

La Conchiglia

The Shell

Year XXX - n. 289, October - December 1998 - (IV quarter) Quarterly - ISSN 0394-0152 - Sped. Abb. Post. 45% Roma c. 20 lett. B art. 2 L. 23/12/96
Aut. Trib. di Roma n. 12596 of 28/1/1969 - Lire 15.000 - US\$ 12.50- TAXE PERÇUE P.P.- TASSA RISCOSSA P.T. ROMA



Seashells from Helgoland

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Fig. 1: Rocky intertidal at the northwest of Helgoland

Helgoland, Germany's sandstone island in the North Sea, is widely known because of its tumultuous history and, more recently, for providing an opportunity to buy duty-free items. Few people are aware that the intertidal area of Helgoland is a nature reserve and quite unique because it has a type of rocky intertidal area not encountered elsewhere on German shores. Not only that—a rich variety of birds keeps the ornithologists in a state of permanent enchantment. And the

molluscan fauna bears more than one surprise, even for the fastidious. As guest of the Biologische Anstalt Helgoland, I had the opportunity to study the local molluscan fauna, make collection trips in the littoral and sub-littoral areas and experience a fascinating variety of marine fauna of the North Sea. The following article will not encourage collectors to visit Helgoland for shell collecting: most of the island is a nature reserve, and—luckily—the intertidal flats are not easy to access. Despite the pollution of the North Sea, a large variety of gastropods was found.

Gastropoda - Prosobranchia

To evaluate the ecological development of a defined area, it is necessary to have data taken over a long period of time. Seashells have always been the subject of particular interest and are relatively easy to preserve and identify. Therefore excellent data on the diversity of the molluscan fauna can be derived from observations made by early authors who collected at Helgoland. Comprehensive collections go back to HEINCKE(1894) who quoted 27 marine gastropod species from the German Bay including Helgoland. ANKEL(1936) confirms an account of 27 gastropod species for this area. In 1966 ZIEGELMEIER published a handbook on German prosobranch gastropods, enumerating at least 44 species to occur in the vicinity of Helgoland. However, from this account, eight species have to be transferred to the opisthobranchs. The following list is the result of twelve days' collecting in several areas and habitats. It shows that many of the species recorded almost 30 years

ago may still be found around the island, and even more could be added. At first glance, this might be interpreted as an indication of an intact and undisturbed marine ecosystem. However, these species listings include collected empty shells and hence give no information on present-day conditions. A large number of species usually reflects a diversity of habitats. When subfossil material is taken into account, then a distorted picture arises.

It is therefore necessary to

make a distinction between species that are found alive and those only available from subfossil debris. A consequent distinction of living and subfossil species has not been made by any of the above-mentioned authors. The data on habitat and behavior given in their works, however, permits the conclusion that at the beginning of this century, about 40 species of marine gastropods (prosobranchs and opisthobranchs) had live populations around Helgoland. To permit comparison with the situation today, I have denoted live species (including very fresh dead shells) with (*) and those collected only eroded or subfossil with (-). The latter species could not be ascertained as living around Helgoland today.

Fig. 2: Taking in the dredge from 50m on the MV Uthörn



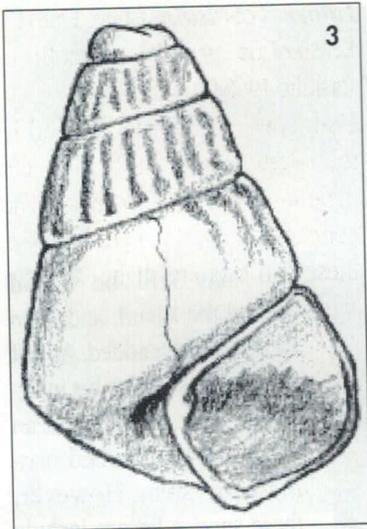


Fig. 3: *Partulida spiralis*

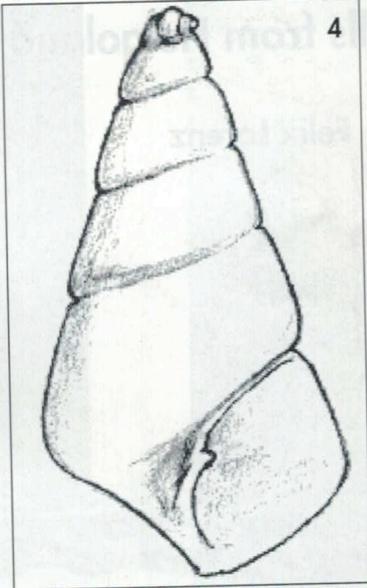


Fig. 4: *Odostomia unidentana*

***Acmaea virginea* (Müller, 1776)(-)**

One eroded 8mm specimen from beach grit near the "Lange Anna". Several subfossil specimens from dredgings in the "Tiefe Rinne". Was apparently more common also in the lower littoral some years ago. The typical habitat in the intertidal area, on algae and hard substrate with *Lithothamnion*. Formerly common (Heincke 1894), but intense search in this area has produced no fresh dead or living shells.

