

The only other British *Chemnitzia* which I have not seen alive are the *Ch. Barleei*, *Ch. excavata*, *Ch. Scillæ* (*Ch. nivosa*, which is the *Ch. cylindrica* (juv.), and *Ch. truncatula* of authors). Though in a former paper I have included the *Aclis unica* amongst the *Chemnitzia*, it may possibly turn out to be of a different type:—this observation is made without further knowledge on this point; I know pretty nearly its habitat from having found recent shells, but with the animal so collapsed as not to emit the organs. I will make no remark on the *Aclis ascaris* and *A. nitidissima*, as the animals still elude our researches.

I have now stated all that I know, agreeably to my views, of this difficult and interesting genus, and corrected some popular errors as well as those of observation, and particularly many of my own; for however greatly our *amour propre* may suffer by such admissions, there is absolutely no other alternative but to submit to them, which, if omitted, or not made at the proper moment, would leave us pretty much in the same position as the Chancellor of the Exchequer's regiment of conscience-money payers, which curious public fact, illustrative of one of the mysterious operations of the human mind, if properly pondered on, will suggest to us all, in respect of the present and the hereafter, many salutary, important, and high considerations.

I am, Gentlemen, your most obedient servant,

WILLIAM CLARK.

XX.—On the Sloughing of the Spider-Crab (*Maia Squinado*).

By P. H. Gosse, A.L.S.

AN opportunity having just occurred to me of witnessing the sloughing of a large Crab, I put down the principal points that I observed, hoping that they may throw light upon a subject that has always appeared so full of difficulty; namely, the manner in which the limbs are withdrawn from the exuviae.

As I was out this morning searching for algæ and zoophytes at low water, in the little cove of Hele near this town, I looked into a crevice that formed a small tide-pool beneath a huge overhanging rock. In the remotest corner crouched a Spider-Crab (*Maia Squinado*), face outwards, as is the custom with crabs in such circumstances. On pulling it out, I was astonished and delighted to observe how completely the carapace and the limbs were covered with parasitical zoophytes and algæ. A delicate *Ceramium* was conspicuous among the latter, and the former consisted of *Antennulariæ* and *Plumulariæ* in great profu-

sion, and in the highest possible condition ; many of them loaded with ovigerous vesicles.

While in the act of securing the crab in my collecting-basket, esteeming it only on account of the zoophytes it carried, I felt the body fall away from the carapace, which hung for an instant by the frontal part and then gently detached itself, with a feeling to my fingers as if it had been *torn* away. On looking at the crab I saw the new carapace perfectly formed and coloured, with no marks of injury where the slough had parted from it. The whole of the limbs and the under parts still remained invested with the old skin.

My collecting-jar was not large enough to receive the animal, which I was therefore compelled to bring home dry in the basket. But I immediately covered it with sea-water on my arrival, after it had been exposed about three-quarters of an hour. It was very inert and seemed exhausted. My attention was taken up with one of the zoophytes, which was new to me, and I did not look again at the crab for about a quarter of an hour. It was then in the very act of sloughing the remainder of its exuviae. The whole of the limbs, the abdominal segments, the sternum, with all the members of the mouth, came off entire, being connected by the common integuments.

When I looked at it, the first thing that struck me was the pulling of the legs out of their sheaths. The posterior ones were freed first ; the anterior pairs were about half out, and the animal pulled first at one, then at another, until they were quite drawn out, as if from boots. *The joints, as they came out, were a great deal larger than the cases from which they proceeded.* It was evident that in this instance, neither were the shells split to afford a lateral passage for the limbs, nor were the limbs reduced to tenuity by emaciation. It seemed to me that the parts, which had an almost jelly-like softness when extruded, were compressed as they were drawn through the narrow orifices by the fluids being forced back, these returning through their vessels, and distending the liberated portion of the limb, as it was freed.

The enlargement of the whole animal was as immediate and imperceptible in its progress as that of a caterpillar in the act of moulting. I measured some of the dimensions soon after the completion of the process, and found them as follows :—

	In the slough.	In the crab.
Length of the carapace to the tip of frontal spines ...	$3\frac{7}{8}$ in.	$4\frac{5}{8}$ in.
Width of the carapace at the lateral spines	$3\frac{3}{16}$ „	$3\frac{7}{8}$ „
Diameter of thigh of first true leg	$\frac{5}{12}$ „	$\frac{6}{12}$ „

The claws of the anterior feet, and the black horny points of

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the ambulatory feet, were increased in size more than proportionally, as were the abdominal foot-processes.

The whole of the branchiæ were represented in the most beautiful order in the exuviæ, with the crescentic *flabellum* laid over each series perfectly *in situ*. They were enveloped in an ample and most delicate mucous membrane, which was attached to the margin of the crust all round, and was evidently the lining membrane of the branchial cavities. The coats of the stomach, with its minute teeth, were also there in the form of a membranous bag, attached to the mouth by the lining of the œsophagus. The coats of the antennæ and of the eyes remained attached to the carapace; and the glassy corneæ of the latter were not reversed.

On opening a joint of one of the legs of the exuviæ, I found the thin shelly plates that afford attachment to the muscles still *in situ*.

I was struck with the beautifully regular though minute serrature of the opposing edges of the claws in the renewed animal, the teeth closing accurately into the intervals of the opposite series when appressed. Scarcely a trace of any such structure could be discerned in the slough; the teeth having been probably worn smooth by use.

I did not see any of the struggling that is sometimes spoken of; it seemed to be a very easy and simple matter. The new integuments were perfected, though soft, before the old were thrown off, and the immediate cause of the separation of the crust appears to me, the sudden growth of the animal within, forcing asunder the upper and lower crusts at the posterior margin: then the pulling out of the limbs presents no more difficulty than what depends on the enfeebled condition of the muscular energy.

The great claws of the common crab and of the lobster, of course, suggest a more difficult operation. But the congruity seen in the operations of nature makes it unlikely that one mode of procedure would obtain in these and another in a species so affined as the Spider-Crab. Hence, I presume that even these members, bulky as they are, are drawn through their narrow joints, not by being *emaciated*, but simply by being *softened*, and by their fluids being displaced *in detail*.

Ilfracombe, Devon, August 14, 1852.



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