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.

- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☑ Bound with other material/ Relié avec d'autres documents
- ☑ 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
- ☐ 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.

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 pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☑ Quality of print varies/ Qualité inégale de l'impression
- ☑ Continuous pagination/ Pagination continue
- ☐ Includes index(es)/ Comprend un (des) index

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

- ☐ 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
						✓					

The Canadian Entomologist.

VOL. XXIII. LONDON, OCTOBER, 1891. No. 10.

DESCRIPTIONS OF SOME BUTTERFLY LARVÆ FROM YOSEMITE.—III.

BY HARRISON G. DYAR, YOSEMITE, CAL.

Phyciodes mylitta, Edw.

Egg.—Not observed; but laid about 50 together.

First Stage.—Head shining black; width .25 mm. Body cylindrical; cervical shield and anal plate black; fine black hairs, slightly curving forward, arise from minute black elevated spots.

Second Stage.—Head black and shiny; width, .40 mm. The body is covered with rows of conical elongated tubercles, each with many bristly hairs, arranged as in the mature larva. Sordid greenish, shaded with black dorsally, the cervical shield, anal plate and tubercles black.

Third Stage.—Head slightly bilobed with a few hairs; shining black, labrum pale; width .60 mm. Cervical shield and anal plate black, the processes on the body densely spined, not long, the three upper rows on each side black, the rest short and pale. Body blackish on the dorsal half, with a black dorsal line; subventral and ventral regions pale whitish. Thoracic feet black, abdominal feet blackish.

Fourth Stage.—Head slightly bilobed, rounded, ocelli large, mouth projecting; a number of hairs, colour shining black, labrum whitish, hair black; width 1.1 mm. Body covered with conical processes, .50 mm. long, densely spined and arranged as in *Junonia*. The body dorsally, including the cervical shield and anal plate and the three upper rows of processes, deep black; grayish laterally and subventrally, the fourth row of spines and a stigmatal band running along their bases subtranslucent white. Thoracic feet and last pair of abdominal feet black, the others much paler; claspers white.

Fifth Stage.—Head black and shiny, slightly hairy, a whitish streak on the side of the vertex of each lobe; width 1.8 mm. Body black

above, yellowish subventrally, with a faint geminate yellowish dorsal line. The conical spined tubercles of rows (1)–(3) are black, rows (4)–(6) straw-yellow, spiracles black; thoracic feet black, abdominal pale. As the stage advances subdorsal, stigmatal and substigmatal lines appear, not very distinct, and formed of yellowish mottlings on the black ground colour.

Chrysalis.—Of usual shape, thorax not carinated but with three blunt points, the anterior part rounded; cases moderately prominent; a depression between thorax and abdomen. Abdomen straight along the ventral side, curved dorsally, with five rows of short, blunt points, cremaster flattened, rather long, colour nearly uniform, dull wood-brown from black mottlings on a reddish-brown ground colour, the dorsal tubercles reddish. A row of minute white dots on antennæ cases and around borders of wing. Length, 12 mm.; width, 4 mm.

Food Plant.—Thistle *(Carduus).*

Chrysophanus arota, Boisd.

Larva.—Elongate elliptical, flat below, the feet all short; sides sloping; dorsum forming a narrow flattened ridge, slightly wider on joints 3 and 4; body highest at joint 5 and tapering to the extremities. Head retracted under joint 2, pale testaceous, the mouth parts surrounded with brown; width in the last stage, 1 mm. Body minutely pilose, with very small white granulations, or subdorsal white line along the ridge interrupted at the segmental sutures (which are deep), beginning on joint 3, most distinct on joints 3 and 4, somewhat fainter centrally, and somewhat more continuous posteriorly. A similar fainter line on the subventral ridge, becoming obsolete at the extremities. Both lines look as if not quite on the surface. Spiracles small, circular, yellowish. Cervical shield in the middle of joint 2, very small, triangular, depressed. Length, 17 mm.; width, 5 mm.

Chrysalis.—Robust, short, rounded; depression between the thorax and abdomen small; abdominal segments appressed, motionless. General colour sordid green, most distinct on the abdomen dorsally; thorax with a few black specks and a smoky black dorsal line which is continued in a row of dots on the abdomen. Each side of this, on the central part of the thorax, is a white streak, supplemented on the posterior part by a short white curved line. On the abdomen, a subdorsal row of blackish

spots and a number of smaller black dots, besides an obscure white line on the posterior part, each side of the dorsal row of dots; abdomen pinkish laterally. Length, 12 mm.; width, 5.5 mm.

Food Plant.—Wild gooseberry (*Ribes*). The larvæ occur several on the same branch, but they feed singly.

THE LARVA OF ZOTHECA TRANQUILLA, GROTE.

BY HARRISON G. DYAR, YOSEMITE, CAL.

