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BOOKS RECEIVED.

The Mollusca of the Firth of Clyde.—By A. Brown, 1878, 8vo., pp. 130. [The Author.

The American Naturalist.—Edited by Prof. A. S. Packard, junr., May–July, 1878. [The Editor.

The Naturalist.—Edited by C. P. Hobkirk, F.L.S., and G. T. Porritt, F.L.S., 8vo., May–July. [The Editors.

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ANNOTATED CATALOGUE OF THE SPECIES OF *CONUS*, COLLECTED IN THE SOUTH SEA ISLANDS.

BY ANDREW GARRETT.

On looking over my notes and Journals made during many years devoted to Conchological researches in the various South Sea Islands, I have selected and tabulated the following list of Cones collected in all parts of Polynesia, hoping it will not be devoid of interest to those engaged in elucidating the difficult problem of the geographical distribution of the mollusca.

It is worthy of remark that every species mentioned in the present list has been collected by the writer, so that the locations and range of each can be relied on as correct. Of course further research will increase the number of species, and prove that others have a more extended range than given in this Catalogue.

I have not attempted to elucidate the cause of variation, which, in many cases, is as great in the same group of Islands as in those species common to remote localities. Shells inhabiting Western Polynesia are most generally larger and firmer than Eastern Polynesian examples, but in some instances the contrary takes place.

In order to acquire a true knowledge of geographical distribution, local lists carefully tabulated will be of material aid in solving the problem. In future papers I purpose to catalogue other genera in the same manner.

	Viti Islands.	Tonga Islands.	Samoa Islands.	Kingsmill Isl's.	Caroline Islands.	Cook's Islands.	Society Islands.	Panmotu Isl's.	Marquesas Isl's.	Sandwich Islands.
1. Conus abbas, *Brug.*						×				
2. ,, abbreviatus, *Nutt.* ...										×
3. ,, Adansonii, *Lam.*	×									
4. ,, ammiralis, *Lin.*	×									
5. ,, arenatus, *Brug.*	×	×	×	×	×	×				
6. ,, aulicus, *Lin.*...	×			×						
7. ,, auratus, *Brug.*	×			×				×		
8. ,, aureus, *Brug.*							×	×		
9. ,, bullatus, *Lin.*	×		×	×			×	×		
10. ,, balteatus, *Sow.*	×		×							
11. ,, coelebs, *Hds.*	×									
12. ,, canonicus, *Brug.*... ...	×		×	×			×			
13. ,, consul, *Boiv.?*	×									
14. ,, capitaneus, *Lin.*	×	×	×	×	×					
15. ,, catus, *Brug.*...	×	×	×	×	×	×	×	×		×
16. ,, clavus, *Lin.*	×	×	×	×						
17. ,, coccineus, *Gmel.*						×	×			
18. ,, cylindraceus, *Brod.* ...						×	×	×		
19. ,, distans, *Brug.*	×							×		×
19A. ,, emaciatus, *Reeve*	×									
20. ,, encaustus, *Kien.*									×	
21. ,, eburneus, *Brug.*	×	×	×	×						
22. ,, episcopus, *Brug.*	×	×	×	×	×	×	×	×		
23. ,, ermineus, *Born.*	×			×		×	×	×		
24. ,, exiguus, *Lam.*	×									
25. ,, fabula, *Sow.*...	×			×			×			
26. ,, figulinus, *Lin.*	×									
27. ,, flavidus, *Lam.*	×	×	×	×	×	×	×	×	×	×
28. ,, generalis, *Lin.*	×									
29. ,, geographus, *Lin.*	×		×	×	×		×	×		
30. ,, glans, *Brug.*...	×	×	×	×	×	×				
31. ,, Hebraeus, *Lin.*	×	×	×	×	×	×	×	×		
32. ,, imperialis, *Lin.*	×	×	×	×	×	×	×	×	×	×
33. ,, mappa, *Crosse.*								×		
34. ,, literatus, *Lin.*	×			×	×		×			
35. ,, lividus, *Brug.*	×	×	×	×	×	×	×	×	×	×

			Viti Islands.	Tonga Islands.	Samoa Islands.	Kingsmill Isl's.	Caroline Islands.	Cook's Islands.	Society Islands.	Panmotu Isl's.	Marquesas Isl's.	Sandwich Isl's.
36.	Conus	luteus, *Brod.*								×		
37.	,,	legatus, *Lam.*						×		×		
38.	,,	lictor, *Boiv.?*	×		×							
39.	,,	magnificus, *Rve.*										×
40.	,,	magus, *Lin.*				×	×					
41.	,,	marchionatus, *Hds.* ...									×	
42.	,,	marmoreus, *Lin.*	×	×	×	×	×	×		×		
43.	,,	miles, *Lin.*	×	×	×	×	×	×	×	×		×
44.	,,	miliaris, *Lin.*	×	×	×	×	×	×	×	×		
45.	,,	millepunctatus, *Lam.* ...	×	×	×	×	×	×	×	×		×
46.	,,	minimus, *Lin.*	×	×	×	×	×	×	×	×		
47.	,,	mitratus, *Brug.*	×		×							
48.	,,	mustelinus, *Brug.* ...	×		×	×	×					
49.	,,	nanus, *Brod.*	×	×	×	×	×	×	×	×	×	
50.	,,	nocturnus, *Brug.*	×		×							
51.	,,	nussataila, *Lin.*	×	×	×	×	×	×	×	×		×
52.	,,	omaria, *Brug.*	×									
53.	,,	panniculus, *Lam.*			×	×	×					
54.	,,	pertusus, *Brug.*							×			
55.	,,	praefectus, *Brug.*	×									
56.	,,	pulicarius, *Brug.*	×	×	×	×	×	×	×	×	×	
57.	,,	pusillus, *Chem.*	×									
58.	,,	planorbis, *Born.*	×	×	×	×	×	×	×	×		
59.	,,	parvus, *Pse.*							×			×
60.	,,	praetextus, *Rve.*	×			×			×	×		
61.	,,	quercinus, *Brug.*	×		×				×		×	×
62.	,,	rhododendron, *Couth.* ...						×				
63.	,,	scaber, *Kien.*				×						
64.	,,	solidus, *Sow.*				×			×	×		
65.	,,	sponsalis, *Chem.*	×	×	×	×	×	×	×	×	×	
66.	,,	striatus, *Lin.*	×	×	×	×	×	×	×	×		×
67.	,,	Tahitensis, *Brug.*	×	×	×	×	×	×	×	×	×	×
68.	,,	terebra, *Born.*	×	×	×	×	×	×	×	×		
69.	,,	tessellatus, *Born.*	×		×	×	×	×	×			×
70.	,,	textile, *Lin.*	×	×	×	×	×	×	×	×		
71.	,,	tulipa, *Lin.*	×	×	×	×	×	×	×	×	×	×

