

The nutmeg trees on the island, about half a million in number, produced in 1870 1,022,207 lbs. of nutmegs, and 197,143 lbs. of mace.

The weather at Banda is rainy and moist throughout the year, August to November being the driest months. The northwest monsoon blows occasionally with violence, while the southeast monsoon seldom exceeds a moderate breeze. There is monthly mail communication with Banda from Batavia.

The Resident and some of the other gentlemen at Banda stated that in July and August the water was usually milky white, but during the Challenger's visit it was exceptionally clear; in connection with this it may be mentioned that on the 28th September, shortly before reaching Banda, Mr. Buchanan procured in the water-bottles from 400 and 600 fathoms a milky-white water, the appearance being due to an amorphous precipitate.

It having been ascertained from the Resident during the stay that a small steamer which had been for a cruise to Ceram had broken down on its return when within a few miles of Banda, and that the crew had no provisions on board, the steam pinnace was sent out to search. In the evening the pinnace returned, having found a small boat, containing the Dutch master and half a dozen Malays so exhausted from want of food as to be unable to reach the islands. They reported leaving the steamer two days previously, and that its crew had then no water left; under these circumstances the ship proceeded out in search of the steamer, and steamed nearly over to Ceram without seeing it or its crew, natives of that island, consequently it was concluded that they had reached a harbour there, and the Challenger returned to Banda. While the ship was away, the steam pinnace remained with some of the naturalists dredging in 20 to 30 fathoms, close to Banda, when along with other specimens numerous Monaxonid sponges were obtained. Mr. S. O. Ridley, F.L.S., of the British Museum, who is preparing a Report on this group, has furnished the following notes:—

“*The Monaxonida* (as it is proposed, in accordance with principles laid down by Professor Sollas<sup>1</sup> and advocated by Professor F. E. Schulze, to term that group of the Siliceous Sponges named Monactinellidæ by Professor Zittel) are, as the investigations of the ‘Lightning’ and ‘Porcupine’ in the North Atlantic, those of Dr. Bowerbank in the Shetland seas, and those of Professor Agassiz in the Gulf of Mexico would lead us to expect, well represented in the Challenger collections, viz., by about two hundred species, of which about seventy are new to science; and they are by no means confined to the more moderate depths. Representatives of the group were obtained at seventy-three distinct localities out of the total number of dredging and trawling Stations.

“Of the six marine families, Renieridæ, Chalinidæ, Desmacidinidæ, Ectyonidæ, Axinellidæ, and Suberitidæ, commonly recognised in this suborder, the Desmacidinidæ take unequivocally the first place in the collection, both from their abundance and

<sup>1</sup> See Cassell's Natural History, vol. vi. p. 326, 1883.

from the interest attaching to the types represented. At the same time no form has been discovered in this family of sufficient distinctness from the known genera to rank as the representative of a new generic type. Those extraordinary forms allied to *Esperia*, with which the researches of Professor G. O. Sars, Sir Wyville Thomson, Mr. Carter, and Professor O. Schmidt have made us familiar, viz., *Chondrocladia* and *Cladorrhiza*, are present to the number of at least nine species, of which

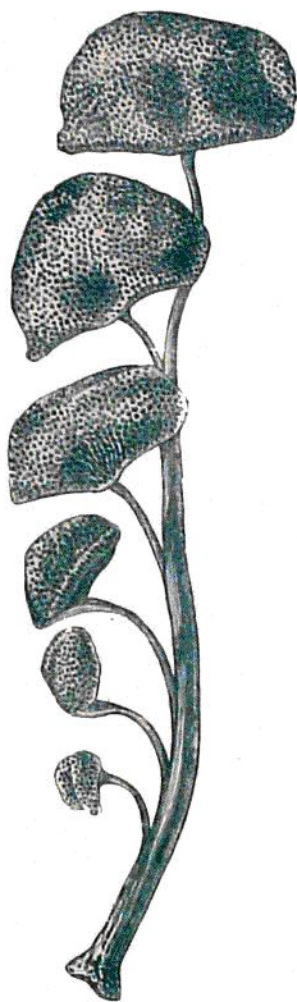


FIG. 187.—*Amphilectus challengerii*, Ridley, as seen from the front, reduced to one-half natural size. Moluca Sea, 825 fathoms.