***Aporrhais pespelecani* Linné, 1758 (-)**

The pelican-foot from Helgoland used to be very rare for many decades. Recently several live specimens were dredged in the further vicinity of Helgoland and are now kept alive in the Biologische Anstalt. No specimens were collected by dredging in the "Tiefe Rinne" where only once (1949) a living juvenile specimen was collected.

***Bittium reticulatum* (Da Costa, 1778) (-)**

Two fragments were found in a bottom sample taken from 25 m in the "Tiefe Rinne". No fresh or living shells.

***Buccinum undatum* Linné, 1758 (*)**

A very common species all around the island. Broken shells can be found everywhere, even inshore in the dunes; a small living specimen was found in the lower littoral in the western part of the island; innumerable living specimens were dredged and trawled in the "Tiefe Rinne" during my stay, the largest of which measured 114mm.

***Cingula aculeus* (Montagu, 1803) (*)**

Several living specimens were found in the littoral of the northwestern intertidal flats. The 3-4mm specimens were hiding under polychaete worm tubes on the underside of lar-

ge boulders. This species was not reported by Ziegelmeier. Probably it was confused with the following taxon. In *C. aculeus* there are no corrugations on the later whorls, rarely on the first and second whorl, while in *C. striata* there are prominent corrugations on the third and fourth whorl.

***Cingula striata* (Montagu, 1803) (*)**

Differs from *C. aculeus* by the presence of corrugations on the third and fourth whorl. The costae are less prominent and more numerous than in the preceding species. A few broken but fairly fresh shells from the littoral of the northwestern intertidal only.

***Crepidula fornicata* (Linné, 1758) (*)**

A species introduced with American oysters (first reported from Great Britain in 1880, since 1949 reports from Helgoland). Used to be more common

than today, according to local experts. We collected a few fresh dead specimens on the "Düne" and one from the northwestern intertidal. A few dead specimens were also found in dredged samples from 50 m.

***Gibbula cineraria* (Linné, 1758) (*)**

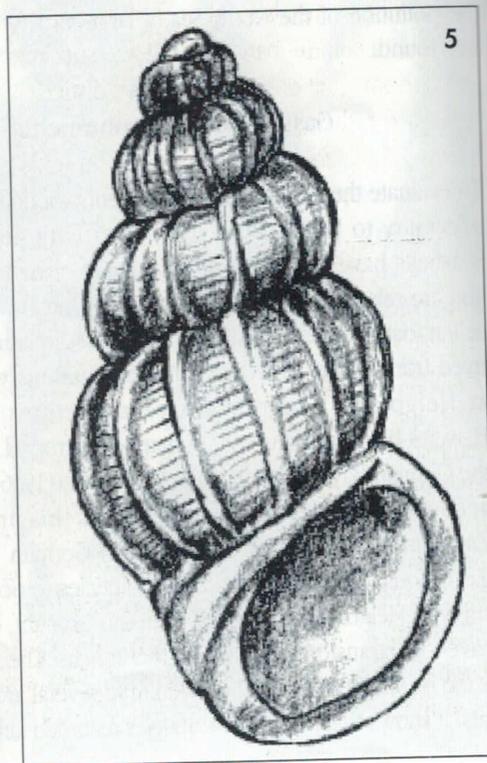
A very common species in the littoral everywhere around the island. Eroded specimens in beach grit show the beautiful mother-of-pearl present in most species of Trochidae.

***Gibbula tumida* (Montagu, 1803) (*)**

Smaller than the preceding species, with a more stepped spire.