Eggs.—Laid in a mass, probably under the bark of the food-plant, for which purpose the long ovipositor of the ♀ moth seems fitted; the winter is probably passed in this state. Spherical, but somewhat misshapen from being closely pressed together; smooth, slightly shiny; under the microscope appearing irregularly indented; colour, yellow, becoming later reddish; diameter, .5 mm.

There appear to be six larval stages, the last two of which are all that came under observation, and to them the following description applies: The larvæ live singly, each in a leaf of its food-plant, curled over and lined with silk.

Larva.—Head entirely black, except the bases of the antennae, which are whitish; smooth, shiny, but under a lens seen to be slightly shagreened; a few hairs. Width in the fifth stage, 1.8 mm.; in the sixth, 2.8 mm.

Body plump and smooth, tapering at the extremities, curled spirally when at rest. The small black piliferous dots are normal in arrangement; row (4) stigmatal, posterior to the spiracles; rows (5) and (6) anteriorly and posteriorly in the subventral space, and row (7) the dots on the venter of the apodal segments are very small. Dorsum dark olive-gray, containing a broad yellow dorsal band, which is broken into two round spots on each segment, the anterior one of which is twice indented, or nearly bisected on the dorsal line. This marking is narrower towards the extremities and becomes somewhat confused. Below the olive-gray is a narrow interrupted whitish subdorsal band bordered with black, a lateral blue-gray band and a broad yellow stigmatal band separated from the lateral band by a wavy black line. Venter bluish gray, streaked with black subventrally, feet yellowish, spiracles black. In another example the dorsal and lateral regions are concolorous, bluish gray, sprinkled with black streaks, the dorsal and subdorsal bands edged with black. The anal plate is unornamented.

Cocoon.—Formed of silk, quite thick and not at the ground.

Pupa.—Cylindrical, the abdominal segments tapering, cases and thorax moderately enlarged, cremaster tapering, flat, armed with short hooks. Smooth, pitchy dark brown, almost black, paler in the three movable abdominal incisures. Length 17.5 mm., width 5.5 mm.

Food plant.—Elder *(Sambucus).*

There is but one brood a year, the moths appearing during the last of June.

The appropriate and pleasing name of this pretty species was kindly sent me by Prof. Smith.

A TACHINID BRED FROM A CHRYSALIS.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

Meigenia websteri, n. sp.

FEMALE.—*Head* a little wider than thorax and abdomen. *Eyes* brown, very sparsely hairy; front and face not quite one-half the width of head; front a little prominent; frontal vitta about one-fourth the width of front, brown, lighter behind where it splits on each side of the ocelli; frontal bristles in a single row, descending a little below base of third antennal joint, some fine hairs on sides of front outside them; two orbital bristles; sides of front with a slightly brassy tinge; sides of face moderately wide, a little less than one-half the width of the facial depression, silvery, bare; face slightly receding, facial depression silvery, facial ridges ciliate to a little below base of third antennal joint; cheeks moderately wide, cinereous, hairy, with bristles on lower border; vibrissæ inserted at a little distance above the oral margin; antennæ not as long as the face, blackish, third joint slightly reddish at base; second joint not elongate, bristly; third joint not widened, more than three times as long as the second; arista black, microscopically pubescent, thickened more than half its length, three-jointed, the second joint hardly elongate; proboscis, brown, fleshy, not so long as height of head, labella well developed; palpi well developed, flavous, club-shaped, thickened and curved at the tip, black bristly; occiput cinereous, gray hairy below, with fringe of black hairs on orbital margins.

Thorax clothed with stout bristles and very fine short hairs, cinereous, with four narrow blackish vittæ ; scutellum, broadly light-reddish ochreous at tip, with two stout lateral macrochætæ, the posterior one reaching the base of third abdominal segment, also a discal pair, and a short, decussate apical pair. *Abdomen* rather broadly ovate, first segment black, somewhat abbreviated ; other segments cinereous, with a narrow blackish hind margin ; first segment without macrochætæ ; second with a lateral marginal one and a median marginal pair ; third segment with about ten marginal macrochætæ above, and others below ; anal segment armed with marginal and sub-discal macrochætæ. *Legs* black, bristly, femora somewhat silvery ; tibiæ with stout bristles, especially hind pair which are also ciliate on outer edge, a longer bristle in middle and another at tip ; claws and pulvilli slightly elongate. *Wings* longer than abdomen, without costal spine, grayish-hyaline, third vein spined at base ; apical cell ending a little before tip of wing, narrowly open ; fourth vein rounded at bend, without stump or wrinkle ; apical cross-vein nearly straight ; hind cross-vein sinuate, nearer to bend of fourth vein ; tegulæ whitish, halteres fuscous.