three *Cladorrhizæ* and as many *Chondrocladiæ* are certainly new to science; among the points of interest which they present not the least is the fact that the majority of the species do not exhibit the same shrubby form as the original species to which these names were applied, but a shape the peculiarities of which led Professor Schmidt to found the genus *Crinorrhiza* for a specimen belonging to this division of the Desmacidines obtained off Barbados. *Crinorrhiza* has a relatively small, subglobular body, from the equatorial aspect of which radiate in a horizontal direction a number of strong spicular tufts; a central root may also be present. While, however, Professor Schmidt considered these, certainly remarkable, external characteristics of sufficient importance to justify the erection of a genus, the Challenger specimens show that the spiculation of the five species which exhibit them belongs to two distinct types, the one that of *Chondrocladia*, the other that of *Cladorrhiza*. It therefore becomes necessary (having regard to the superior weight which must be admitted to attach to spicular characters in contrast to those derived from the external form) to abandon the genus *Crinorrhiza*, as constituting a mere growth-type, comparable to the 'artificial genera,' *Amphoriscus*, *Olynthus*, &c., recognized by Professor Haeckel among the Calcarea. Of the more familiar genera *Esperia* has nine or ten species, of which probably one-half are new to science. *Esperia rotalis*, Bowerbank, is remarkable for ranging from Britain to Port Jackson; a new species from the Cape is distinguished by its immense tricurvate and bihamate spicules. *Alebion* is represented by some new species in which the 'bipocillate' spicule attains a

size and beauty hitherto unknown. *Myxilla* is rich in individuals, but there is a sameness about the characters of the species which contrasts strongly with the manifold forms assumed by *Esperia*; a new species from Japan will be termed *Myxilla japonica*.

"A type characterised by a smooth acute skeletal and an equianchorate parenchyma spicule, to which the name *Amphilectus*, Vosmaer, has been restricted, produces one of the few new Monaxonida possessing a striking external habit. *Amphilectus challengerii*

(see fig. 187) differs very slightly in the characters of its skeleton from *Amphilectus edwardi*, a species common in British seas, but whereas the habit of the other known species of the genus is either massive or simply ramose, that of the species from the Molucca Sea is altogether novel in its family, although it simulates somewhat *Caulospongia*, Kent, which has been placed among the Suberitidæ, and *Foliolina*, Schmidt, a Renierid. A new species of *Crella* (*Crella navicelligera*) is remarkable for the extraordinary lateral extension of the shaft of its small anchorate spicule, giving it the general outline of those reproductive bodies of the Gregarinidæ known as 'pseudonavicellæ.' The Stations between the Cape and Kerguelen Island exhibit a rich fauna of European facies, among which may be mentioned a new *Vomerula* and a fine *Gellius* of extraordinarily delicate and vitreous character, recalling that of many Lyssacine Hexactinellida, and with the ends of the usually doubly-pointed skeletal spicule quite rounded off. Of the curious, probably almost cosmopolitan, genus *Rhizochalina*, immense examples, in which the body alone attains a diameter of 6 inches, were obtained in Bass Strait; they are evidently identical with a specimen from South Australia, described by Lamarck in 1815 under the name of *Alcyonium putridosum*, and are closely related to *Desmacidon fistulosa*. Bowerbank. A study of the genus *Tedania*, by hardening and staining the soft tissues, shows that its systematic position is with the Desmacidinidæ rather than the Renieridæ. The long fine acerate spicules commonly occur in bundles, and evidently represent the 'trichites' of *Esperia*.

"In all, the collection contains about eighty species belonging to this family, of which upwards of thirty are new to science.

"The Renieridæ proper are not numerous. The difficulty of finding constant and distinctive generic and specific characters in this subdivision is well illustrated by the large series of *Amorphina megalirrhaphis*, Carter, from Kerguelen Island. Most of these specimens, like the typical ones, have a rather pale brown colour and a glabrous surface, and consist of low irregularly-shaped masses; the only traces of skeletal fibre consist of some short strands apparently representing the primary or vertical fibres of other Renierids; however, the specimen figured (fig. 188), besides its definite, regularly lobate form and dark amber-brown coloration, possesses a very distinct set of primary fibres and a dermal reticulation like that of *Pellina*, with which genus it might have been placed if its relations to the other typically Amorphinoid specimens were not obvious. A *Pellina*, forming flat sheets of large size, occurs in 600 fathoms at the mouth of the Rio de la Plata,



FIG. 188.—*Amorphina megalirrhaphis*, Carter. ♀. Variety with distinct dermal and primary skeletal fibres, and numerous vents (*v*), natural size, from the side. Christmas Harbour, Kerguelen Island, 60 fathoms.

