



## Protection of herbaria and entomological collections from insects by means of sulphide of carbon

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To cite this article: M.J.B. Schnetzler (1876) Protection of herbaria and entomological collections from insects by means of sulphide of carbon, Annals and Magazine of Natural History, 17:102, 484-485, DOI: [10.1080/00222937608681997](https://doi.org/10.1080/00222937608681997)

To link to this article: <http://dx.doi.org/10.1080/00222937608681997>



Published online: 15 Oct 2009.



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As soon as the false branchiæ appear (that is to say, eight or ten days after hatching), the blood-corpuscles may be seen oscillating in the dorsal vessel, then vaguely indicated. Eight days later the circulation is well established, and is effected in the manner indicated in the well-known and often-cited memoirs of Carus and Verlore.

The buccal and locomotive organs undergo analogous changes, although less strongly marked than those of the branchiæ, always excepting the mandibles, which become more robust and more villous, and acquire a form rather different from that of the mandibular hooklets of the larva when only a few days old.

When it has attained the age of six months, and a length of from 7 to 8 millims., which corresponds to that age, the larva of *Palingenia virgo* is no longer subject to changes of any importance, until the time of nymphosis; but those which it has already undergone authorize us in saying that it presents a new and striking example of *hypermetamorphosis*, analogous to those which we have made known in the larvæ of the (Estridæ (*Æstrus equi*). Von Siebold has indicated similar phenomena in the Strepsiptera, and Fabre, of Avignon, in *Meloë*.

We have fully ascertained the precise duration of the incubation of the egg of *Palingenia virgo*. By care, patience, and perseverance, after frequent checks, I have succeeded in ascertaining that the time necessary for the hatching of the egg is six months at least, and seven months at the most. None of the naturalists who have preceded me were able, I believe, to arrive at this result. Swammerdam himself therefore would no longer have the right to repeat now-a-days what he said when he wrote his admirable memoir on the *Ephemera*—namely, that the period of the incubation of their eggs is very difficult to say, and known of God alone, who gave them form and life\*.

Lastly, from the observations that we have made during many consecutive years (from 1862 to 1874), and the principal results of which are contained in the note which we have the honour to lay before the Academy, the illustrious author of the 'Biblia Naturæ' would be no more authorized to maintain that the larvæ of the *Ephemera* at their escape from the egg do not differ from the adult larvæ either in form or organization :—"A vermibus adultioribus nec figura, nec fabrica discrepant."—*Comptes Rendus*, May 1, 1876, p. 1030.

*Protection of Herbaria and Entomological Collections from Insects by means of Sulphide of Carbon.* By M. J. B. SCHNETZLER.

M. Schnetzler of Lausanne states that the collection of Swiss flowering plants belonging to the Academy of Lausanne having been attacked by *Anobium paniceum*, he was led to try the effect of sulphide of carbon in destroying those insects and their larvæ. He had a wooden box made large enough to contain five fasciculi of the herbarium, each composed of about 200 plants. Four ounces of sulphide

\* "Dictu sane quam difficillimum est, nec nisi soli Deo notum, iis qui formam vitæque dedit" (Biblia Naturæ, tome i. p. 236).

of carbon were poured into the five fasciculi; the box was tightly closed, and the whole left for a month (January 15th to February 15th). All the insects were destroyed and no injury was done to the specimens or to the papers on which they were fastened. A little later in the season a fortnight was found to be sufficient. The expense of the operation is very small; and M. Schnetzler recommends that the boxes should be placed under a shed, as in case of the escape of any vapour from them there might be danger of explosion. The same process may be employed for collections of insects.—*Comptes Rendus*, April 10, 1876, p. 863.

*Silica of Grasses and other Plants carried up as Diatoms or other Siliceous Grains, and not in Solution or as Soluble Silicates.* By Prof. P. B. WILSON.

My attention was called, some time since, in the examination of the ash of plants obtained by slow incineration in a platinum crucible, to the fact that when the ash is treated with dilute acid, and evaporated to dryness on the water-bath, it does not pass into the gelatinous condition prior to complete decomposition of the *hydrated* mass, as is the case with the silicates soluble in acid, or those decomposed with sodium and potassium carbonates. If, however, the ash, prior to the treatment with acid, is subjected to a high temperature, a combination of silicic acid with the alkalies, the alkaline earths, and the earths takes place, if all are present; then the silica separates in the gelatinous form, and presents all of the chemical reactions of silicic acid obtained from the natural silicates. The silica obtained from ash by either of the processes indicated, on close examination, was observed to be entirely free from any combination, showing that it had been assimilated in the free state.

To demonstrate this theory, my friend G. I. Popplein, Esq., of this city, suggested the application of infusorial earth of the Richmond formation, found in large quantities on the western shore of the Chesapeake bay, to land sown in wheat. I have obtained straw from wheat so grown, and have found, after it has been treated with nitric acid and the siliceous remains placed on the field of the microscope, that it consisted wholly of the siliceous shields of Diatomaceæ, the same as found in the infusorial earth, excepting that the larger disks in their perfect form were absent (*Actinocyclus Ehrenbergii* and *Actinoptychus undulatus*). My conclusion is that they (and there probably may be other forms) are too large to enter the root-capillaries. During the coming summer I will attempt, if possible, to make micrometer measurements of both.

The discovery of Diatomaceæ in their original form in this wheat-straw precludes the possibility of the infusorial earth having undergone any chemical change in the soil, either by forming chemical combination with the alkalies or the earths, or by suffering physical disintegration from any catalytic action of any salts present in the soil.