MALE.—Differs as follows :—Smaller ; front hardly more than one-third width of head ; face not so broad ; no orbital bristles ; antennæ nearly as long as face ; third joint about five times as long as the short second ; claws and pulvilli not elongate.

Length 6 to 7 mm.; of wing 5 to 6 mm.

Described from two specimens, ♂ ♀, from Professor F. M. Webster, and bred by him from a chrysalis. Lafayette, Indiana.

NOTES ON THE DYSDERIDÆ OF THE UNITED STATES.

BY NATHAN BANKS, ITHACA, N. Y.

The *Dysderidæ* is a small family of spiders occupying in a certain respect an intermediate position between the *Tetrapneumones* and the *Dipneumones;* the openings to the tracheæ are just behind the lung-slits, so that they may appear to have four lungs. The eyes are six in all of our forms. The mandibles are not small, in *Dysdera* quite large. The

male palpi are quite simple in structure. Our genera may be separated by the following table:

1 { M. E. *in front of A. S. E. ..... *Usofila*
  { M. E. not as far front as A., S. E. 2

2 { M. E. in front of P. S. E. ..... *Segestria*
  { M. E. as far back as P. S. E. 3

3 { Three claws to tarsus ..... *Ariadne*
  { Two claws to tarsus ..... *Dysdera*

USOFILA GRACILIS, Keys.

Marx in Proc. Ent. Soc., Wash., 1890, Vol., II., p. 36, pl. I., fig. 6. Alabaster Cave, Cala.

This is quite unlike other *Dysderidæ* in general appearance, but is referred by Keyserling to this family.

DYSDERA INTERRITA, Hentz.

D. crocata, Koch. Marx Cat. Aranæ of temp. of N. Am., 1890.

D. interrita, Hentz. Proc. Bost. Soc. Nat. Hist., Vol. IV., p. 224, 1842.

" " " Spid. U. S., ed. Burgess, p. 20, pl. II., fig. I., 1875.

" " " Emerton, New Engl., Drass., Agal. and Dysd., p. 36, pl. VIII., fig. 2, 1890.

New Engl., N. Y., D. C., Md., Va.

ARIADNE BICOLOR, Hentz.

Pylarus bicolor, Hentz. Proc. Bost. Soc. Nat. Hist., Vol. IV, p. 225, 1842.

" " " Spid. U. S., ed. Burgess, p. 21, pl. II., fig. 3, 1875.

" *pumilis*, Hentz. Proc. Bost. Soc. Nat. Hist., Vol. IV., p. 226, 1842.

" " " Spid. U. S., ed., Burgess, p. 22, pl. II., fig. 5, 1875.

*M.E.—median eyes; A.S.E.—anterior side eyes; P.S.E.—posterior side eyes.

Ariadne bicolor, Hentz. Emerton, New Eng., Drass., Agal. and Dysd., p. 37, pl. VIII., fig. 3, 1890.

" " " Marx Cat. Aranæ of temp. N. Am., 1890.

" *pumilis*, " " " " " " " " " 1890.

New Engl., N. Y., D. C., La., Ala., Fla., Ohio., Va., Md., Pa., N. C.

A. pumilis is only the young of *A. bicolor*.

SEGESTRIA PACIFICA, nov. sp.

Length, 5.3 mm.; length of ceph., 2.3 mm.; length of abd., 3. mm.

Breadth of ceph., 1.3 mm.; breadth of abd., 1.5 mm.

Length of femur I., 2. mm.; Length of tibia I., 1.8 mm.

Color—Cephalothorax brown, darkest near front margin, yellowish towards posterior end; mandibles, reddish brown; maxillæ, yellowish; lip and sternum, brownish; palpi whitish, with dark ring at base of tibiæ; legs whitish, with brown rings at tip of femora, on patellæ, and near base and tip of tibiæ and metatarsi, first pair darkest; abdomen nearly white, with scattered reddish-brown spots, which form a large patch on the middle of the dorsum and a few smaller patches behind it; on the venter a broad median stripe reaches from the lung-slits to and around the spinnerets, which are yellowish.

Cephalothorax wide in front, but little wider in middle, rounded behind, head low, eyes six, S. E. touching, the A. S. E. not quite their diameter from the front margin, M. E. larger than S. E., touching, about their diameter from the front margin. Mandibles large, slanting, much thicker than anterior femora; maxillæ long; lip long and truncate at lip; sternum narrow in front, widest behind the middle; legs 1–4–3, 2nd pair lost; first pair of legs largest; abdomen nearly cclindrical, spinnerets short.

One specimen from Washington State [T. Kincaid].

OFFICIAL MINUTES OF THE MEETING OF THE ENTOMOLOGICAL CLUB OF THE A. A. A. S., 1891.

(HELD IN THE COLUMBIAN UNIVERSITY, WASHINGTON, D. C., AUGUST 19–22, 1891.)