Inhabits the sublittoral at depths ranging from 10 to at least 100 m and it is usually found by dredging. Very com-

Fig. 5: *Manzonina costata*



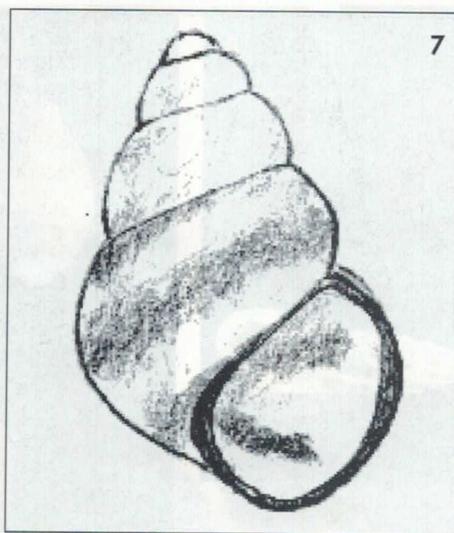
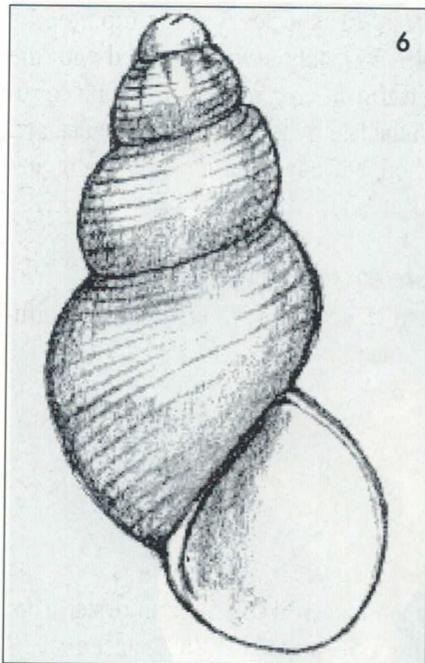


Fig. 6: *Cingula aculeus*

Fig. 7: *Rissoa parva interrupta*

Lacuna divaricata (Fabricius, 1780) (*)

Very common along the beaches of the "Düne". Differs from *Littorina* sp. by the presence of a slit-like umbilicus. Lives amongst algae in the littoral. The name for this shell was synonymized with *Lacuna vincta* (Montagu, 1803) by Poppe & Goto, 1991.

Littorina littorea (Linné, 1758) (*)

This is the most common species in the littoral of Helgoland, every bit of rock and wall exposed during low tide bears specimens of this variable species. Among typical black individuals there are also red and white ones as well as specimens with colorful banding. Juvenile specimens are quite different from adult ones as these have distinct striae while adult ones are rather smooth. The largest specimens measured 36mm. The populations of this species have declined drastically in the past years, probably due to over-collecting in the accessible areas of the intertidal (SCHULTE, pers. comm. 1998)

Littorina saxatilis (Olivi, 1792) (*)

In past years the declining populations of *L. saxatilis* have recovered in most areas of Helgoland. Especially common on the uppermost intertidal of the northwest, it is the most abundant species next to *L. littorea*. Another species of *Littorina* claimed to occur at Helgoland is *L. neritoides*. Despite intense search all around the island, I was unable to find a specimen, nor has anybody I talked to ever seen a *L. neritoides* from Helgoland. I suspect the records go back to an elongate ecomorph of *L. saxatilis* found around the "Lange Anna" or to large specimens of *Lacuna divaricata* which may be similar in shape.

Littorina obtusata (Linné, 1758) (*)

Littorina mariae Sacchi & Rastelli, 1966 (*)

Both species are found spread in the intertidal zone, just below the zone inhabited by *L. saxatilis*. The conchological differences between these two taxa are slight: While in *mariae* the spire is completely flat there is a slight elevation visible in *obtusata*. The animals differ in details of the male reproductive organs. In their ecology the two may be characterized by the tendency of *mariae* to occur closer to the shore than *obtusata*. There are also differences in the reproductive rates and seasons (GALLARDO & GÖTTING

1985). Both are common in the intertidal of Helgoland. The yellow and banded forms of the *L. mariae*-type are restricted to areas where yellow *Fucus*-algae are also found (e.g. in the South Harbor of Helgoland). In areas predominantly inhabited by black algae the dark form of *mariae* dominates.

The species of *Littorina* found in Helgoland show different modes of development. While *L. littorea* has a planktonic veliger stage, *L. mariae* and *obtusata* have intracapsular ("direct") development. *L. saxatilis* is ovoviviparous. This interesting fact shows that different modes of development are not always significant for generic distinction—they may occur within closely related species of a single genus. In the Cypraeidae, the mode of development (planktonic or intracapsular) is considered when distinguishing between genera (LORENZ & HUBERT 1993). In the littorinids, it is a variable in the species' strategy to adapt to specific habitats (see also GALLARDO & GÖTTING, 1985). What consequences this has for the still-debated generic subdivision of the Cypraeidae is certainly a most interesting question for future discussion.

