course it is impossible to arrive at any very accurate determination regarding this, since in the case of any particular species we are obliged to base our conclusions on observations of

the times when the earliest butterflies were seen, when they became most abundant, when the numbers perceptibly diminished, or specimens became old and worn, and when the last were seen. It is particularly difficult to decide upon the average age of individuals, when, as is not infrequently the case, a brood of butterflies is augmented by gradual accretions for a long period of time, three, four or five weeks. It is again difficult in the case of those butterflies, and there are not a few of them, like some of our *Argynnidi*, which appear upon the wing in mid-summer, receive a sudden accession to their numbers a month or two after the advent of the earliest and then only begin to lay their eggs. I, for one, can hardly believe that all these earliest individuals perish before the season for egg laying, and I even think from the condition of specimens, worse and worse as the season progresses, that some of the earliest live to the last and are upon the wing sometimes for two and three months of the year.

ON SPECIFIC NAMES.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

Dr. Williston, in his painstaking work on the *Syrphidae*, says: "There are no generic and specific limitations in nature," and illustrates the statement by the present knowledge of the family with which his synopsis deals. And what Dr. Williston brings forward is a mere quota of the mass of evidence brought out by naturalists generally, and by entomologists dealing with the different orders of insects. But while, theoretically, the essential unity of living forms or of nature as a whole may be granted, the practical question of what names we shall bestow upon our specimens and upon what basis these names shall repose, must be solved. Our systems of nomenclature must be brought into consonance with the facts observed. And it is well that our nomenclature be not too rigorous, so that I have expressed the opinion in these pages that we shall have to use in certain cases a trinomial title. With regard to the test for genera in the moths, I have to refer for my conclusions to a paper in *Papilio*, 3, 35, where I say that the *amount* and *extent* of the peculiarity gives the criterion, not the *kind*. Every well-marked variation and modification of structure, which can be clearly made out by the microscope or otherwise, is of generic value. The moment this rule is departed from, we are thrown upon individual "opinions." All the characters which, when well-marked, are of generic importance, are liable to slighter modi-

fications, which are only specific. It is the *kind, constancy or amount* of these modifications which must decide the class in our artificial divisions of these natural objects. And here the tact of the specialist, of which Dr. Williston also speaks, comes into play. With regard to the criterion for species, I have expressed myself already clearly in these pages, so far as the Lepidoptera are concerned. For the student of butterflies and moths, the criterion for species must lie in a knowledge of the whole life of the insect. If it breeds true to type, nowhere encroaching upon the cycle of its neighbour, we must bestow a specific title. The insect is today a species, whatever its ancestry, whatever its probable future development. The fact, from our experience, may be assumed without a knowledge of the larva and natural history, but *until* this knowledge is also added to our observations on the perfect insect, the specific title is not firmly or conclusively founded. This is what I meant to say with regard to the forms of *Callimorpha*. Now in separating the forms of *Datana*, we had alcoholic specimens of the larva and the personal observations of Mr. Angus to fall back upon, for most of the species. And the fact with these moths that in the earliest stages the species are not distinguishable on sight, has been shown by Mr. Wm. H. Edwards to be true with nearly related butterflies, as for instance species of *Colias*. While breeding has revealed to us a number of questions, such as dimorphism, which we must take into consideration, I must still renew my protest against *lumping* upon grounds drawn from the perfect insect alone and upon insufficient evidence. The new facts lead us insensibly to criticize species, to conceive a prejudice against them, and then to lump without sufficient evidence. And I repeat, that as Entomologists we are here to discriminate, to separate, not to confound. Butterflies were by the ancient Hebrews classed among "flying things." From this primitive conception of their place in animated nature, we have gradually come to-day into nearer definitions of their relationship.

In the discussion of all these questions there can be no progress without reasonableness. Temper and even position will not ultimately decide these questions, although the melancholy conclusion of Spinoza is here not without its truth: "*unusquisque tantum juris habet, quantum potentia valet.*" The appeal to time need not always have to be made. A great deal of what is wrong and one-sided need not afflict us, as Entomologists, if we would only take matters coolly, or only grow warm over the beauties of our treasures.

DR. CHRISTIAN ZIMMERMANN.

BY H. A. HAGEN, CAMBRIDGE, MASS.

