

## KEY TO THE COMMON GASTROPODS OF THE MIAMI AREA

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This key deals only with a limited number of the local forms. It covers those common shelled-gastropods which live between tide marks or in shallow water. All of the latter are likely to be taken in dredgings or to be found washed up in shell drift on the beach. With a few exceptions, none of the very small shells have been included. While some immature shells are very similar to the mature forms, others differ considerably. The key would have become too complicated if young stages had been included, and these must be learned by examination of museum collections. It should also be remembered that specimens found in the shell drift are often considerably bleached and eroded. References are given to the following publications:

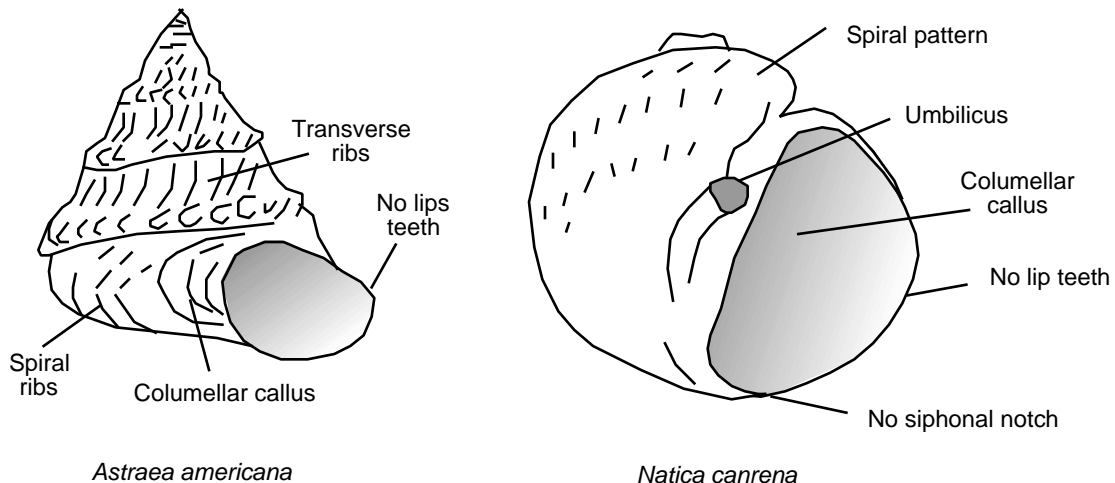
Johnsonia. New sections of this publication appear at intervals. Those up to Vol. 2, Part 27, are included in the Key.

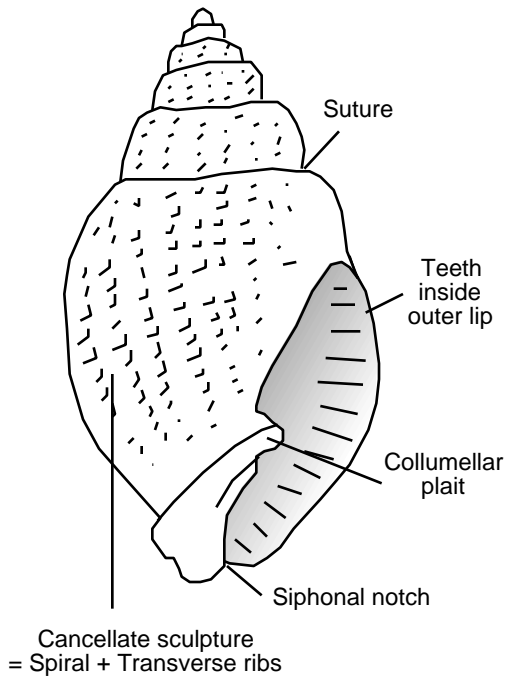
Russell, H. D. The recent mollusks of the family *Neritidae* of the western Atlantic. Bull. Mus. Comp. Zool., Vol. 685, Part 4, pp. 347-404.

Smith, Maxwell. East Coast Marine Shells. 3rd edition, 1945.

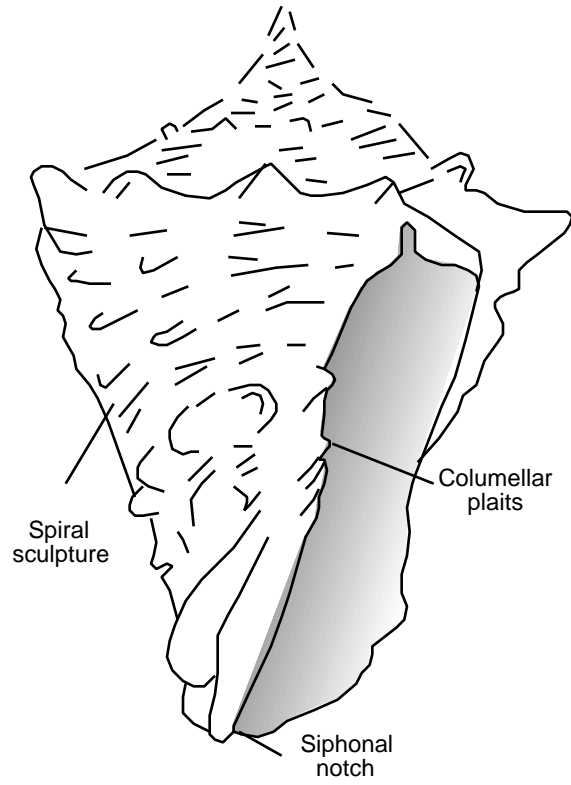
There is a glossary of terms in Maxwell Smith, and the two pages of figures included here illustrate those most commonly used in the Key

Sizes represent average full grown specimens, and not the largest that are ever found.