*Stylorrhiza* extends as far south as Kerguelen Island, where it is abundant. The Renieridæ amount to about thirty species, of which five are new. The Chalinidæ comprise about twenty species, but are not as a whole in a very satisfactory state of preservation; *Pachychalina*, with three new species, is the only genus of much interest. The Ectyonidæ are remarkably few in number.

“The Axinellidæ are, after the Desmacidinidæ, of the greatest interest. For a species from near Bahia having the erect slender digitate habit of the European species of *Raspailia*, but distinguished by remarkably elongate dermal spicules, blunt at one end and terminating at the other in three short and scarcely divergent points, and occurring in groups, a new genus is necessary, which will be called *Thrinacophora*;<sup>1</sup> the main skeletal spicule is acerate, and the parenchyma contains bundles of slender acerate ‘trichites’; it appears to stand to some extent between the Axinellidæ and Desmacidinidæ. Another species of similar habit approaches the curious discoid *Halicnemia patera* of the Shetland seas so closely in spiculation as to enforce very strongly the doctrine that external form must be only used with the greatest caution as a guide to affinity. About thirty species, of which fully one-third are undescribed, belong to the family.

“The Suberitidæ (excluding *Tethya*, which has been relegated to the Tetractinellida on the ground of its spiculation and skeletal arrangement) are surprisingly scanty, considering their abundance in both shallow and deep water in the North Atlantic area. They number about thirty species. Of the essentially bathybial forms, the range of *Trichostemma* (*Radiella*, Schmidt) is extended by the Challenger collection from the North Sea and equatorial Atlantic to the equatorial Indo-Pacific area, whence comes a new species. *Sceptrella* (*Latrunculia*, Bocage) is represented by two new species from the southern hemisphere, in one of which the outer end of the characteristic sceptre-like spicule is prolonged into a spike. *Bursulina muta*, Schmidt, which is closely related to *Polymastia brevis* of Bowerbank, extends to the North American Atlantic coast, *Thecaphora* to the Tristan da Cunha group of islands.

“*General Distribution.*—The most prolific localities are the neighbourhood of Bahia, the southern and western coasts of Patagonia (distinguished by the abundance of individuals of *Alebion* and *Tedania*), the Philippine Islands (a very varied fauna), and (as already shown by the investigations of the ‘Alert’) Torres Strait, also Kerguelen Island (especially Renieridæ and Suberitidæ). But little of striking novelty was obtained in the Atlantic; on the other hand, at the few (eight) very deep Stations in the Pacific which produced Monaxonida, the captures were almost exclusively new Desmacidines of the important genera *Chondrocladia* and *Cladorrhiza* mentioned above, almost every Station having a species peculiar to it.

“Some idea of the proportions in which *Monaxonida* occur at different depths may be

<sup>1</sup> θρίναξ, a three-pronged fork.

gathered from the following table, if it is remembered that the productiveness of a locality in sponges of this group is usually in inverse proportion to its depth."

Depths of Stations.	Number of Stations of this depth at which Monaxonida were obtained.
3000 fathoms.	1
2900 "	1
2000-2600 "	7
1000-2000 . "	5
200-1000 "	11
100- 200 "	17
Less than 100 "	31

#### BANDA TO AMBOINA.

The vessel left Banda at 8 P.M. on the 2nd October, passing out by the channel between the islands of Neira and Pisang, and then between the islands of Swangi and Rhun.

On the 3rd, at 5.30 A.M., the ship was stopped, being then close to the position of a sounding of 4000 fathoms marked on the chart, and the trawl put over. The weather was unfortunately cloudy, so that the position could not be ascertained by observation. After paying out 4400 fathoms of trawl rope, bottom was found by sounding in 1425 fathoms. At this time the weather cleared a little, and sights were obtained and a bearing of Gunung Api, which placed the ship about six miles west of the position of the 4000 fathoms sounding. The bottom temperature was 38°, the same as that at 900 fathoms. At 4 P.M. the trawl was hove in, after which sail was made for Amboina, the weather being squally, with heavy rain.

The deposit at the above depth was a blue mud containing 31 per cent. of carbonate of lime. The surface layer, about half an inch in thickness, was brownish in colour, while the deeper ones were blue and very compact. Pelagic Foraminifera, Radiolarians, and Coccoliths were abundant. The mineral particles consisted of quartz, mica, magnetite, felspar, pumice, and fragments of rocks.

The trawl brought up a considerable quantity of mud, which, with the exception of a few lumps, all belonged to the brownish surface layer. Mixed up with the mud were many large fragments of pumice, pieces of wood, leaves, and fragments of cocoanuts and other fruits. As was usually the case when the trawl brought up mud from the imme-