

deon short : abdomen elliptical, smooth, shining, a little narrower but not longer than the thorax ; metapodeon longer ; octoon and following segments short : legs bluish green ; tarsi white, their tips piceous : wings limpid ; nervures fulvous ; humerus not more than one-third of the length of the wing ; ulna as long as the humerus ; radius short ; cubitus very short ; stigma very small.

Found at Bombay. In the collection of the Rev. F. W. Hope.

It belongs to the section of *Entedon* which I have named *Pedobius*, comprising *E. Alaspharus*, *Eubius*, *Amyntas*, *Epigonus* and other species. See Monogr. Chalciditum, i. 109.

28. *Scelio Acte*, fem. *Niger, antennis nigris basi fulvis, pedibus fulvis, femoribus fusco fasciatis, alis limpidis.* (Corp. long. lin. 2.)

Body black, long : head and thorax convex, rugulose : head transverse, as broad as the thorax ; vertex broad ; front not impressed : eyes of moderate size, not prominent : antennæ black, subclavate, as long as the thorax, inserted near the mouth ; first joint long, stout, fulvous ; second joint fulvous, long-cyathiform ; third long-cyathiform ; fourth and following joints forming a fusiform club : thorax oval : prothorax very short : scutum of the mesothorax large ; scutellum small : propodeon transverse, declining : podeon short : abdomen flat, fusiform, striated, rather narrower and much longer than the thorax : legs fulvous ; coxæ black ; a broad piceous band across each of the femora ; joints of the tarsi from the first to the fourth successively decreasing in length ; fifth joint as long as the fourth : wings limpid.

Found at Bombay. In the collection of the Rev. F. W. Hope.

XXVIII.—On the Development of *Starch and Chlorophyll Granules*. By CARL NÄGELI*.

IN the actual *punctum vegetationis* there is nothing but a homogeneous mucilage (protoplasma of Mohl). This becomes finely granular in the lower part ; it is here that the deposition of the fibres occurs. If we examine the fluid of the cell from this part (the fibre zone) of a young leaf or stem, we find in it very small granules, the diameter of which does not exceed $\cdot 003$ of a line, and in these consequently nothing is to be made out. In the vicinity are cellules or utricles of from $\cdot 001$ to $\cdot 0025$ of a line ; they are filled with a thin yellowish mucilage, which, in the smaller appears homogeneous, in the larger finely granular. Somewhat lower down (the starch zone) the formation of amyllum takes place ; the young leaf there becomes of a shining white colour. The cell-

* From the memoir on *Caulerpa prolifera*, by Carl Nägeli. Zeitschrift für Wissenschaftliche Botanik, von M. J. Schleiden and Carl Nägeli, Erster Band, Erstes Heft, 1845, p. 149 *et seq.* Communicated by Arthur Henfrey, F.L.S. &c.

contents exhibit abundance of similar larger and smaller utricles. We find utricles also, which contain with the granular mucilage one or more small starch granules in process of development; further, some which inclose from one to three and, more rarely, four to six perfect starch granules. Near to these occur some free starch granules separate or adhering together, the number of which increases as we examine the contents of the starch zone further down, while the number of utricles diminishes.

The amylum globules do not originate immediately in the cell-contents in *Caulerpa*, but in separate, small mucilage-cells. In the investigation of this subject we must bring the cell-fluid under the microscope, without adding water, as the contents of the utricles are altered by it. The previously equally distributed mucilage is precipitated from the membrane in the form of a continuous layer or of particularly large granules. The utricles undergo a similar alteration from the application of iodine. The mucilage becomes coloured by it yellow or yellowish brown; the membrane however, being from its situation free from the superincumbent contents, appears as an uncoloured line. The starch granules inside the utricle are perceptible on account of their blue colour. When these starch granules are perfectly formed the utricles are re-absorbed. Once, probably in consequence of pressure and the action of water, I saw an utricle burst and the starch granules escape from it. It is certain however that this is not the normal process, but the granules of amylum become free as the utricles are gradually dissolved. The former now appear as single granules, if in the utricles they lay separately or several loosely aggregated. They remain adhering together in clusters of three or more, if they were crowded together.

The formation of chlorophylle takes place in the leaves, and indeed always, *after* the formation of amylum. They seem to be produced in a similar manner to the latter. In each part of the leaf, which gradually becomes green, we find in the cell-contents, in addition to the starch granules (which originate earlier), utricles in which merely a greenish matter is to be perceived, others containing three or more green granules, lastly free chlorophylle granules separate or adhering in clusters of four to eight. Lower down in the leaf occur only free chlorophylle granules in company with the starch granules. As the parent-cells of the chlorophylle are only half the size of the starch, the investigation is very difficult, and conclusions are only possible from analogy, as particular conditions agree with those of starch-formation. I believe myself entitled however from this to assume that the chlorophylle granules in *Caulerpa* originate, several together, in separate mucilage-cells, which are afterwards absorbed.

Since nothing has been hitherto observed of the development of starch and chlorophylle, it is sufficient here merely to state the fact as authentic in the cells of *one* plant. I intend at a future period to publish some other facts on the development of these two elementary structures and their mutual relation, and wish that other microscopical inquirers would direct their attention to this point, for it is indeed only occasionally that one meets with useful facts.

The origination of caoutchouc appears first to take place where the amylum and chlorophylle formation is completed. It is there that I first find the little granules in the cell-contents with certainty, and from there first it visibly coagulates in water.

XXIX.—*Botanical Notices from Spain.*

By MORITZ WILLKOMM*.

[Continued from p. 120.]

No. X. MALAGA, May 30th, 1845.

AFTER spending several days in the little town of San Roque, situated two leagues distant from Gibraltar, I proceeded along the coast towards Malaga, where I arrived on the 19th of April. The vegetation of the hilly country of San Roque is, in its principal features, perfectly similar to that of Algeciras. All the hills are thickly covered with *Calycotome villosa*, Lk., here and there alternating with large patches of *Lavandula Stæchas*, L. The high plains on the north and west of the town, which separate this hilly district from the valley of the Rio Guadarranque, are mostly covered with *Quercus humilis*, Lam., which is here very common, but appears seldom to flower; at least I have hardly obtained ten specimens in flower. On these high plains *Cistineæ* occur in abundance, especially *Cistus crispus*, L., *C. albidus*, L., *Helianthemum salicifolium*, P., *H. guttatum*, P., and others; further, *Ornithopus compressus*, L., *Ranunculus flabellatus*, Desf., *Uropetalum serotinum*, K., several *Orchideæ*, *Erodia*, &c. The most important botanical localities in the environs of S. Roque are—the oak-woods stretching out in a north and west direction and watered by the Guadarranque, the sandstone hills rising on the other side of that river, a branch of the Sierra de Gazales and Monte Almoráima, a sandstone mountain lying between the bay and the sea. In the rocky clefts of this mountain occur the pretty *Anthericum bicolor*, Desf., not unfrequent, besides numerous *Cistineæ*: as *C. albidus*, *crispus*, *populifolius*—upon the roots of which I observed here *Cytinus hypocistis*,—*Helianth. halimifolium*, and especially *H. Tuberaria*, P.; besides *Anemone palmata*, L., *Ranunculus flabellatus*, *Passerina villosa*, *Tulipa Celsiana*, and on moist localities on the broad coomb

*. Translated from the Botanische Zeitung, Nov. 14, 1845.



Nägeli, Carl. 1846. "XXVIII.—On the development of starch and chlorophylle granules." *The Annals and magazine of natural history; zoology, botany, and geology* 17, 185–187. <https://doi.org/10.1080/037454809495586>.

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