Lunatia catena (Da Costa, 1778) (*)

The finding of a fresh *L. catena* in the vicinity of Helgoland confirms that it still occurs there. Living specimens have not been found for many years and even fragments are scarce. The illustrated crabbed 17mm shell was found by dredging in the "Tiefe Rinne" at 50m depth.

Lunatia nitida Donovan, 1804 (*)

In the past years this beautiful moon-shell had become extremely rare and no living examples were found. On our dredging tour in the "Tiefe Rinne", we had about two dozen living and several more dead specimens, which indicates that the population has recovered. The name was synonymized with *Lunatia pulchella* (Risso, 1826) by Poppe & Goto, 1991.



Fig. 8: from left to right:
 3 x *Gibbula cineraria*, 2x *Gibbula tumida*
 1x *Lunatia catena*, 1x *Lunatia nitida*, 1x *Scala clathrata*



Fig. 9: 2x *Littorina obtusata*, 3x *Littorina mariaae*, 3x *Littorina littorea*, 2x *Littorina saxatilis*

Fig. 10: left: *Crepidula fornicata*, dx *Aporrhais pespelecani*



Manzonina costata (Adams, 1854) (-)
 A single broken shell measuring 4mm was found in a bottom sample taken from 50m.

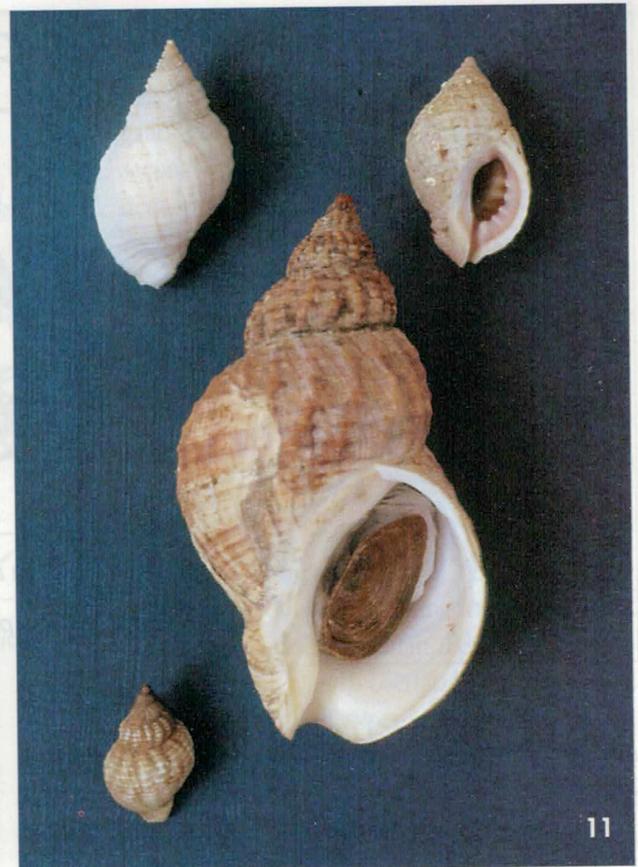


Fig. 11: 2x *Nucella lapillus*,
 2x *Buccinum undatum*

Nassarius incrassatus (Ström, 1768) (*)

A variable species common in the sublittoral of Helgoland. Several specimens were found by dredging. Fresh specimens were also found beached at the "Düne". The size of adult shells varies considerably, from 7mm to 14mm.

Nucella lapillus (Linné, 1758) (*)

The German populations of this species are under protection by law. With good reason: at Helgoland the species was

Fig. 12: 3x *Nassarius incrassatus*, 2x *Philbertia linearis*
 1x *Acmaea virginea*, 2x *Lacuna divaricata*, 1x *Triphora perversa*





Fig. 13: *Polycera quadrilineata*



Fig. 14: *Onchidoris muricata*

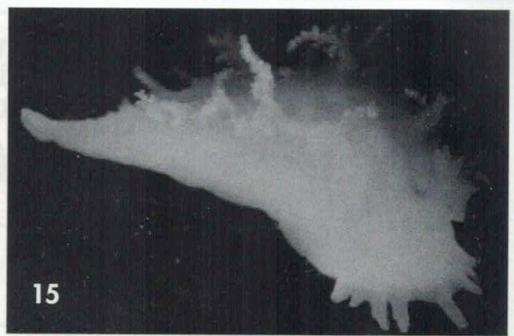


Fig. 15: *Tritonia plebea*



Fig. 17: *Aeolidiella glauca*

once very common in most rocky areas of the littoral close to shore, in association with *Mytilus* and barnacles. Around Helgoland today, only one population of more than about 30 specimens seems to remain. Eroded shells, however, are quite common on the beaches. *N. lapillus* is an active predator; it drills holes into *Mytilus* and barnacles with its radula.