There exists no biography nor necrology of this excellent entomologist, as far as known to me, though he lived for thirty-nine years in the United States. I am much indebted to Dr. Geo. C. Horn for Zimmermann's note-book, which, with his library, came into the hands of the late Dr. J. L. Leconte.

Only a very short abstract of the contents, which are written wholly in German, can be given. The entries begin with Zimmermann's earliest boyhood and end in 1843, followed by a few pages for 1865. The narrow pages contain only the substances of events in short phrases, often very cutting, both for Europe and for America. If the whole could be published, it would give a very interesting picture of the life of an excellent naturalist, always kept down and hindered by want and ill-luck, but always ready to "begin again." It is sad that such a life, akin to the remarkable histories of former ages published by the masterhand of G. Freytag, should have been possible in the 19th century—a continuous struggle of a noble soul with continuous misfortune.

Christian Zimmermann was born in Quedlinburg, Prussia, September 6, 1800. His father and three generations before him were carpenters, as the name indicates; all were born and died in Quedlinburg. Christian entered the gymnasium in 1811, and graduated in 1821. The note-book, May 26, 1814, says: "I am to-day 5000 days old." (He always counts his life, both in Europe and here, by the 1000 days.) The collection of beetles begins, and the study of music. His talent for music must have been obvious, as one year later he played the organ for the church-service, and studied thorough bass. When he graduated he writes: "Up to this time my money was made by keeping score for target-shooting, teaching children, giving music-lessons, organ-playing, copying music, furnishing music at funerals, stuffing birds."

His parents, who were poor, proposed that he should choose a profession; but determined to study, he went to Halle, where he stayed as student from 1821 to 1825. He passed his examination after having attended the lectures in theology, philology and philosophy, but his entomological studies were never neglected.

In 1827 he published his first music, a Polonaise. When he left Halle in 1828, he was already acquainted with a large number of eminent

zoologists. He went to Berlin, and writes: "Great expectations, small success, a load of cares, experience of the world." He worked with Prof. Klug in the Museum, and gave Latin lessons to barbers' apprentices. March, 1829, working up the genus *Amara*, of which some sheets were printed. 1830, very bad times begin; want of money. 1831, monograph of the genus *Zabrus* finished; printed in June.

During this time he had become acquainted with many prominent entomologists and with a large number of students, who later became famous, but the constant want of means was so depressing that he decided to try his fortune as a collector in Mexico. He sold his collection of 2,400 species of beetles and his books. To enable him to fulfil his intentions, twenty-four naturalists of prominence from Germany, England and Russia subscribed six hundred dollars, and a number of friends six hundred and eighty dollars to pay his debts. This was all repaid with interest by Zimmermann, as soon as he had made money here, as a page in his notebook states. He left Hamburg, Aug. 5, 1832, as steerage passenger for Philadelphia. He began directly to collect, and to study the English language. His collection grew rapidly, but in a few months he saw that it was impossible to work in expensive America for cheap Europe without running in debt. So he decided to leave Philadelphia and to try his luck as a teacher in South Carolina. He made the trip, according to the custom of German students, on foot, a knapsack on his shoulders and a few dollars in his pocket. This journey of 713 miles, in the midst of a severe winter, and attended with much hardship, which proves his excellent health and strength, was made in fifty days, with twenty-seven dollars in cash, six dollars credit, three maps, one book and a pocket-knife. The visit to Dr. Melsheimer on this trip has been published before by me. The detailed report of excursion given by Zimmermann to Prof. Burmeister is very interesting, but has never been printed. Zimmermann had no idea that he was here considered simply a tramp, which explains easily and rightly most of his complaints.

In Georgetown, S. C., he tuned pianos and gave music-lessons till he was engaged in the South Carolina Female Institute, at Berhamville, to teach music and drawing. This happy change in his circumstances allowed him to pay directly the debts made in Europe, with five per cent. interest. He collected largely; sometimes quoting the number collected at the end of the month or the year, as: "11,508 specimens have been

collected," besides mentioning any remarkable forms. He made many excursions, visited Cambridge (where he saw Harris), Niagara, Albany, the Catskills, New York and its surroundings. He made the acquaintance of every naturalist of eminence. He sent to Europe many insects and received many from there, together with the newest publications. His correspondence was apparently a large one.