		Viti Islands.	Tonga Islands.	Samoa Islands.	Kingsmill Isl's.	Caroline Islands.	Cook's Islands.	Society Islands.	Pammotu Isl's.	Marquesas Isl's.	Sandwich Isl's.
72.	Conus tendineus, *Brug.*	×						×	×		
73.	,, Santieri, *Kien.*									×	
74.	,, vexillum, *Mart.*	×	×	×	×	×	×	×	×		×
75.	,, virgo, *Lin.*	×	×	×	×	×	×	×	×		×
76.	,, vulpinus, *Brug.*	×									
77.	,, varius, *Lin.*	×		×							
78.	,, vermiculatus, *Lam.* ...	×	×	×	×	×	×	×	×	×	×
79.	,, sp.									×	
80.	,, sp.		×					×			
81.	,, sp.										
		60 species.	30 species.	41 species.	44 species.	34 species.	34 species.	42 species.	38 species.	14 species.	21 species.
		Western Polynesia 64 sp. 21 sp. not found in Eastern Polynesia.					Eastern Polynesia 57 sp. 15 sp. not found in Western Polynesia.				

1. Conus abbas, Brug. We found two beautifully marked examples of this species washed up during a heavy gale at Rarotonga Island, Cook's group.

2. Conus abbreviatus, Nut. Not uncommon in the lower region of the littoral zone, and seems to be peculiar to the Sandwich Islands.

3. Conus Adansonii, Lam. Somewhat rare, and only occurred to our notice at the Viti Islands, where we found them lurking in sand at or near low water mark.

4. CONUS AMMIRALIS, Lin. During two years collecting in the Viti group we found only a single very perfect live example of this beautiful species, in sandy-mud in the upper region of the laminarian zone. Several small beach worn specimens were found in various parts of the group.

5. CONUS ARENATUS, Brug. Common at the Viti Islands, less so at the other groups, and very rare at the Cook's Islands; the limits of its range in Eastern Polynesia. Most generally found buried in coarse sand.

6. CONUS AULICUS, Lin. Very rare; no living examples found.

7. CONUS AURATUS, Brug. This is also a very rare species; found lurking under stones at low water mark.

8. CONUS AUREUS, Brug. Very rare; only found in the condition of dead shells.

9. CONUS BULLATUS, Lin. Only several dead but very perfect examples found on reefs.

10. CONUS BALTEATUS, Sow. Not common; found among seaweed near low water mark.

11. CONUS COELEBS, Hds. We obtained a number of examples of this species in the upper region of the laminarian zone, on sandy-mud bottom at the Island of Vanua Levu, Viti Islands.

12. CONUS CANONICUS, Brug. A rare species; found hiding under stones on reefs. The animal is flesh-white with a buff-yellow creeping disk, which, together with the upper surface of the foot is delicately marbled with rich reddish-brown, and the ends of the same organ edged or tinged with rose-red. The siphon and tentacles are white, the former tipped with rose-red and ornamented with an anterior transverse black spot

13. CONUS CONSUL, Boiv.? Several dead but perfect examples found on an extensive sand flat on the south coast of Vanua Levu, Viti Islands. We are uncertain about the determination of this species. Boivin's description and figure agrees very closely with this shell. It is also very much like *Conus raphanus*, Brug., and may possibly be that species.

14. CONUS CAPITANEUS, Lin. This is not by any means a common species. We obtained a few examples on reefs in Western Polynesia.

15. CONUS CATUS, Brug. Found at all the South Sea Islands, except the Marquesas, and more plentiful at the Panmotus than elsewhere. Station, under stones on reefs.

The animal is pale cinereous, varied with delicate brown mottlings, which are most conspicuous in the muzzle.

16. CONUS CLAVUS, Lin. A rare species; found under clumps of coral on reefs.

17. CONUS COCCINEUS, Gmel. Rare, and only found washed up on beaches. We received a few examples from Swain's Island, all beach worn.

18. CONUS CYLINDRACEUS, Brod. A very rare species; only occurred to us in the condition of beach shells. Besides the locations mentioned, we have ascertained that it is occasionally found in Flint's Island, which is also in Eastern Polynesia.

19. CONUS DISTANS, Brug. A common species at most of the South Sea Islands.

The animal is very timid and sluggish, of a purple brown color, with paler mottlings and darker veins. The siphon is white, varied with purple brown spots. Mouth white, margined with brown; on reefs.

20. Conus encaustus, Rve. We obtained about a dozen examples of this species at the Marquesas Islands, where they occurred on a small shore flat.

21. Conus eburneus, Brug. Not uncommon on sandy bottoms in the upper region of the laminarian zone. We have found it more abundant at the Society Islands than elsewhere.

22. Conus episcopus, Brug. Though having an extensive range through the South Seas, this is not by any means a common shell. Living examples where found under clumps of coral inside reefs.

    The animal is creamy-white or creamy-yellow, mottled with reddish-brown, the mottlings disposed in transverse dashes on the upper surface of the foot, which is also marked with three anterior black spots; the end of the siphon and the tips of the tentacles rose-red, the former with a tranvsverse black zone.

23. Conus ermineus, Born. Though having a wide range is not by any means common; on reefs.

24. Conus exiguus, Lam. We found two shells, dead, but in good condition, in the Viti group, which accord well with the description and figure of Lamark's species.

25. Conus fabula, Sow. A rare species, found under clumps of coral on reefs. Society Island examples are much finer and larger than those obtained in the western groups.

    The animal is purple-red, minutely dotted with whitish, the dots more crowded on the tentacles.