Philbertia linearis (Montagu, 1803) (*)

A common shell in the sublittoral. We also found living specimens of this turrid in dredged material from 50m of the "Tiefe Rinne".

Rissoa parva* var. *interrupta (Adams, 1798) (*)

An abundant species in the lower littoral and the upper sublittoral. Samples of algae usually contain several dozen of these tiny (2-4mm) shells. As identification of the smaller European gastropods takes time and patience, the lists of species that are presented nowadays are likely to be incomplete and full of misidentifications. This is the case for *Rissoa parva* var. *interrupta*. Recent reports list *Hydrobia ulvae* (which does not occur in Helgoland) or *Barleeia rubra*. This species is commonly illustrated (Graham, 1971) but prob-

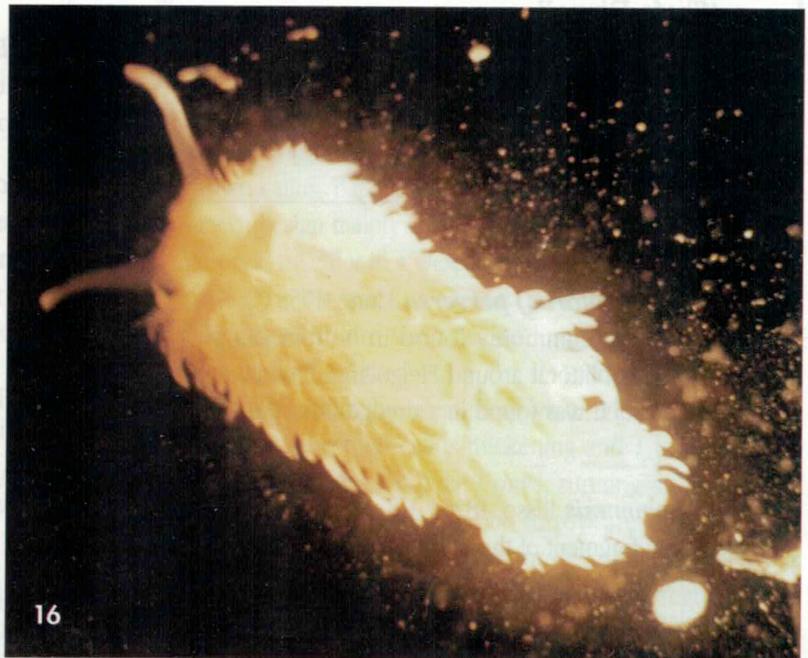


Fig. 16: *Aeolidia papillosa*

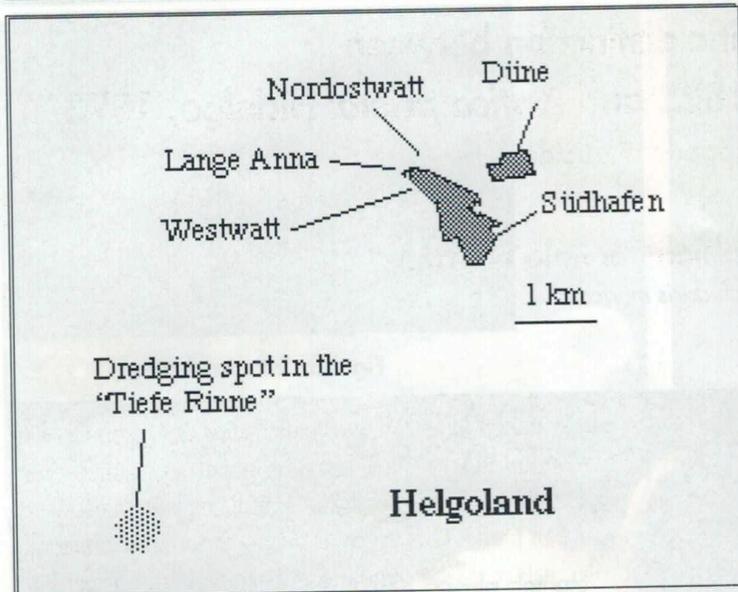
ably does not exist. It was discussed as a possible synonym of *R. parva* (see FRETTER & GRAHAM 1978); my findings on Helgoland support this assumption. ZIEGELMEYER illustrates a specimen of *Rissoa parva* with strong axial cords normally found in this species. He also cites HEINCKE (1897) who calls it "most abundant" at Helgoland. The illustration of only a corded shell has apparently misled later workers who merely used ZIEGELMEYER's illustrations to identify their findings. The species *Rissoa parva* is very variable throughout its distribution and its variety *interrupta* is a smooth form without axial cords. Occasional specimens from Helgoland still show traces of cords towards the aperture.