The Washington meeting of the Club was one of the most successful ever held in point of attendance and interest. Seven sessions were held, with average attendance of twenty-two, and minimum of eighteen. Forty-two persons registered and received Club badges, in the following order :—

Herbert Osborn, Iowa; John B. Smith, New Jersey; Howard Evarts Weed, Mississippi; D. S. Kellicott, F. M. Webster, Ohio; C. V. Riley, L. O. Howard, Washington, D.C.; James Fletcher, Ottawa, Canada; W. B. Alwood, Virginia; B. Pickman Mann, E. A. Schwarz, Washington, D. C.; Lawrence Bruner, Nebraska; A. J. Cook, Michigan; Paul Wallace, California; E. B. Southwick, New York; G. H. Perkins, Vermont; Geo. H. Hudson, New York; Wm. H. Ashmead, Florida; J. A. Lintner, New York; Howard H. Hopkins, Maryland; Martha E. Stuart, Nebraska; Lucien M. Underwood, Indiana; O. F. Cook, New York; Mary E. Murtfeldt, Augusta Murtfeldt, Missouri; E. W. Claypole, Katherine B. Claypole, Agnes M. Claypole, Edith J. Claypole, Ohio; E. W. Doran, Maryland; Geo F. Atkinson, Alabama; J. M. Stedman, North Carolina; Otto Heidemann, William H. Fox, Geo. Marx, Washington, D. C.; Charles Robertson, Illinois; L. H. Pammel, Iowa; E. A. Popenoe, Kansas; A. B. Cordley, George C. Schaeffer, C. L. Marlatt, F. H. Chittenden, Washington, D. C.

There was no lack of papers, and the daily programmes of the Club were published in the programmes of A. A. A. S.

MINUTES.

The Entomological Club of the A. A. A. S. met at 9 a.m. on August 19th, at Room 15 Columbian University, President Osborn in the chair, eighteen members present.

In the absence of the Secretary, the President called Mr. J. B. Smith to act as such during the reading of the address, and Vice-President Miss Mary Murtfeldt occupied the chair during the delivery of the

ANNUAL ADDRESS OF THE PRESIDENT.

BY HERBERT OSBORN, AMES, IOWA.

The Entomological Club has reason to congratulate itself upon the favourable conditions under which it meets. We are here in our national capital, a city in which every American feels a pride, and the beauty of which can but favour our enjoyment. We are in the centre of entomological activity for the United States—and I am tempted to say for the world, for I believe we should have to make diligent search to find any community where so many skillful entomologists are devoting their entire time to entomological problems.

We have here one of the finest insect collections in the country, a collection unique and invaluable in the richness of its biological material, and one which has already become of great use and a Mecca to entomologists all over the country. With all these favouring circumstances we can most certainly expect a profitable meeting, and I feel perfectly safe in saying that every entomologist here will return to the regular duties of his profession with renewed zeal, and with a better knowledge of the possibilities of entomological work, and a feeling that he has been many times repaid for the time and trouble he has expended in attending the meeting.

But with the knowledge of these favouring conditions and the thought of what should be expected in a presidential address on such an occasion, I confess that it is with great trepidation that I undertake the discussion of any of the many problems that are presented as living topics in the entomological field.

Our Club includes in its membership a majority of the working entomologists of America, each one alive to the advancement of his favourite science, eagerly watching for progress in every avenue of research and keenly anxious to favour every means of promoting its interest.

Each one then, we feel, has a special interest in the enlargement of the entomological fraternity, and in the means and methods for the training of the coming generation of workers.

I feel, therefore, that while there are many important topics that could be selected as the basis of this address, I cannot possibly go astray in occupying your attention for a short time with some thoughts concerning the educational value of entomology, the training to be desired in it, and the present and possible means for the growth of this work.

It is but a short time since entomology was entirely excluded from college courses, or, if included at all, formed but a fractional part of zoölogy; and the training given had little reference to the actual work devolving upon an entomological student in the collection and study of his particular favourites.

Even at the present time, there are, so far as I know, not more than a dozen colleges in the country where entomology is given a place in the regular college curriculum, and in only about half of these does it form a required part of any regular college course. In some of these the required work consists of but a short course, devoted largely to economic subjects, and the student gets but a bare insight into the problems of systematic entomology, or the wonderful biological wealth belonging to this branch of science.

To the members of this Club it is of course unnecessary to urge the value of entomology as an educator, but I would like to call attention to it here for the purpose of emphasizing the matter and urging a greater utilization of it in educational work. While we ourselves may realize its value and give it all the rank proper, I fear we do not always insist as we might on the standing it deserves in this regard.

We do not need to depreciate the value of other scientific studies in order to uphold entomological work as one of the most suitable of all branches of science to form a part of a course in scientific training.