26. Conus figulinus, Lin. Very rare. Two dead but perfect specimens found inside reefs.

27. Conus flavidus, Lam. A common, somewhat variable species; found on reefs and stony bottoms.

Animal brownish-yellow; siphon diluted white, dotted with yellowish and zoned with black; upper surface of the foot reddish-brown, mottled and minutely speckled with brown.

28. Conus generalis, Lin. Only three dead examples found at Lauthala Island in the Viti group.

29. Conus geographus, Lin. Not common; only one living specimen obtained of a native at Samoa.

30. Conus glans, Brug. Not common; under clumps of coral on reefs.

31. Conus Hebraeus, Lin. A common species; found on reefs and weedy grounds.

Animal blackish, the head tinged with red, and the foot, which is tinged with pinky-red anteriorly, is margined both above and beneath with tawny-yellow, and the creeping disk is marked with a middle longitudinal stripe of the latter hue; siphon grayish, tinged with pink and variegated with blackish.

32. Conus imperialis, Lin. Not uncommon and found in the same station as the preceding species.

The animal is of a purple-red color, dotted with white and delicately mottled with black.

33. Conus mappa, Crosse. This is *C. intermedius*, Rve., rebaptised by M. Crosse as Reeve's name is preoccupied for a fossil cone. This species seems to be rare; we only obtained several beach examples at the Panmotus, and received a specimen from Starbuck Island, which is also in Eastern Polynesia.

34. Conus literatus, Lin. On sandy bottoms in the upper region of the laminarian zone.

35. Conus lividus, Brug. A common variable species; found on reefs and weedy and sandy bottoms.

The animal is deep purple-brown, delicately flecked with black and minutely dotted with white.

36. Conus luteus, Brod. We found one beach specimen of a cone at Kankora, Panmotu Islands, which we presume to be Broderip's species, which came from the same location.

37. Conus legatus, Lam. Very rare ; only three dead examples found.

38. Conus lictor, Boiv.? We found two beach-worn shells at Samoa, which we doubtfully refer to Boivin's species.

39. Conus magnificus, Rve. A rare species ; found under stones.

40. Conus magus, Lin. Somewhat rare.

41. Conus marchionatus, Hds. One dead and very much worn specimen picked up on the beach. It is said to be very rare at the Marquesas where it is peculiar.

42. Conus marmoreus, Lin. Common in Western Polynesia, rare at the Cook's Group, and during seven month's research at the Panmotu Islands only found one very large living example. They are found living on sandy bottom, though sometimes on reefs.

43. Conus miles, Lin. Not uncommon on reefs.

44. Conus miliaris, Brug. A common species; inhabiting reefs and sandy bottoms in shallow water.

The animal is of a whitish-buff color, with a few light reddish brown mottlings and dotted with flake-white; siphon white, tipped with pink, and varied with light brown.

45. Conus millepunctatus, Lam. A common species ; living on sandy bottom in the upper region of the laminarian zone.

The animal has a tawny-yellow foot which is mottled beneath with purple-brown and varied with black and

brown above; the siphon is creamy-yellow varied with fawn-yellow, and marked at the anterior end with a wide transverse black band.

46. Conus minimus, Lin. Not uncommon at most of the South Sea Islands, and delight in sandy-mud bottom in shallow water.

    Animal of a light-buff hue, more or less varied with reddish-brown, the siphon and either end of the foot tinged with rose-red.

47. Conus mitratus, Brug. A rare species; found under clumps of coral on reefs.

48. Conus mustelinus, Brug. Also a rare species; found in the same station as the preceding.

49. Conus nanus, Brod. A common species; found on reefs.

    Animal diluted white, closely dotted and pencilled with opaque white, and the tip of the siphon and ends of foot rose-red.

50. Conus nocturnus, Brug. Several examples found in shallow water on sand flats.

51. Conus nussatella, Lin. Somewhat rare, and generally found hiding under clumps of coral on reefs.

52. Conus omaria, Brug. Not common. Under stones on sand flats.

53. Conus panniculus, Lam. A rare species; only found in a dead condition on reefs.

54. Conus pertusus, Brug. Only two dead examples found on the reef at Anaa, Panmotu Islands.

55. Conus praefectus, Brug. Only several dead specimens found on a sandy-mud flat at Vanua Levu, Viti Islands.

56. Conus pulicarius, Brug. An abundant species inhabiting sandy bottoms in shallow water, and more common in the Society Islands than elsewhere.

The animal has a tawny-yellow creeping disk, veined with darker; the siphon is yellow tipped with rose-red, and ornamented with a subterminal black zone and numerous abbreviated brown lines and opaque white dots. The muzzle is yellowish and transversely lineated with light brown; upper surface of the foot tawny-yellow with darker mottlings, veined and slightly clouded with black along the margins.

57. Conus pusillus, Chem. A common Sandwich Island species found on reefs and rocky coasts. A few examples occurred to our notice in the Viti Group.

Animal pinky-flesh color dotted and pencilled with opaque white, and the ends of the foot and siphon tipped with rose- red.

58. Conus planorbis, Born. A common species at the Society Islands, found on reefs, but much less abundant at the other groups.

The animal is rich buff-yellow, with darker veins on the foot, and slightly mottled with reddish-brown; siphon with a terminal zone of the latter color.

59. Conus parvus, Pse. A rare species living under stones on reefs.

60. Conus praetextus, Roe. A few examples found on reefs and weedy gravelly flats.

61. Conus quercinus, Brug. Not uncommon on sandy bottom in the upper region of the laminarian zone. We found them more plentiful at the Society Islands than at the other groups.

The animal is of a tawny hue, closely freckled with black and white, the dots most crowded on the posterior part of the foot; siphon and mantle diluted white, the

former freckled with white and black, and tipped with pale rose; the mantle exhibits a few marginated specks like those on the siphon.

62. Conus rhododendron, Couth. We found several beach-worn examples of this beautiful species at Rarotonga, one of the Cook's group, and received two larger specimens from Starbuck Island.

63. Conus scaber, Kien. Several examples occurred on reefs at the Kingsmill Islands.

64. Conus solidus, Sow. A beautiful and somewhat rare species; found under clumps of coral on reefs.

65. Conus sponsalis, Chem. Common on reefs.

Animal pinky-white; the ends of the siphon and both extremities of the foot intense carmine, and everywhere veined and punctulated with opaque white.

