

the whole to its utmost. In pure water the motion occurs about once a second; as the water becomes impure the motion becomes more rapid, and the larva issues from the water as soon as possible, being able to live out of water for several days even when only a few months old. Well developed ova are found even in the larva when only two-thirds grown.

The paper gives detailed comparative descriptions of the *Corydatus* and the *Chauliodes* larvæ. This last may always be distinguished from the former by having a smooth and unarmed skin; that of *Corydatus* has a skin roughened with granulations and capitate or clavate projections (overlooked by previous describers), the little projections being visible even in the first stage, at which time they are less capitate. The *Chauliodes* larva has the last pair of spiracles on the tips of a pair of contractile filaments, described as setæ by Walsh, who failed to apprehend their real nature, and wrongly described the *Chauliodes* larva as having one pair of spiracles less and one abdominal joint less than that of *Corydatus*, whereas both larvæ have the same number of joints and spiracles and both possess the rudimentary mesothoracic spiracle, which Mr. Riley finds more common in insects than is generally supposed. In other structural respects, as well as in habits and transformations, the two larvæ greatly resemble each other. The eggs of the *Chauliodes* have a longer tubercle or stem on the top, and are not covered with white albuminous material as are those of *Corydatus*. Mr. Riley has obtained large additional numbers of the egg masses of the latter the present summer, finding them not only on the leaves as described in his former paper, but on the stems of different trees, as well as on rocks overhanging water. He has had as many as twenty egg masses on a single maple leaf, both sides of the leaf being completely plastered up by them; and as a large number of these masses will generally be found in some one particular locality, or on a few branches of the same tree, the assumption is that the females congregate for purposes of oviposition. The white, albuminous substance covering these eggs shows by analysis that it has all the physical properties of wax.

THE MONKEY QUESTION IN INDIA.

A MONKEY campaign threatens to complicate the Asiatic question. It appears that within eight miles of Calcutta a detachment of baboons have lately taken forcible possession of the village of Augurpara, on the high road to the military station of Barrackpore, and, having ejected by violence and intimidation all the more human inhabitants, have billeted themselves on the orchards and gardens of the hamlet, whence they direct offensive stratagetic movements, night attacks, and predatory raids upon the neighborhood. In many points these simian marauders resemble their prototypes in Bulgaria, for we are told that "they are great brutes, and as savage as wild beasts. They attack children, and even full-grown women without fear, selecting always the female and weaker sex as the special objects of their violence." Fortunately, however, Calcutta is close by, and the local volunteers will, it is hoped, suffice to suppress the outbreak and drive the insurgent apes back to their jungles, thus obviating the necessity of calling out the regular troops and saddling India with additional military expenditure.

Meanwhile the fact remains that the residents of Augurpara have deserted their homes *en masse*, and that the apes are in riotous possessions of the plantain trees and the guava orchards, and reveling on the mangoes and other fruits now all ripe. Whether good may not come out of this evil, and the vagrant baboon, having made experience of the advantages of civilization, may not eventually come to prefer a settled life, and take to husbandry, is an interesting speculation we cannot here discuss.

Troublesome the Indian monkeys have been from the first, and local administration is constantly confronted with problems of a puzzling nature, in consequence of the objectionable tendency to intrude which characterizes them, and the sentimental veneration in which they are held by the people. The monkey, in the first place, has no self-respect; he thrusts himself into all companies, performing all domestic duties under the public eye, while scorning to recognize any of the niceties of the minor ethics. The average Christian, therefore, considers him a nuisance, and the ape never succeeds in effecting a lodgment on the premises of Europeans in India. The Hindoo, however, even though he may deplore the monkeys' shortcomings, is shackled by his religious scruples in his conflict with them, and dare not openly affront the creatures.