That it requires close application, careful attention to details, and thus exercises in fullest degree every faculty of observation, is a necessary consequence of the minuteness and complex organization of insects. It presents, therefore, every advantage offered by botany or any branch of zoology as a means of training the faculties to close observation.

It is stated of Cuvier, that being applied to by a young man who desired to become a naturalist, for advice as to the course he should pursue, he answered, "Go and study entomology."

We believe fully in the necessity of a thorough foundation for entomological as well as any other scientific work, and would by all means advise students intending to enter this field to learn so much of chemistry, physics and general biology as to equip themselves for handling the intricate problems of life which must of necessity be met in any thorough study of insects. But, we would like to urge also the advantage to be gained by devotees of other branches of science if they would use the subject of entomology as a part of their mental equipment. Not only is the training to be gained one that is of the highest value in the cultivation of the faculties we have mentioned, but the facts acquired are of a nature to be used in every calling in life in which the student may engage.

We are all often amused by the questions propounded to us about insects, questions often from highly educated people, which display the direst ignorance concerning some of the most elementary principles of entomology. This condition is one of the greatest hindrances to the adoption of remedies based on any biological foundation. Confusion of species, lack of any idea of the metamorphosis of insects (except possibly some of the most common), and total ignorance of the structure of insects or of the physiological features which enter so largely into the use of remedies, all combine to render the intelligent adoption of the necessary measures in insect warfare difficult.

Education in these matters must be in considerable part by personal means. Teachers in higher institutions must train the teachers who carry knowledge to the academies and high schools, and these in turn must furnish the training in the lower grade and country schools. Will the time ever come when the country teacher will be qualified to answer common questions about insects that may be propounded by his pupils, to give them accurate instruction concerning the most essential principles of the science, or to direct them in the proper methods by which they can get facts by their own observation.

There is no question as to the fascination of the subject, each one here by his presence attests this fact, as attractiveness of the study is the main motive for its pursuit, and the wonder is that so few carry an interest in the subject beyond the enthusiastic collecting of youthful years.

It is true that entomological study soon becomes serious work, when undertaken with any purpose or effort to further knowledge along any of

its lines; but such work is very pleasurable, and unless in the complexity of the subject or the disheartening number of forms or amount of literature necessary, would seem to present no insuperable difficulties not to be met with in other sciences.

It is perhaps almost unfortunate that there has been a fashion for a few years past to discredit the value of systematic work, and to laud the researches in histology and embryology as the only work deserving the name of science. The tone of contempt that has sometimes greeted the faithful worker in systematic entomology must have had the effect of discouraging some who might otherwise have made valuable contributions to the science.

We should not be narrow, but let our sympathies and appreciation be as extensive as the group in which we are interested; our perceptions of *the earnest effort and the good in others as sensitive as the organizations* which we place under our microscopes; and our encouragement as quick as the movements of our tiny friends.

The work in histology and embryology is essential, and its importance cannot be ignored. Often giving us the only rational method of discovering affinities, it must be resorted to by the systematic student, and none need underrate it. The further study of entire life-histories of insects, one of the most fascinating of all branches of study, presents a field of such great importance to the economic entomologist, so rich in discovery as to modes of life, and so often important in revealing the affinities of related groups, that he who would neglect or deride this part of entomology must have little conception of its range.

But systematic work too has its place and importance, and I trust the time is now coming when there will be a return of workers to this field.

The need of collections and libraries for this work is appreciated by all, and has been well discussed in the address of last year.

I would like to suggest, however, in this connection the importance of the preservation of collections that have been the basis of systematic work by a specialist. Often such collections go to ruin, and the question comes again and again, would it not have been better if such collection had been placed in some established museum, where its preservation would be assured. I believe fully in the formation of working collections, particularly in limited groups, but when it is possible to deposit such a collection

in a place of permanent preservation, I feel that it should be done for the benefit of future students and the advancement of science.

At present the student of systematic entomology must perforce select some limited group, the literature of which he can obtain, and faithfully divorce himself from the pursuit of knowledge in other groups.

This is well and proper for the worker who has gone far enough to become enamored with his specialty and to recognize the limitations necessary, but there are many young students enthusiastic and active whose ardour would carry them through bravely, if but they could pass through the doubtful stage which comes with the conviction that there are many insects which cannot be determined.

Failure to name his collection, or a disheartening search through all the books at his command without getting any clue to the affinities of his specimens, dampens his ardour and quenches his zeal.

The necessary training for the more serious entomological work and that which must in large part be given by means of carefully arranged courses of study, should, I believe, embrace methods in systematic entomology—of studying the complex life-histories of insects, and of working out the problems of minute anatomy and embryology that so constantly confront us. A thorough knowledge of insect anatomy is essential and should be acquired before the student attempts original work on morphology or revisional work in classification. Above all, the student should become impressed with the importance of accuracy, both in study and in statement, and it should be the crowning glory of this as well as all scientific work to develop in the student the keenest perception of the fact that scientific work means truthful work.