66. Conus striatus, Lin. Not uncommon, and most generally found on weedy and stony bottom. Our largest and finest marked examples were obtained at the Society Islands.

Animal creamy-white; foot closely mottled with reddish-brown on the upper surface; creeping disk tawny-yellow, varied with light reddish-brown; siphon transversely pencilled with light brown; head and tentacles more or less tinged with reddish-brown.

67. Conus Tahitensis, Brog. Found at all the South Sea groups, but not plentiful; on reefs.

Animal rich, dark olive-green, profusely freckled with black.

68. Conus terebra, Born. Though having an extensive range through the South Seas, it is not very plentiful; on reefs.

The animal has a yellowish-brown foot, veined with deeper brown and a black spot marks the upper anterior

end; head ochre-yellow; siphon creamy-white, with two transverse black zones which are margined with orange-yellow.

69. Conus tessellatus, Born. We have invariably found this a comparatively rare species at all the groups except the Society Islands; and even the latter location only obtained them plentifully in *one* small strip of white sand, just below low water mark.

The animal is of a yellowish-white color, with the foot mottled with brownish-buff, and anteriorly spotted with black; the creeping disk is buff-yellow with darker veins; siphon creamy-yellow tinged with brown, edged with yellow, and a large transverse black spot marks the anterior end.

70. Conus textile, Lin. Not uncommon; under stones on weedy bottom in the upper region of the laminarian zone.

71. Conus tulipa, Lin. Somewhat plentiful; under clumps of coral on reefs. When collecting at the Panmotus, I found three examples of this species, and held them in my hand while searching for other shells, when one suddenly threw out its long slender proboscis and punctured one of my fingers, causing sharp pain not unlike the sting of a wasp.

72. Conus tendineus, Brug. A rare species; only found washed up on sandy beaches.

73. Conus Santieri, Kien. Not uncommon; under stones at the Marquesas, where it seems to be peculiar.

74. Conus vexillum, Mart. Somewhat rare; on reefs.

Animal deep olivaceous-black with a paler creeping disk, and the end of the siphon, together with the anterior end of the foot margined with olive-yellow.

75. Conus virgo, Lin. Not very common and generally found on sandy bottom in the upper region of the laminarian zone.

The animal has a tawny-yellow colored foot edged with chrome-yellow, the disk clouded and veined with yellowish-brown, and its upper surface mottled and veined with light brown and black; muzzle creamy-white edged with chrome-yellow, and the latter transversely streaked with the same hue and ornamented with a transverse black zone; the margin is diluted white margined with chrome-yellow.

76. Conus vulpinus, Brug. Not uncommon on sandy-mud bottom in the upper region of the laminarian zone.

77. Conus varius, Lin. A very rare species; found under clumps of coral on reefs.

78. Conus vermiculatus, Lam. Abundant on reefs at all the South Sea Islands.

79. Conus sp. A single beach worn example found at the Marquesas, which I cannot refer to any species known to me. It is 37 mill. long by 20 in diameter, shaped like *C. mustelinus*, with about 40 closely-set transverse conpicuous elevated lines, but the normal colors have almost entirely disappeared.

80. Conus sp. Several dead but tolerably perfect specimens found. In color and markings not unlike *C. omaria*, though only half as large. It may only be a variety of that species.

81. Conus sp. A single immature example found on the reef at Huahine, Society Islands, is like an immature *C. virgo*. It is only 16 mill. long by 8 in diameter; color, excepting a few brown spots on the spire, uniform flesh tint under a thin, smooth horn colored epidermis; spire with eight volutions which are deeply striated.

The following species (unknown to me) are recorded from the Viti Islands:—

Conus crassus, Sow.
„ *Sowerbyi*, Rve.
„ *dilectus*, Gld.
„ *lemniscatus*, Rve.
„ *radiatus*, Gmel.

Since writing the preceding notes I find I have omitted to enter in the list *Conus emaciatus*, Rve., a common species which only occurred to my notice at the Viti Islands, where it was found on reefs.

The animal has the foot marbled with light and dark chestnut brown, its upper anterior end white, margined with yellow and marked with a black spot; head and tentacles pale yellow; siphon white, margined with lemon yellow and ornamented with two transverse black zones.

July, 1877.

COLONISING LAND SHELLS.

By J. S. GIBBONS, M.B.

Some of our British species appear to partake of the colonising propensities of the English race. *H. aspersa*, Müll., is recorded from Brazil, S. Australia, &c., and I have found it at St. Helena and the Cape of Good Hope. *Z. cellarius*, Müll., is a still greater wanderer, and it also occurs at St. Helena, Madeira, and the Cape. These two species are not only widely diffused, but they are sometimes astonishingly prolific. I never saw *H. aspersa* so abundant as near Cape Town, while *Z. cellarius* occurs literally in hundreds in the space of a few square feet near a water-fall, St. Helena.

Jan., 1878.

NOTES ON *BULLIA RHODOSTOMA*, GRAY.

BY J. S. GIBBONS, M.B.

The genus *Bullia*, Gray, is well developed in the S. African Seas, there being some 12 species inhabiting the sandy shores from low water to a depth of six or more fathoms. *B. rhodostoma* is by far the most common, occurring in vast numbers on the sands between tide marks. It appears to be confined to that part of the coast lying to the eastward of Cape Point, being replaced in Table Bay by a closely allied, but probably distinct species.

The animal has an extremely large foot, heart shape, very broad and thin, deeply cleft in front and of a pale, semi-pellucid, yellowish-grey color. In front rather above the lobes of the foot, and passing through the sinus in the shell is a long, tapering, very mobile, siphonal process, the edges of which are curved round so as to form an almost perfect tube; the mouth is between this process and the lobes of the foot.