After a few years his situation in the school where he was engaged was given up; it had become unpleasant sometime before. He possessed now an excellent collection, very comfortable furniture and three thousand dollars, and decided to buy a little farm to be used as a nursery and for raising silk-worms. In 1839 he made, as he states, fourteen "farm reisen" in Philadelphia, Maryland and other states, partly with Ziegler and Morris. His project proved to be a failure, and he decided to return to Europe and to send his property to New York. After a short visit to Harris, he went to New York to find that the vessel with all his property was lost in a fearful storm. His note-book says: "Sept. 10, I am notified of the loss of my collection and property." "Sept. 16, beginning of a new collection; the voyage is given up." "Sept. 25, invitation of Harris to come to Cambridge," where he stayed until November 12. On Nov. 7th new insect-boxes were bought of the box-maker, Newell, in Cambridge. He made many excursions with Harris, whose family very well remember the German naturalist.

The next year he lived in Baltimore, occupied with entomological systems and excursions with Mr. Morris, and decided to return to South Carolina. Feb. 27, records a "letter to Hannah, with an offer of marriage." March 21, "Hannah answers 'yes.'" April 3, "I find *Horia sanguinipennis*." April 14, "I find *Trichius maculosus*."

He had made the acquaintance of Mrs. Hannah Green, afterwards his wife, seven years ago in Georgetown, S. C. We find in his note-book, "Evening with Hannah; drawings on the wall; Sweet Home and picture; quarrels plenty." Monday, June 21, "Arrival at Rockingham, N. C." June 22, "I reach the town in the morning, visit Hannah at noon, and am married in the evening."

"Hannah begins her school, July 16, with sixteen pupils, and seven pupils of mine in music and drawing."

"Sept. 17, dispute took place with Hannah about American culture,

and the fight that lately happened in Washington among the members of Congress."

It very soon became apparent that it was impossible to make a comfortable living in North Carolina, and they decided to return to Columbia, S. C. Here they built a school-house, forty feet by sixteen, which was inaugurated December 18, 1843. The expense was, for the building, \$417; for Loring's globes, \$33. Income during the year, \$1,521; expenses, \$1,277.

This is the last entry in the diary, and I know nothing more of his life except what is told in some letters to Thaddeus W. Harris. Some extracts follow: "1865, January 1, I possess \$570 in Confederate money; \$200 in Confederate bonds; \$900 in certificates; \$200 in provision store shares; \$13 in bank notes; \$114 in silver. Feb. 10, the Yankees are in Barnwell Co. To-day's prices—A load of oak wood, \$140; a barrel of flour, \$550; a pound of brown sugar, \$12; a bushel of corn, \$35. Feb. 17, the Yankees are here, 75,000 strong. This is the last day of Columbia. They at once entered the houses, got drunk and set fire to everything. I began to move everything that could be moved into the garden; but they broke open the trunks and boxes with their swords, and followed this up with a regular and general plunder. Feb. 22, the Army has left. All quiet. My collection and books brought back in the house. Expenses for this day—1 bushel meal, \$40; 13 lbs. beef, \$22; molasses, \$6. July 1, we still possess \$1,100 Confederate State bonds, worth nothing; \$915 Confederate treasury notes, worth nothing; \$13 South Carolina bank bills, worth — (?); \$3 South Carolina state bills, worth — (?); silver money, \$74; gold, \$2.50; copper, 5c. We must begin again at the beginning."

This is the closing sentence. These few, simple words, without any moan over the loss of his all, are not a little touching, all the more so, because the pathos is unintentional—the pathos of facts, not of words. They call to mind his former record of the loss of everything by shipwreck on the 10th September, 1839, followed by the entry on Sept. 16th, "Beginning of a new collection."

Zimmermann died in December, 1867. He left no children.

His interest in science was always kept up. Nearly every month the number of insects collected is reported, sometimes amounting to 3,725, and during the year to 11,500. In November, 1842, he sent fifty dollars to T. W. Harris, to buy three Goliaths. He constantly bought books both in Europe and America, and his library was valuable. It was bought

by the Museum of Harvard College, in Cambridge, excepting some volumes which were retained for his own use by Dr. J. L. Leconte, at whose instance the purchase was made.

His collection is also in the Museum, having been bought first by Dr. Lewis, of Philadelphia, and from him by the late R. Crotch, who sold it to the Museum. A great part is in Leconte's collection, and can be recognized at once by the numbers on the pins in Zimmermann's hand-writing.

He was an unwearrying worker. In 1842, he wrote to Harris that he was occupied with a systematic arrangement of the Lamellicorns, and wanted *Echiurus* and *Goliath* for study. In April, 1844, he writes again to Harris: "I have almost finished my chapter on Lamellicorns."