The equipment to carry on such instruction is not essentially expensive, and the cost of equipment should not deter any well-endowed institution from providing thoroughly for good work. The item of books will figure largely, but these may be selected as needed and no immense outlay is required at once.

One of the most difficult problems met by the teacher is to supply satisfactory guides to his students in classificatory work, and I believe every working entomologist will concede the desirability of a condensed manual for the determination of the families and genera of the insects constantly met in his work. The question is, how can such a manual

ever be prepared? The work is evidently too great for any one individual, for keys in any group to be serviceable must be prepared by someone familiar with the group; and, furthermore, the entomological workers of America are all too much engaged in active professional studies to devote much time to such work.

That some combined plan is requisite seems apparent, and I know no better place to inaugurate such an effort than in this Club.

There are already many valuable analytical tables, but these are scattered through so many publications (many of which are inaccessible to general students) that to be of service in the particular manner I have in mind, they should be brought together in some compact single volume, with such directions as to their use, as to make them serviceable without a specialist at hand.

I would suggest that a special committee be appointed at this meeting to consider the possibility of preparing such a work, either as a special effort of the club or by simple co-operation among members of the club, who are willing to assist by allowing the use of tables already prepared, or the preparation of new ones in the group with which they are familiar.

Such a manual would necessarily have certain limitations, and, doubtless, at first, some imperfections, but the scope of the work may probably better be discussed in a special committee, should it please you to form one, and the matter of imperfection is incident to every new undertaking.

The cordial reception which this suggestion has met with from some entomologists to whom I have presented it, and their generous offer to allow the use of tables they have published, and to revise and extend them, have encouraged me in the belief that such a plan can be worked out. The matter seems to me of such vital importance, especially in college work and for students who desire to make entomology a serious work, that I believe we should not be discouraged by the difficulties which certainly exist in such an undertaking.

Another matter to which I desire to call your attention is that of a general gathering of entomologists during the Columbian Exposition. We are all aware of the pleasure of meeting our national co-labourers in this field, and if arrangements are made so that a general congress of the entomologists of the world can be had, I believe the interest and profit of the occasion will be great.

In the establishment of the World's Congress Auxiliary of the Columbian Exposition, I understand that such a gathering is contemplated, and that such a general meeting will be provided for, if but the entomological societies and individual entomologists will co-operate in the movement. The time indicated in their circulars seems hardly propitious, as it would seem far easier to secure such a gathering at the time of the meeting of our Association of Economic Entomologists, but, doubtless, the preference of that Association and this Club will be considered, as without their support such a congress could not succeed.

It would seem to me very proper that the club pass a resolution endorsing the effort to arrange for an Entomological Congress, offering its support and designating the officers for the coming year, as the medium of communication concerning any matters requiring action before our next annual gathering, and, if deemed wise, some special instruction as to an effort to arrange dates which will accommodate the entomologists of the country best.

As entomologists we should uphold the standing of our profession. We are sometimes met by evidences of a sentiment hardly complimentary to our calling, an apparent feeling that the entomologist may be a harmless sort of fellow, who catches bugs in a net and then puts them in a bottle; but that for any important work in this life he does not amount to much. This feeling, I am glad to say, seems to be changing rapidly, and in this connection I feel impelled to remark that in my opinion entomologists owe a debt of lasting gratitude to the distinguished head of the division of entomology for the status given to entomological work in the U. S. and throughout the world. To him, I believe, more than to any other one man is due the credit of placing entomological science alongside of other branches of science in the respect and confidence of the people, and thus bringing our profession from the position of a harmless pastime to one of recognized standing alongside of other branches of applied sciences.

Let us, as entomologists, in all our work endeavor to keep this standard high, to avoid anything like the quackery which drags itself alongside of scientific medication.

* * * * * * * *

Mr. Mann moved a vote of thanks to the President for his excellent address, which duly carried.

On motion of Mr. Mann it was resolved that a committee of three be appointed to consider the recommendations of the address, and report as early as convenient.

Messrs. Mann, Fletcher and Smith were appointed as such committee by the President.

The President suggested a committee on Programme, and on motion of Mr. Mann, amended by Mr. Fletcher, that the Secretary be one of the members, it was so resolved.

Messrs. Webster and Kellicott were appointed the additional members of the committee.

On motion, Mr. Smith was elected acting Secretary for the present meeting.

Mr. Webster moved that one meeting of the Club be set aside for short notes and random observations, and Dr. Kellicott amended by suggesting that the next meeting be so set aside. Both motion and amendment carried.

On motion of Mr. Mann, after some general discussion as to hours of meeting, the Club adjourned to 1 p. m.

AFTERNOON MEETING.