The movements of the animal along the wet sands is rapid, and always within reach of the waves; it advances the two rounded lobes of the foot simultaneously, at the same time slightly drawing them together, and then drags up the shell. The siphon is carried curled backwards, but fully half its length touches the sand; it is continully in motion, and serves to scoop and guide a small stream of water into the mouth. The animal does not confine itself to a straight course but turns in various directions, ploughing deepish furrows in the sands. It is very interesting to watch them crawling about in every direction, some large, some small, their peculiar mode of progression, by a series of quickly succeeding spurts, making the spectacle the more singular. Although destitute of eyes, they possess substitutes in a great sensitiveness to touch, and probably an acute sense of smell, and they are certainly more active and shew more intelligence (or its equivalent in the Mollusca) than most members of this class. When lifted off the sands by

the shell, the animal twists its foot about, and on being replaced immediately bores obliquely downwards and disappears from view; the same happens when the shell is merely touched. If however the mollusk is lifted up and the *foot* touched, the animal ejects a small stream of water and then twists its foot up, so as to allow of its complete retraction within the shell, a small horny operculum closing the aperture. The animal buries itself, and does so partially when overtaken by a powerful wave, so as to prevent its being carried back into deep water.

Sometimes gigantic Medusæ, nearly a yard in diameter, are stranded on the shore; there is then a grand feast, numbers congregate on and around it, while others in the vicinity may be observed hurrying up open mouthed.

B. rhodostoma may be taken as the type of the S. African littoral species, of which there are several, but the deep water species are very different both in structure and habits.

PHOLAS CRISPATA, L., BORING IN METAMORPHIC ROCKS.

By J. S. GIBBONS, M.B.

I found the above species in considerable abundance in decomposing gneiss near Aberdeen. The live mollusk was not known to Macgillivray when he published his "Mollusca of Aberdeenshire."

A NORTHERN LOCALITY FOR *H. CANTIANA*, Mont.

By J. S. GIBBONS, M.B.

Newcastle is, I believe, the northern-most point for this species, there however it is supposed to have been introduced with ballast. Some years ago I collected it on the chalk cliffs of Bempton, near Flambro' Head, a locality so retired that it is impossible to suppose it otherwise than indigenous.

AN HOUR'S SHELL HUNTING IN CURAÇAO, W.I.

By J. S. GIBBONS, M.B.

The West Indies are known to all Conchologists as a region in which land-shells are specially abundant. I have pleasing reminiscences of several of the islands and ports in the shape of numerous species collected during the few hours usually at my disposal, but no place equals St. Ann's, Curaçao, in my estimation, from a Conchological point of view.

The town itself is old and quaint—even abroad the Dutch endeavour to continue their home-habits and do their best to reproduce the canals and dykes of their native country, consequently, in St. Ann's water takes the place of pavement, and one employs a boat where in other places one would use a cab, or walk. I spent but little time, however, in investigating the peculiarities of the town, but hailing one of the things they call boats (for all the world like a square washing tub), I was sculled to the end of one of the few dry-land streets and struck out for the country. I had to pass along what a week or two before had been a street, parallel with, and close to the sea, but the greater part of which was in ruins from the tidal-wave of September 23rd. In some places the road was buried to a depth of six or seven feet under a mass of shingle thrown up on the beach; houses by the dozen were levelled to the ground and all bore more or less evidence of the terrific power of the wave. I thought to have found some marine shells washed up, but my time being very limited and noting that the soldiers (stationed at intervals of a few yards, with naked swords, to prevent plundering) were looking at me with suspicious eyes, I decided to push on for the country.

After all I never fairly reached the country. Near the outskirts of the town there is a hill on which are a few houses; here a waste piece of ground of very limited extent supplied me with occupation for all the time I had to spare. Covered with

masses of coral, neither grass nor water to be seen, the only vegetation consisting of a few stunted cacti and still fewer acacia bushes, this was so rich in shells that of several species enough specimens could have been collected in a few yards to supply, I should suppose, all the shell cabinets in the world. I have frequently collected a larger number of species during a single excursion, but never before seen so many individuals living in so limited a space of ground.

The stones, plants and ground were covered with *Strophia uva*, L. *Tudora megacheila*, P. & M., was in equal abundance, suspended by its silk-like thread from Acacia boughs, or strewed thickly along the ground underneath. A *Bulimulus (B. multilineatus* v. *Sisalensis)* abounded on the smaller boughs, while under masses of coral *Macroceramus inermis*, Gundl., *Pupa Parraiana*, D'Orb., and *P. pellucida*, Pfr., were abundant. In the loose soil *Cylindrella Raveni*, Bland, *Cistula Raveni*, Bland, and a curious *Cionella* were so numerous that a spade would have been the best instrument with which to collect them. I wasted a good deal of valuable time in separating them from the soil, when by simply taking away a few handfuls of mould, I might have obtained a larger number of specimens. A species of *Stenogyra* and a *Succinea* complete a list, all of which might have been gathered from almost any square yard of ground on the hill-side.

I cannot conclude this account without bearing evidence to the invariable kindly interest taken in the proceedings of a shell collector by the W. Indian negro—it is the solitary good trait I noticed in the race. In the above, as in many other shell-hunting expeditions, they were very useful. I shall not readily forget a scene in Georgetown, Demerara, where about half-a-hundred volunteers, of both sexes, assisted me in collecting *Ampullarias* from a ditch in one of the principal streets.

Dec., 1877.

BIBLIOGRAPHY.

Notes on the Helix sepulchralis and its allies, with descriptions of two new species.—By G. French Angas, C.M.Z.S., F.L.S., &c. (P.Z.S., Nov., 1877, pp. 3 and plate.)

Mr. Angas has rendered in these notes good service to conchology by examining the fine series of Madagascar shells in the collection of Sir David Barclay, Bart., and differentiating the 4 distinct species that have hitherto been grouped under the name of *sepulchralis* of Férussec.

M. Crosse had previously indicated one as distinct, under the name of *subsepulchralis*, differing from the true *sepulchralis* in its smaller size, more contracted umbilicus and banded periphery, the dark coloring showing also on the interior of the lip, while the concentric depression and coarse plication are absent.

The two remaining forms proposed for specific rank are :—

Helix hova. This is the *sepulchralis* var. *c* of Reeve, and bears some resemblance to the preceding species, and has three broad chesnut zones on a pale ground.