Epitonium clathrus (Linné, 1758) (*)

A beautiful 45mm specimen was found in 50m in the "Tiefe Rinne" where this species seems to be rather common, judging from several fresh fragments. The color of the shell varies from all-white to purplish with darker staining on the riblets.

Epitonium clathratula (Kanmacher, 1798) (*)

A large 17mm specimen was found crabbed in the same



haul as the previous species.

Triphora (Monophorus) perversa Linné, 1758 (*)

Broken shells are commonly found in bottom samples taken from the sublittoral around Helgoland. One juvenile but living specimen was found in a dredge from the "Tiefe Rinne".

Turritella communis Risso, 1826 (-)

A single 10mm fragment of the "common" *Turritella* was all I could gather during my stay in Helgoland. Generally it is rather regularly found alive in sublittoral habitats.

Gastropoda - Opisthobranchia

Numerous species of nudibranchs and shelled opisthobranchs are known from the North Sea. Most of them do not attain the maximum sizes typical for the respective species. Finding some of the smaller nudibranchs and other living micromollusks in dredged shell grit may be possible only by applying a trick: distribute samples of dredged material in a shallow basin, cover thinly with seawater. Leave for about 48 hours. Micromollusks and nudibranchs will climb up the walls of the basin or can be found crawling just under the water-surface.

Aeolidia papillosa (Linné, 1761) (*)

A single 18mm specimen of this common nudibranch was found in the "Tiefe Rinne", approximately 5 km offshore in the southwest of Helgoland using a dredge at 50 m.

Aeolidiella glauca (Alder & Hancock, 1845) (*)

A 20mm specimen of this species was found in the same haul as the preceding one.

Archidoris pseudoargus (Rapp, 1827) (*)

This large nudibranch is common in the sublittoral of Helgoland. Several specimens were found with algae along the walls of the southwestern harbor.

Brachystomia rissoides (Hanley, 1844) (-)

Two 3mm specimens were found dead in a dredged shell grit sample taken from 50m. ZIEGELMEYER reports this species to be parasitic on *Mytilus edulis*. Strangely, no evidence of living *Mytilus* was found in the shell grit sample.

Cylichna cylindracea (Pennant, 1777) (-)

A dead 9mm shell was found in bottom samples taken from approximately 25m in the southwest of the island.

Eulima alba (Da Costa 1778) (-)

One broken 14mm shell in a bottom sample from approx. 30m.

Facelina bostoniensis (Couthouy, 1838) (*)

This attractive nudibranch was found in grit dredged from 50m at the "Tiefe Rinne".

Odostomia conspicua Alder, 1850 (*)

Odostomia unidentata (Montagu, 1803) (*)

One living specimen each of these tiny parasitic gastropods was found in shell grit dredged from 50m. In the genus *Odostomia* (as well as in the related *Turbonilla*) the protoconch is sinistral while the adult coiling is dextral.

***Odostomia* sp.** (-)

One dead and rather eroded 3mm specimen was found in shell grit dredged from 50m.

Chrysallida obtusa (Brown, 1827) (-)

Two dead but complete 3mm specimens were found in the same haul as the *Odostomia*.

Chrysallida spiralis (Montagu, 1803) (-)

Several dead specimens of 2-3mm were found in dredged shell grit and bottom samples taken from 50m.

Polycera quadrilineata (Müller, 1776) (*)

Three specimens of this colorful opisthobranch appeared in grit dredged from the "Tiefe Rinne".

Onchidoris muricata (Müller, 1776) (-)

A minute 3mm specimen was discovered in grit dredged from 50m.

Tritonia plebeia Johnston, 1828 (*)

This appears to be one of the most common nudibranchs of the sublittoral of Helgoland. Several specimens were found in samples of shell grit dredged from 50m in the "Tiefe Rinne". The color of the animal varies from silvery white to deep orange.

(Concluded on p. 59)