The Club met pursuant to adjournment at 1 p.m., President Osborn in the chair, twenty-one members present.

The President stated that under the resolution adopted, short notes were in order, and he called on the members for such.

Mr. Kellicott mentioned a Tortricid feeding on *Silphium perfoliatum*, whose habits he studied last year, but of which he got only a single imago in bad condition and not yet named. The eggs are laid in the flower buds, and the larvæ eat into and destroy them. At this time the larvæ are livid in colour, and there become about half an inch in length; then they either crawl down outside, or bore through the stem to the root in which they feed until winter. They make a silken tube in which they hibernate and sometimes also pupate; usually in spring they crawl out into the loose soil and there pupate.

Mr. Webster spoke of a Cecidomyid larva preying on the cherry aphis, and exhibited specimens. The imago which was bred seems a *Diplosis*. *Hyperchiria io* he has usually found rather rarely; but this year he has received it from corn, where it was feeding in considerable numbers.

Scolytus rugulosus is common in the experiment orchard and very injurious, but does not attack healthy trees. Only such as have been injured in some way seem to be infested.

Lumbricus, sp. Quite young worms have been sent from the celery gardens of Northern Indiana, with the complaint that they injured the young plants, first in the hot beds, and, later, in the field after transplanting. The injury has been of quite a serious nature. The Buffalo tree-hopper, *Ceresa bubalus*, was sent from Richmond, Indiana, June 12, with the statement that they were destroying young tomato plants in gardens. The three specimens received were yet in the larval stage, and were at once placed on young plants in breeding cage. They attacked the plants just above the surface of the ground, puncturing the stems, causing a contraction and weakening of the stem, which soon fell over, though the upper portion did not wither or at once die. The affected part formed a distinct contraction, which was probably an eighth or an inch in length, and discoloured. Precisely similar attacks were made on a species of Tasmanian *Oxalis*, which stood upon the same table with the tomato plants, when the tree-hoppers were allowed to gather upon the stems. The last of the depredators finished the pupal stage on July 8.

The following species have been observed attacking the blackberry:—*Coleophora*, sp. The larvæ were observed eating into the tender expanding buds in April, and in May they were observed mining the leaves. No adults were reared, though attempts were made to do so; *Blennocampa paupera* was observed ovipositing in the young buds in April; *Anomala binotata*, adults were surprised in the act of depredating on the foliage early in May, and an allied beetle, *Trichius piger*, was observed feeding upon the blossoms in June. The larva of *Eccopsis permundaria* was found eating into the fruit in May, the pupal stage lasting twelve days, and the adult emerging May 21.

The clover hay worm, *Asopia costalis*, was found in abundance in northern Ohio, April 27. Pupation was observed among these May 25; adults emerged June 12. These last oviposited June 13-17, and apparently these larvæ were found in heads of living clover in breeding cage July 1st. Adults made their appearance on August 8, at which time pupæ and also half-grown larvæ were to be found in the cages.

Sandalus petrophya, male and female, were observed at La Fayette, Indiana, on red or swamp maple, *Acer rubrum*.

Mr. Kellicott said *io* frequently does not separate until nearly full-

grown. He found a lot on chestnut, two of which pupated and emerged the same fall, the others remaining in pupa until the following spring.

Mr. Osborn stated that his experience with *io* at Ames was similar to that described by Mr. Kellicott, and he asked whether *Asopia farinalis* ever occurs in clover hay. He at one time found the imago very abundant where clover was badly infested, but he could not say the larva was that of *farinalis*. No one present was able to answer.

In reply to a question, Mr. Webster said he had seen the Cecidomyid larvæ feeding on the Aphids.

Mr. Ashmead said the habit is not uncommon. He has bred predaceous species himself, and Mr. Fletcher has recorded a similar occurrence.

Mr. Howard thought the habit could scarcely be called a common one; he recollected only two European records of that character.

Mr. Lintner spoke on the occurrence of an onion pest at Canastota and vicinity, in Central New York, during the month of June. The pest was reported as a dark coloured caterpillar of a maximum length of an inch and one-fourth, feeding on the plants above ground, overrunning large fields of onions in the muck lands north of Canastota, and consuming not only all of the onion tops but other vegetation also. From the account given, the caterpillar was believed at first to be the species of cut-worm that in the spring of 1885 proved so exceedingly destructive in the onion fields in Goshen and vicinity, in Orange County, N. Y., as recorded in Prof. Riley's Report to the Department of Agriculture, for the year 1885, viz.: *Agrotis messoria*. Comparison of the caterpillar secured later, showed it to be a different species, which, on being carried through its final stage, confirmed the identification of it which had been made from Prof. Forbes's admirable figure in his 15th Report, as *Agrotis ypsilon*. The moths emerged from the pupæ in the early part of July.