Helix sakalava. This species is known to some collectors as the var. *oliva-maculosa* of *sepulchralis* and is distinguished from that species by the absence of the oblique plications, the lower edge of the concentric depression being bounded by a prominent keel, the umbilicus being pinched and contracted and the epidermis freckled and diaphanous.

Three varieties of this species are described :—

Var. *a.* Shell white, with an olive-yellow epidermis.

Var. *b.* Shell pale green, with three brown bands and freckled with diaphanous markings.

Var. *c.* Shell pale yellowish-olive, irregularly painted with longitudinal brown flames.

J. W. T.

Die geographische Verbreitung der Mollusken.—

By W. Kobelt.

The admirable papers compiled by Dr. Kobelt on the terrestrial and fluviatile molluscan fauna of different regions are founded on the researches of the latest authorities. The prefatory remarks give the authorities for the different regions and the author's views on the peculiarities of distribution, &c.

In the first part, which is devoted mainly to the Atlantic Islands, the faunæ of the Azores, Madeira, Canaries, Cape Verde, Prince's Island, St. Thomas, Fernando Po, St. Helena, and South Morocco, the chief feature of which is their large number of endemic species, the total number of species being for the Azores 69 of which 33 are special forms, the most interesting feature being the *Vitrinæ* and *Craspedopoma*.

Madeira, which has a fauna far more specialized than the Azores, contains 161 species, of which 133 are peculiar or found nowhere else, the characteristic groups are *Leptaxis*, *Ochtephila*, *Tectula*, *Cionella*, *Craspedopoma*, &c.

The Canaries partake in common with the Madeiras of a marked special development of species; in a total list of 193 species, 167 are found only on those Islands, the predominant groups being *Hemicycla*, *Plectophorus*, and *Buliminus*.

The Cape Verdes produce a very meagre list having but 39 species, 27 being peculiar; *Leptaxis* is the prevaling genus.

Prince's Island contains 27 species of which 21 are peculiar. Here we find indications of more eastern affinities in the two species of *Nanina*, the *Achatina*, *Ennea*, &c.

St. Thomas Island has 10 species, 8 of which are peculiar, *Nanina* being the prevailing genus.

Fernando Po has only 4 species of which two are *Achatinæ*.

St. Helena has 18 species, 2 of the Helices have been referred to the Polynesian genus *Endodonta* by some authors, while there are 5 *Achatinæ.*

We trust that the able and learned doctor will continue from time to time the good work he has begun and of which this is the first part.

We may refer to the fact that the author of this valuable paper has recently been elected the first of ten honorary members of the Conchological Society of Great Britain and Ireland on account of his eminent services to the Science.

J. W. T.

On the variation in sculpture of the genus Nassa.—By F. P. MARRATT, May, 1876, 8vo., pp. 8.

In this paper the author points out the improbability of the fixity and distinctness of species, as held almost universally by Conchologists and others some years ago. The great accessions made during the last few years to our knowledge of the variation and distribution of species have completely revolutionized our ideas on many questions relating to the Mollusca.

The variations as exhibited by the *Nassæ* are here fully discussed, the author's views favoring *Nassa semicostata, N. distorta, N. lachrymosa,* and *N. Jacksoniana* being regarded as mere varieties of *Nassa monile,* Kiener. *N. tegula,* and *N. coronula* are simply different forms of one species. *N. canaliculata* and *N. lens* are identical, only differing in having open or closed sutures.

N. plicata, N. pulla, and *N. sulcipera* are varieties of *N. arcularia.*

N. lentiginosa, N. punctata, N. velicata, N. compta and *N. luctuosa* also are in all probability merely varietal forms.

N. gemmulata is an exceedingly variable species, hardly any two specimens being exactly alike.

N. variabilis is also shown to be very variable and to include several species at one time considered to be quite distinct.

The linking of *Nassa* with other genera is next discussed, examples being named of an approach to *Rissoa* in *N. rissoides*, to *Phos* in *N. pallida; N. plicosa* is allied to *Strongyloceras*, *N. obliqua* to *Neritula*, *N. tritoniformis* to *Ranella*, &c.

This contribution by Mr. Marrat to our knowledge of the range of variation in the *Nassæ*, of which genus he has made a speciality, is important to all Conchologists who are interested in this fascinating branch of study.

J. W. T.

The Mollusca of the Firth of Clyde.—By Alfred Brown.*

The molluscan fauna of the estuary of the Clyde has for a long time past received a considerable share of attention from many eminent conchologists, partly on account of its intermediate position between the northern and southern provinces, and therefore harbouring many species which reach their most southern or northern limit in its waters, and partly on account of the numerous bays and lochs in which collecting may be carried on in almost all weathers, the great facilities for travelling and the beauty of the scenery have also no doubt tended to render this estuary a favorite hunting ground.

As might be expected several lists of the molluscan fauna have been published at various times by different investigators, but no reliable one has been published in recent years having the same scope as the very excellent catalogue now before us (the one

* Glasgow, 1878, royal 8vo., 130 pp., price 5/-. Hugh Hopkins, 85, Renfield Street.

recently published by Mr. Robertson embracing the whole area of the west of Scotland), which is intended as a guide to the mollusca of the Firth, as limited by a line drawn from the south end of Kintyre to the heads of Ayr.

No less than 353 species are mentioned in this work as having been recorded from the locality; of this number Mr. Brown excludes 63 as not sufficiently and satisfactorily proved to be inhabitants of the firth.

Of the 290 admitted species 2 belong to the *Brachiopoda*, 95 to the *Conchifera*, 2 to the *Solenoconchia*, 138 to the *Gastropoda*, and 3 to the *Cephalopoda*, the whole of which with the exception of *Rissoa abyssicola*, *Isocardia cor*, *Arca lactea*, *Litorina neritoides*, *Scalaria communis*, and some of the *Nudibranchs* have passed through the author's hands; the list may therefore be relied upon as thoroughly accurate and trustworthy.

The greatest care has been taken to exclude alien species, the difficulties in the way being considerably lessened by the stringent regulations preventing ballast being thrown into the channel by vessels entering the ports.

Two well known species (*Pecten islandicus* and *Saxicava Norvegica*) are occasionally found in a more or less perfect state, doubtless washed out of the glacial clays.