In many cities of India the monkeys inhabit recognized quarters, and are allowed every morning to descend from temple top and tree into the market place, and there to eat their fill of whatever may be exposed for sale. The owner sits by, pretending to grant the meal without grudging, but when no one else is looking he often takes the opportunity of giving the intruder a hearty cuff to send it on to the next stall for the rest of its breakfast. This semi-sacred character complicates the problem before the magistrate, for if one street complains to him that the monkeys have mischievously picked half the tiles off the house and begs to have them deported, the next street petitions that their religious prejudices may not be outraged by any interference with the simians' liberty. Sometimes, however, whole towns agree that the monkey nuisance has become intolerable, and, gods or not, vote for wholesale deportation. But the monkeys are as astute as their neighbors, and though submitting to be coaxed across the river, or carted off to a neighboring jungle, utilize both ferry and high road traffic for a speedy and comfortable return. Between Benares and Ramnagar a constant transportation of monkeys was at one time carried on; but since as many came back by boat of their own accord—the ferryman not daring to refuse their wishes—the local official abandoned the enterprise, and to this day the animals share both city and palace with the human inhabitants.

In the hill districts whole fields of corn are ravaged in a morning by the long-tailed troops, but the superstitious villager will not do more than shout at them his respectful request to go away. To catch them would do no good, and kill them he dare not, so he abandons his grain cultivation altogether for a year, and the monkeys pass on to another village. In the plains of India, from one sea to the other, representatives of the family are found, and command everywhere a similar respect. Their images in mud, marble or metal, are exposed for sale in every idol shop, and though not actually worshiped, are sufficiently revered to find a place on every altar and in almost every temple.

The villagers of Augurpara have therefore succumbed to no despicable foe, for the task of driving three hundred sulky baboons out of a village without outraging religious sentiment is a task calling for considerable tact, and not a little strategy.—*London Telegraph*.

SUPERHEATED steam is extensively used in soap-boiling in France.

[Abstract.]

NOTES ON THE LIFE HISTORY OF THE BLISTER BEETLES AND ON THE STRUCTURE AND DEVELOPMENT OF HORNIA.

By PROFESSOR CHARLES V. RILEY.

At the Hartford (1874) meeting of the Association, Mr. Riley described the newly-hatched larva of some of our common blister beetles; but all attempts to trace their habits had proved futile both in this and other countries until 1877, when he discovered that they preyed on the eggs of locusts (*Acerididae*). In a paper published in the last volume of the "Transactions of the Academy of Sciences of St. Louis," the life history of several of our common blister beetles is traced. The present paper gives a brief résumé of the facts there recorded, showing that the beetles belonging to the genera *Epicauta* and *Macrobasis* go through the same curious hypermetamorphoses as do other species of the family *Meloidæ*, and especially as *Meloe* and *Sitaris* were already known to do. The larva hatches as an active, pale brown, long-legged creature, termed triangular on account of its three-clawed tarsus. It then changes to what Mr. Riley calls the *Carabidoid* stage, in which it is white, less active and fleshy; then to what he calls the *Scarabæidoid* stage, in which it is still more degraded and clumsy; then hardens to what he calls the *Coarctate larval* stage, in which it is perfectly helpless, and resembles the puparium of many Diptera; then to the final larval stage, in which it is again white and soft, and more or less active; then to the true pupa state; and, finally, to the beetle; existing, thus, in eight distinct states (including the egg), instead of the four in which ordinary insects occur.

The paper is principally devoted, however, to the life history of a very anomalous, wingless genus of this family, the *Hornia minutipennis*, Riley. This insect is degraded and subterranean, and was found in the cells of a common mason bee, the *Anthophora abrupta*, Say. Its life-history, which was not known at the time the species was described, has been completely made out by Mr. Riley the present summer. The eggs, which are laid loosely in the burrows of the bee, hatch during the early part of June. The triungulin is extremely active, and, in all essential characters, very similar to that of *Sitaris*, one species of which, in Europe, likewise develops in the cells of *Anthophora*. By means of its tarsal claws and of a pair of preanal spinnerets and claspers, it holds on very tenaciously to the hairs of the bee, and is carried on the same into the bee-burrow. When the bee-egg is laid, and before the cell is capped over, this triungulin disengages itself from the bee, and at once pounces upon the bee-egg. After having sucked the contents of this last it throws off the triungulin skin and assumes the *carabidoid* stage; thereafter feeds upon the honey paste stored by the bee, and, within the cell, goes through all the hypermetamorphoses characteristic of the family. All the later stages, however, take place within the puffed skin of the *scarabæidoid* larva, the *coarctate* larva being well separated therefrom, but the third or final larva having such a delicate skin that it is not easily separated from this last when shed. There is but one brood annually; the pupa state being attained in August, and the beetle maturing all its parts during the autumn, and lying within its numerous coverings until the following May.