It was not possible at the time to visit the infested locality to note particularly the habits of the cut-worm and the amount of injury inflicted by it, nor could any definite or satisfactory information be obtained by correspondence, for the attack ceasing with the pupation of the larvæ, all further interest in it on the part of the onion growers seemed to be lost.

Mr. Lintner also read a letter from Mr. Geo. F. Shepley, asking for information concerning an insect which had bored galleries in the pine boards and in the linen contained in a closet, and had done much injury to the fabric. He asked whether any members recognized the attack.

Mr. Riley said the description was so indefinite that little could be made of it. A number of Ptinidæ made galleries somewhat as described; but without seeing the injury he would not venture an opinion.

Mr. Campbell stated a somewhat similar experience. From some spruce boards, employed in building, a small species of *Monohammus* issued. He suggests that the linen was bored simply to get out, and not because the insects had any liking for the material.

Mr. Mann observed that in his laboratory fittings white pine was used for shelving and drawer cases, and that from this issued a longicorn which he thinks was *Xylotrechus colonus*. He thinks they would have pentrated linen or any other substance to make their way out.

Mr. Smith noted the capture of *Cicindela lepida* at Jamesburg, N. J., July 4th, 20 miles from the nearest sea shore at which this insect had been previously found.

The Elm leaf beetle had been again closely watched during the past season, and again the insect had been found to be single brooded. The injury done first by the hibernating beetles, then by the larva, and again by the new brood of beetles, has given the impression of as many broods.

Zeuzera is undoubtedly spreading. It has been found beyond Newark, and the injury by the larva was begining to be apparent on the elms of that city. The suggestion by Mr. Southwick at the meeting of the Association of Economic Entomologists, that elm had been referred to as the only food plant, was true only of America. In Europe it had been known as injurious to quite a number of widely different species.

Cryptorhynchus lapathi was spreading and was doing serious injury to willow. Nearly all the clumps of willows near Newark and Arlington had been destroyed, and some fancy and garden trees had been killed.

Mr. Howard said Walker had years ago given North America as a locality for *Zeuzera pyri*, and Morris had made the same statement. He asked whether this did not conflict with the idea that it was a recently imported species, and further, whether Walker might not have had the species described by Herrich-Schaeffer.

Mr. Smith replied that Morris had followed Walker simply, and that Walker's specimen must be examined and its history ascertained before its identity could be assumed. The species described by Herrich-Schaeffer was so entirely different that even Walker could not well mistake it. He had so little faith in Walker's determinations that he would not be surprised to find the American specimens to be *Ecpantheria*.

Mr. Howard further suggested that the elm-leaf beetle would be a good subject upon which to try the importation of parasites. Three species were known to infest it in Europe.

Mr. Riley expressed some surprise at Mr. Smith's experience with the elm-leaf beetle in New Jersey. At Washington he felt quite certain there were two broods, and New Jersey did not usually differ much in such matters from Washington. The date of hibernation—early August—was so very early as to be remarkable, and proved certainly that temperature had nothing to do with it.

Mr. Smith agreed that usually Washington and New Jersey did not differ in number of broods; but he had carefully watched these insects two years in succession, from day to day, and felt absolutely certain as to his facts. The beetles first ate round holes in the leaves, eating the entire tissue. The larvæ then ate on the under or upper side, usually the former; but did not eat through the leaf. This often killed off the foliage, leaving it dry and brown. A new growth would then usually start, and this in turn was injured by the midsummer beetles eating round holes in it. These beetles were never observed copulating; but after eating a week or two they retired. In the belfry of the college building hundreds had been found early last September, entirely torpid.

Mr. Riley said Mr. Smith's observations agreed perfectly with what he had noted; but he was not ready to admit that it was all caused, in Washington, by one brood. He felt quite certain that he had observed a second brood, which to some extent overlaps the first.

Mr. Lintner said, a strange feature was the habit of feeding quite extensively in fall, and then again in spring. He thought fall feeding should bring full maturity, as during hibernation they were almost torpid, scarcely even breathing. He had been watching the spread of the insect along the Hudson, and it has now reached to within twenty miles of Albany. He expects to hear of it there almost daily.

Miss Murtfeldt gave a brief account of a case where the screw-worm, the larva of *Lucillia macellaria* or something very like it, had attacked a lady near St. Louis. Over 200 of the larvæ were taken from the head and throat by means of forceps, and the patient must have suffered tortures. The larvæ differ a little from the figures she had seen, and she asked to have her determination verified.

Mr. Weed examined the specimens and thought there was no doubt of their being the screw-worm.

Dr. Marx made the announcement that he was now studying the ticks, but found considerable difficulty in getting material. He asked all members of the Club who had specimens, or could obtain them, to send to him for study. He would be glad to name and return material.

On motion of Mr. Mann the meeting adjourned.

Mailed October 7th, 1891.