The nomenclature adopted is that of Dr. Jeffreys', the most important synonyms being given under the head of each species; those also are indicated that are known to have been found in the Scottish Post-tertiary deposits.

The habitats are given with a carefulness and accuracy that cannot be commended too highly, adding also considerably to the value of the work.

The British and foreign distribution is given fully, the foreign stations being authenticated by the names of the authorities being appended.

For the guidance of conchologists the best dredging stations and the most favorable times are precisely pointed out, full and lucid instructions as to the making of the dredge, the most approved methods of using it, with full particulars as to the outfit and accessory apparatus shown by experience to be necessary.

The work is concluded by a full and complete index to every generic and specific name mentioned in the volume.

We can cordially recommend Mr. Brown's very excellent and accurate work to all conchologists interested in the Scottish marine fauna or in the progress of science.

J. W. T.

Address delivered to the Biologcal Section of the British Association, Plymouth, 16th August, 1877. —By J. Gwyn Jeffreys, L.L.D., F.R.S., Treas.G. & L.SS., President of the Section.

This excellent and elaborate address which deals mainly with the results of those deep-sea dredgings that have marked an era in Conchology, and in which the learned author has taken an active and leading part, gives a list of 75 species, all of which have been dredged in depths exceeding 1000 fathoms, during the cruise of the Valorous, in 1875. Of the 75 species 3 are *Brachiopoda*, 39 *Conchifera*, 11 *Solenoconchia* and 22 *Gastropoda;* and of this number no less than 46 have been described by Dr. Jeffreys as new, and many of the remainder were previously known only by their fossil remains in the pliocene formation of Sicily and elsewhere, thus showing the marvellous distinctness of the fauna of the great depths that the recent researches have discovered.

In consequence of the greater depths that the past few years have shown life to abound, Dr. Jeffreys distinguishes two new

zones of depth—the "abyssal" for depths between 100–1000 fathoms, and "benthal" for depths of 1000 fathoms and more.

The author is of opinion that the distribution of the deep-sea mollusca is caused by submarine currents, and that the Arctic and Antarctic currents do not extend beyond the equator.

The theory of the continuity of the chalk which has had many able advocates, is discussed by Dr. Jeffreys in the two aspects of mineral composition, and the organisms belonging to each.

The Chalk consists almost entirely of Carbonate of Lime, while according to an analysis of the late Prof. D. Forbes of a sample of Atlantic ooze, procured from a depth of 1443 fathoms, it contained scarcely 50 per cent. of that substance; and one of its most able advocates, Sir Wyville Thomson, admits that more careful examination shows important differences.

The organisms considered by Dr. Jeffreys are naturally the Mollusca regarded by Lyell as the "highest or most specialized organisms" on which geological reasonings are founded.

The apparent resemblance of the abyssal and benthal ooze to the ancient chalk has led geologists to the conclusion that the chalk fauna had lived in deep water. From a list prepared by Mr. Etheridge for Dr. Jeffreys and reproduced in the address, it is apparent that all the genera enumerated in the list were comparatively shallow water forms, not a single *Leda*, *Pecchiolia*, *Ncæra*, *Bulla* or any of the *Solenoconchia* occur in the upper or white chalk although they inhabit the deep sea ooze and especially characterize the modern deposit, Mr. Woodward also remarks that the crustacea of the chalk are shallow water forms.

The white chalk is in many places composed of *Globigerinæ*, &c., all of which inhabit at present the surface of the sea. According to Dr. Wallich, *Globigerinæ* are found in all latitudes and at all depths ranging from 50–3000 fathoms.

In conclusion, Dr. Jeffreys expresses his inability to refer a single species of cretaceous mollusk to recent forms, and deprecates the modern theory of evolution as unsupported by facts, which appear rather to favor devolution or succession.

To all conchologists and geologists we would recommend a careful perusal of this deeply interesting and important address, containing, as it does, the carefully digested and tabulated results of some of the most important scientific expeditions of modern times. J. W. T.

DESCRIPTION OF A NEW SPECIES OF *PLANORBIS.*

By W. NELSON.

Planorbis (Gyraulus) Gibbonsi (Pl. IV., f. 3).

Shell depressed and somewhat concave in the middle, above and below; rather thin, of a light horn color, closely and finely striate in the line of growth, *epidermis* rather thin, *periphery* rounded, *whorls* 3½, somewhat rapidly enlarging, the last flattened below, as broad or broader than the rest of the shell and deflected near the aperture, *suture* deep and distinct, mouth broadly elliptical, the two ends equally rounded, *peristome* thin and continuous, *umbilicus* very shallow.

Diam. 0.175; alt. 0.045.

Hab. "On decaying vegetation in a stagnant pool, Zanzibar." (Gibbons.)

This very distinct species is nearly allied to *Planorbis glaber*, Jeff., but may be easily distinguished from it by the flattened whorls. It has also some affinity, judging by the description and figure, with *Planorbis Natalensis*, Krauss.

Mature specimens are thickly incrusted.

This *Planorbis* was discovered by Mr. J. S. Gibbons, to whom I have much pleasure in dedicating it.

July, 1878.

NOTE ON ABNORMAL FORM OF *CYLINDRELLA.*

By J. T. MARSHALL.

I think the abnormal form of *C. Raveni* noticed in the *Quarterly Journal of Conchology* for May, by Mr. J. S. Gibbons, is to be accounted for by a piece of grit or a small pebble filling up the natural aperture and thereby necessitating the structure of another mouth. I have observed it in species of *Clausilia*, and also in the marine *Littorina*, though more rarely. In the latter case I account for it by the periwinkle falling and getting wedged in the crevice of a rock, when it would have to exercise its ingenuity in constructing another mouth or submit to starvation.

July, 1877.

NOTE ON A LIST OF SHELLS TAKEN AT GUERNSEY, &c.

By J. T. MARSHALL.

Will you allow me to point out an error in the otherwise excellent paper contributed by Messrs. Cooke and Gwatkin in the *Quarterly Journal of Conchology* for May last? They give *Cochlodesma prætenue* as occurring at Herm; but this species has never been met with in the Channel Islands, and what they probably did find was *Thracia papyracea* var. *villosiuscula*, Macgill. (*T. villosiuscula*, F. & H.) The latter differs from *T. prætenue* in being much less depressed, not smooth or glossy, and in the absence of the peculiar spoon-like ossicle or hinge which is characteristic of *T. prætenue*. It inhabits the coralline zone, and after a storm is frequently cast up at Herm and other sandy beaches, as its fragility and buoyany enable it to be easily transported.