The paper contains some interesting details as to the effect of rain both on the bee larva and the *Hornia* larva; on the vicissitudes that befall the triungulin, its fratricidal propensities when two or more are included in the same cell, and on its adaptability to food-supply.

[Abstract.]

BIOLOGICAL NOTES ON THE GALL-MAKING PEMPHIGINÆ.

By PROFESSOR CHARLES V. RILEY.

The life-history and agamic multiplication of the plant-lice (*Aphididae*) have always excited the interest of entomologists and even of anatomists and embryologists. The life-history, however, of the gall-making species belonging to the *Pemphiginæ* has baffled the skill of observers more than that of any other group.

Mr. Riley is about to publish some new biological discoveries relating to this family of insects, in connection with a descriptive and monographic paper by Mr. J. Monell, of the St. Louis Botanic Gardens. The paper laid before the Association simply records some of the yet unpublished facts discovered.

All of the older writers in treating of the different gall-producing *Pemphiginæ* of Europe have invariably failed to trace the life-history of the different species after the winged females leave the galls, and, with few exceptions, have erroneously inferred that the direct issue from the winged females hibernates somewhere. The most recent production on the subject is a paper published the present year in Cassel, Germany, by Dr. H. F. Kessler, entitled the "Life History of the Gall Making Plant Lice affecting *Ulmus campestris*." The author, by a series of ingenious experiments, rightly came to the conclusion that the insects hibernate on the trunk, but he failed to discover in what condition they so hibernate.

Led by his previous investigations into the habits of the grape phylloxera, Mr. Riley discovered, in 1872, that some of our elm-feeding species of *Pemphiginæ* produce wingless and mouthless males and females, and that the female lays but one solitary impregnated egg. Continuing his observations, especially during the present summer, he has been able to trace the life history of those species producing galls on our own elms, and to show that they all agree in this respect, and that the impregnated egg produced by the female is consigned to the sheltered portion of the trunk of the tree and there hibernates, the issue therefrom being the stem-mother which founds the gall-inhabiting colony the ensuing spring.

Thus the analogy in the life history of the *Pemphiginæ* and the *Phylloxerina* is established, and the question as to what becomes of the winged insects after they leave the galls is no longer an open one. They instinctively seek the bark of the tree and there give birth to the sexual individuals, either directly, or (in one species) through intervening generations.

WHY THE FLOUNDER IS UNSYMMETRICAL.

In the proceedings of the American Academy of Arts and Sciences, Mr. Alexander Agassiz discusses the question how the eyes of the flounder come to be placed both on the same side of the head. It appears that the young flounder immediately after it is hatched, does not differ from other fishes; but, very early in life, as observed in eight species, one eye begins to pass over the frontal bones, from the pale to the

dark side of the animal, by a combined process of translation and rotation.

In *Plagusia*, however, the eye sinks into the head, the old orbit closing up as the eye works across the head, until at length the right eye gets entirely over to the left side. Attention has recently been directed by Pouchet to the fact that the absence of color from the blind side of flounders is plainly due to the partial atrophy of the great sympathetic nerve, effected during the passage of the eye from one side of the head to the other. It has been suggested that the cause of asymmetry in the animal kingdom is due to a difference in the strength of the organs of sense; to this Mr. Agassiz adds that in some hydroids, where the disproportion of one of the organs of sense is very great, the entire animal is unsymmetrical. Moreover, the action of light, he remarks, upon the organs of sense, which in all embryos are developed out of all proportion to their ultimate conditions, must remain an all important element in its effect upon the nervous system. In this connection, it may be stated that Pouchet has succeeded in producing a white side in trouts by destroying the eye of that side of the fish. The bearing of such facts as these on the general subject of protective mimicry is discussed by Mr. Agassiz.

SOME FURTHER FACTS REGARDING THAT "FATHERLESS RACE."

By PROFESSOR C. V. RILEY.