(To be Continued.)

NOTES FOR COLLECTORS VISITING THE PRAIRIES AND ROCKY MOUNTAINS.

BY GAMBLE GEDDES, TORONTO.

Now that the winter is well advanced and before many weeks are over spring will be upon us, it reminds me of many enquiries made during the last few years about the localities and dates of diurnals captured by me in the North-west in 1883 and 1884. These particulars are nearly all to be found at the National Museum of the Geological Museum at Ottawa, but for the benefit of those who may be visiting the North-west with a view to collecting diurnals, I propose to give such information about the rarest species as my notes supply, and as my limited time will permit.

Beginning with June 10th, 1883, at Brandon, N. W. T., I find *Phyciodes carlota* Reak. was taken, and *Lycæna afra* W. H. Ed.

June 12th, Fort Ellis.—*Erebia epipsodea* Butl. was in beautiful condition.

June 15th, Medicine Hat.—*Colias Scudderii* ♀ and *Colias christina* ♂, *Cænonympha inornata*.

June 29th.—*C. christina* ♂ plentiful, *C. Astræa* ♀ (?) one specimen or two.

June 30th, Calgary.—*Chionobas varuna*, *Satyrus* var. *boopis*, *Lycæna afra*, *L. anna*, *L. amyntula*, *L. rustica*, *L. sæpiolus*, *C. ochracea* and *inornata*; of *Colias* four varieties, viz.: *C. Edwardsii*, *C. Scudderii*,

C. alexandra and *C. christina*; *Anthocharis olympia*, *A. ausonides*, about the swamps; *Argynnis nevadensis*, *A. artonis*, *A. Edwardsii*, *A. bellona*; *Phyciodes carlota*, *P. tharos*; *Chrysophanus epixanthe*, *C. helloides*, *Pamphila Manitoba*, *Zabulon*, *Cernes*. *Manataagua*. Not a bad day's work for the last day of June.

July 8th, Edmonton.—*Arg. lais* and *cybele*, *Lim. arthemis*, *L. dissippus*, *Lyc. anna*. No *Colias* or *Pieris* seen to-day.

July 23rd, Fort Macleod.—*Arg. leto* ♀ and *Chrys. sirius*.

July 25th to 30th, Pincher Creek.—*Arg. dio* and *eurynome* taken; *Arg. artonis*; *Pieris occidentalis*.

July 30th.—First specimens of *Parnassius smiutheus*, *Chrysophanus Florus*, *Col. Scudderii* ♀ pale green. Several taken.

Aug. 1st.—*Thecla mopsus*, *T. titus*.

Aug. 2nd, Garnett Ranche, mouth of Crow Nest Pass.—*Colias Hagenii*.

Aug. 3rd.—*Par. smiutheus*. Very common, both sexes.

Aug. 5th.—*Satyryx charon*, and *Sat. sylvestris*, and *Arg. leto*.

Aug. 6th.—*Arg. boisduvallii*, *Limenitis lorquinii*, *Chrys. mariposa*, *Mel. pallas*, *Mel. nubigena*.

Aug. 8th.—*Arg. monticola*, *Pieris oleracea*.

Aug. 15th, Belly River.—*Col. Hagenii*; dwarfed in size, and every shade from albino to orange.

In 1884 I started much later, leaving Toronto 26th June.

June 30th.—Saw one ♀ *Colias christina*, first day out west from Winnipeg.

July 1st, Swift Current.—*Chrysophanus dione*, *Arg. Edwardsii*, *A. Nevadensis*, *Euptoieta claudia*.

July 3rd to 7th, Calgary.—*Col. christina*, *A. lais*, *A. Nevadensis*, *A. artonis*, *Thymelicus hylax*.

July 10th, Morley (now Canmore) station, C. P. R.—*Lyceena shasta*, *Arg. monticola*.

Aug. 1st, Laggan.—*Anthocharis hyantis* and *ausonides*, *Chrys. mariposa*, *Chion chryxus*, *Colias elis*. This was a grand point for collecting. Emerald Lake, about 4 miles from here, is a lovely spot, and the vegetation plentiful and varied, with large numbers of insects.

I have curtailed this as much as possible, but I shall be glad to correspond with anyone going to collect this season, with a certain feeling that, if the eggs of *Colias elis* can be obtained, we shall have the mystery cleared up about the ♂ of this beautiful fly.