July, 1878.

LIST OF WEST AFRICAN SHELLS.

(Continued.)

By F. P. MARRAT.

Other localities.

145 Venus affinis, *Sow.*
146 „ lyra, *Hanley.* Corisco Bay.
147 V. (Circomphalus) plicatus, *Gmel.*
148 V. do. irregularis, *Reeve.*
149 V. (Tapes) dura, *Gmel.* Corisco Bay.
150 Donax n.s. Cape Palmas.

This small and very abundant shell was sent to the British Museum and stated by Mr. E. Smith to be new.

151 D. acutangulus, *Desh.*
152 Mactra (Trigonella) opposita, *Desh.*
153 Pecten gibbus, *L.* Corisco Bay.
154 Avicula chanon, *Adanson.* Corisco Bay.
155 Terebra (Myurella) variegata, *Gray.*
156 Defrancia sinuosa, *Montf.*
157 Murex (Rhinocanthus) tumulosus, *Sow.* Cor. Bay.
158 Do. moqueanus, *Duval.* Corisco Bay. China? *Duval.*
159 M. (Phyllonotus) varius, *Sow.*
160 Fusus (Hemifusus) morio, *L.*
161 Nassa (Niotha) totombo, *Adanson.* Aust., Mosambique.
162 Nassa (Telasco) interstincta, n.s. Corisco Bay.

N. testa oblongo-turrita, nitidissima, lævigata, flavescente, maculis subquadratis fulvis seriatim et transversim ordinatis, zonata; anfr. convexis, ultimo ad basin sulcata, infra suturas sulcatis; columella leviter callosa, alba; labro incrassato, intus lirato.

This elongated shell is certainly one of the most beautiful in this genus, it is allied to the *N. labiosa* of Sow., *N. variabilis*, Phil., *N. sesarma*, Marrat, from Whydah, and *N. vincta*, Marrat.

Its resemblance to the genus *Bullia* is rather remarkable.

Purpura (Stramonita) gigantea, Reeve. A very variable shell and probably a variety of *P. hæmastoma*, L., of the same coast.

163 Fasianella Reevi, *Jonas.* Locality not recorded before. Corisco Bay.

164 Turritella (Torcula) carinifera, *Sam.* Cor. Bay.

Crassatella Africana, n.s.

Crass. testa trigona, subdepressa, epidermide fibrosa, molluscula, induta; transversim sulcata, sulcis profundis, irregularibus, umbonibus depressiusculis; latere antico rotundato, postice subangulato.

Long. 12; Lat. 12½ Lines.

Hab. W. Africa.

Actinobolus Africanus, n.s.

Act. testa oblique ovata, turgida, inæquilateralis, ventricosa, radiatim costata, costis viginti, rotundatis, nodulosis; umbonibus prominentibus, obliquis; alba vel pallide rufo-fusca, epidermide fusca.

Long. 9; Lat. 8 Lines.

Hab. W. Africa.

July., 1878.

LIST OF MOLLUSCA COLLECTED AT MUSCATINE, IOWA, U.S.A.

By PROF. F. M. WITTER.

Helicidæ.

Helix (Hyalina) arborea, Say. Abundant in all localities where any protection is afforded. It seems to be somewhat gregarious. I have found 20–30 specimens crowded together in hibernation.

H. minuscula, Binn. Common with *arborea.*

H. fulva, Draparnaud. Somewhat rare; wide spread, in damp woods; shell fragile.

H. lineata, Say. Rare, but widely distributed; under old logs in damp woods or deep ravines.

H. (Macrocyclis) concava, Say. Rare. It appears to prefer dry or nearly dry woods; Wyoming Hills, and also R.R. embankment, one mile N. of Muscatine.

H. alternata, Say. Common in many localities; seems fond of loam rather than leaves or decaying wood.

H. striatella, Anthony. Very rare; R.R. one mile N. of Muscatine. It is abundant in a deposit of Loess in this city. I found it 20–25 feet below the surface, well preserved along with *Helix pulchella*, Müll. (not found here now), *Succinea avara*, Say, and *Pupa (armifera?)*, Say.

I find it under vines and large rose bushes in one small spot on R.R. embankment. It seems to be about extinct here.

H. labyrinthica, Say. Very rare; in this city in a grove on bank of Mississippi river. I found it somewhat more abundantly near DesMoines, Iowa.

H. HIRSUTA, Say. Common along R.R., N. of Muscatine, on Cedar river, 10 m. N.W. of Muscatine and on DesMoines river near DesMoines.

It appears to thrive in damp grass where there is very little timber, as well as by old logs in woods.

H. MONODON, Rackett. Rare here, common near DesMoines.

Var. LEAII. Common here with *striatella* and *hirsuta.*

H. ALBOLABRIS, Say. Rare here; found in deep ravines 8–10 miles S.W. of Muscatine; on Cedar river in damp forests and very abundant in one locality near DesMoines.

Our *albolabris* is a well marked variety. It is white, sometimes with a slight tint of rose; shell thin, rather smaller and striæ more delicate than the specimens from Ohio and further east.

H. MULTILINEATA, Say. This is our characteristic species of the genus. On most islands in the Mississippi river not subject to overflow, this shell abounds. In some places it is very abundant. It inhabits damp forests where there is abundance of decaying leaves. Our specimens are very robust, and extremely variable in markings and color. A var. which might be called *alba* is found here about one in fifty. I found one small region where this var. constituted about one in four.

Another var. apparently arising from the crowding of the red or brown lines so closely as to blend, giving the shell a dark red or brown color, might be called *rubra.*

In 1875, Oct. 31st, I found this species hibernating on Geneva Island 4 miles E. of Muscatine. They were under logs, thick leaves and in the sand with little else over them. In one spot in this city I found two or three specimens of this species small and lighter colored, a sort of dwarf. I have some shells that measure as follows:—height 17, greatest diam. 30, least 25 mm.

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