I AM led to send you a few additional notes on the curious bag-worm (*Thyridopteryx ephemeraformis*) by the receipt of a recent letter from Mr. William H. Gibson, part of which I herewith extract:

DEAR SIR:—I return from an extended vacation to find your welcome answer to my communication in the SCIENTIFIC AMERICAN relative to that "fatherless and motherless race." I presume you have enjoyed a good laugh at my expense in that matter, and from your standpoint I do not blame you. Please accept my earnest thanks, *personal thanks*, for the complete and satisfactory treatment of the subject. . . . That bag worm had been a continued source of aggravation to me for several years, and I determined at last to publish my experience with the creature, in the very hopes of finding somebody who would be able to solve the problem. I wrote to Professor Baird, at W., several years ago on the subject, but never received a reply. . . . In reference to the act of impregnation, you say, "she patiently awaits the male, and after meeting him," etc. It is of course assumed that the male inserts his organ through the opening of the cocoon, and thus accomplishes the connection.

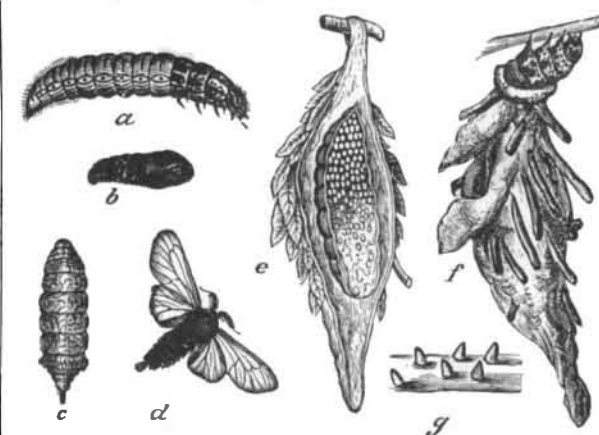


FIG. 1.—BAGWORM: a, larva; b, male chrysalis; c, female moth; d, male moth; e, follicle and puparium cut open to show eggs; f, worm crawling with bag; g, young worms with their conical upright coverings.

In my former communication I merely stated the fact of coition, without in any way explaining the process; but as there may be others who, like Mr. Gibson, are still somewhat puzzled as to the manner in which the male manages to meet his mate, to all appearance so effectually hidden and excluded from his reach; and as the process is singular enough, and not generally understood even by entomologists, a few additional words of explanation seem desirable to supplement what was previously said.

We have seen that by means of the elongation of her puparium, and her partial extraction therefrom, the female is able to reach with her head to the extreme lower end of her follicle, causing, in doing so, the narrow elastic portion

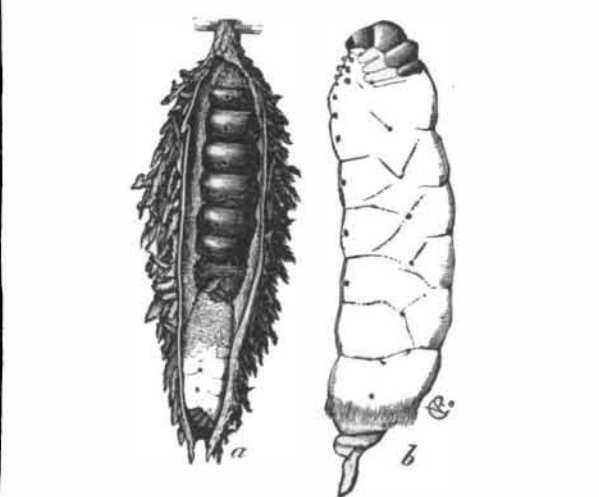


FIG. 2.—BAGWORM: a, a follicle cut open to show the manner in which the female works from her puparium and reaches the end of the bag—natural size; b, female extracted from her case—enlarged.

of the follicle to bulge, and the orifice to open more or less, as it repeatedly did while the larva was yet feeding, whenever the excrement had to be expelled. Fig. 2, a, shows a follicle, natural size, cut open so as to exhibit the elongated puparium, and the female extended from it as she awaits the male; b, represents this degraded female, about thrice enlarged. A cursory examination of the male shows the genital armature (which is always exposed) to consist of (1) a brown, horny, dorsal, bilobed piece, broadening about the middle, narrowing to and notched at tip, *concave*, and furnished with a tuft of dark hairs at tip inside; (2) a rigid, brown sheath, upon which play (3) the genital hooks or claspers, which are also concave inside, strongly bifid at tip, the inner finger furnished with hairs, the outer produced to an obtuse angle