AGAIN RILEYA.

BY L. O. HOWARD, WASHINGTON, D. C.

If all controversial writings were as happy as Mr. Ashmead's last, readers of the CANADIAN ENTOMOLOGIST would not regret the space occupied, and I am glad that one side of the controversy is interesting reading. I hope I may be allowed space to say that Mr. Ashmead admits in conversation that he has erred in his statement that my first publication of the description of *Rileyia* was in the CANADIAN ENTOMOLOGIST for Oct., 1888, as I have shown him the last page of *Entomologica Americana* for July, 1888. May I also state dates once more? Mr. Ashmead's first mention of *Rileyia* was published in his synoptic table in *Entom. Am.* for June, 1888. My full description was then in the hands of Mr. Smith, and was published in *Entom. Am.* for July, 1888. Mr. Ashmead's full description appeared in the Kansas Agric. Exper. Station Bull., in July, nine days later than mine. Entomologists following Mr. Ashmead's views are perfectly at liberty to use the excellent generic name he has proposed for my *Rileyia*, while for the use of those who adopt my views, (and I am happy to say that several well-known entomologists have expressed themselves in my favour), I venture to propose for the Eurytomid genus which was called *Rileyia*, the appropriate generic name *Ashmeadia*, as indicating my appreciation of Mr. Ashmead's unflinching industry as an entomological worker.

CORRESPONDENCE.

COLIAS CHIONE, CURTIS.

Dear Sir: It may be of interest to some of our readers, who are interested in the genus *Colias*, to know that Mr. F. Fitz Payne, (who accompanied Lieut. Gordon's expedition on the "Alert" to the Arctic regions), brought back amongst his collection a single specimen of a most peculiar green coloured female *Colias*. It was sent to Mr. W. H. Edwards first, who examined it, but did not pronounce decidedly upon its name. A few weeks ago Mr. Henry Edwards was spending an afternoon with me, not long after his visit to the British Museum, and he assures me I have got the ♀ of *Colias Chione*, Curtis. The only other specimen known being in the British Museum. I observe that Mr.

Kirby has placed this in his catalogue of Diurnal Lepidoptera as variety "A" of *C. Boothii* Curtis, and both *Boothii* and *Chione* were taken in Ross's 2nd voyage, and both the species and variety were described by Curtis, in 1835. It would be a curious coincidence if, after an interval of over half a century this turned out to be a good species. I have written to a friend, who constantly visits the British Museum, for full particulars and description of the specimen in the collection there, and will state his views through the medium of the CANADIAN ENTOMOLOGIST in a future number.

GAMBLE GEDDES, Toronto.

ARCTIA PHYLLIRA, DRURY.

Dear Sir: When I was in London a year ago, working on the Society's collection, I found amongst the Arctians one that clearly did not belong to any of the forms represented therein; it had the label of A. P. Saunders attached, bearing date July 6th, 1886. Being unknown to me I labelled it "undetermined," and laid it aside; recently, however, when turning over some of the books in the splendid library of the Society, I found the unnamed Arctian unmistakably represented on plate lxiv, vol. 2 of Smith & Abbot, and named *Phalena phyllira*; also in Westwood's Drury, vol. 1, plate vii, fig. 2. It is quite an attractive form, and new to the Canadian list. Mr. H. S. Saunders also has a specimen, taken at electric light, Sep. 6th, 1887.

J. ALSTON MOFFAT.

NOTE.

Later on there will certainly be more to be said respecting certain points touched upon by me in the CAN. ENT. for 1888, but there are four things it will be useful to refer to now. Since writing on *Nathalis iole* (p. 156) I have found that there exists a form of the ♂ in which the "orange spot" is yellow during life. With regard to the forms of *Colias eurytheme* in this locality (p. 201), I now find there is a short flight of genuine *eriphyle* here in September, but the specimens are not so extreme in their divergence from *autumnalis* as one Mr. W. H. Edwards sent me (locality not stated). I shall have more to say about all these forms of *eurytheme* later on. The yellow spider on pink flowers (p. 176) and the Asilid fly attacking *C. eurytheme* (p. 202) have been kindly examined by Dr. C. V. Riley and pronounced to be species of *Misumena* and *Stenopogon*.

T. D. A. COCKERELL, West Cliff, Col.

Mailed March 7th.