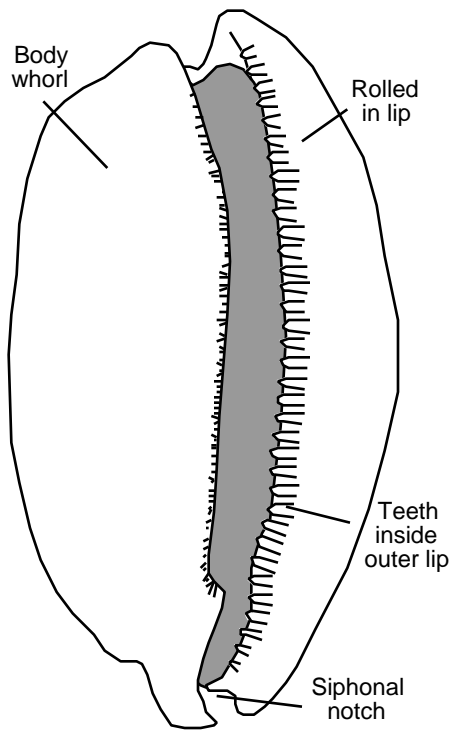




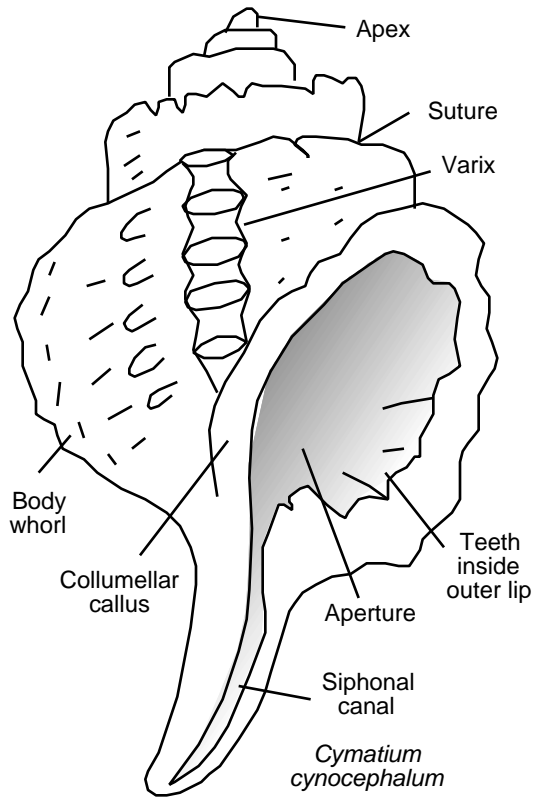
*Cancellaria reticulata*



*Vasum muricatum*



*Cypraea exanthera*



1	Animal with no shell	<i>Nudibranchs</i> and some <i>Tectibranchs</i>
	Animals with shell internal	Some <i>Tectibranchs</i>
	Shell external	2
2	Shell in the form of a hollow cone; not coiled	3
	Shell spirally coiled near apex, irregular and open thereafter. (The coil near the apex may be hard to see.)	9
	Shell coiled into a more or less regular spiral	10*
3	Apex with "keyhole"	4
	Apex not perforate	6
4	Rim inside apical keyhole uniform in width, not undercut or shelf-like at one end	<i>Fissurella</i> spp. <sup>1</sup>
	Rim narrow and flattened at one end, undercut and shelf-like	5
5	Sculpture coarse and knobby; raised alternately large and small	<i>Diadora listeri</i> <sup>2</sup>
	Minutely knobby; every fourth rib large; middle rib between them may be larger than remaining minute ones	<i>D. cayenensis</i> <sup>3</sup>
6	Sculpture, if present, radial only; shell regular	7
	Shell very irregular, with rough, concentric foliations	<i>Hipponix antiquata</i> <sup>4</sup>
7	Inside light, with darker marginal rim	<i>Acmaea</i> spp. <sup>5</sup>
	Inside light or fairly dark, but with darker radiating rays	8
8	Inside and outside dark pearly-grey; inside with darker rays	<i>Siphonaria naufragum</i> <sup>6</sup>
	Inside and outside light greyish-brown	<i>S. alternata</i> <sup>7</sup>

\* Some shells like *Crepidula* (68) are somewhat limpet-shaped externally, but betray their spiral structure by a plate inside the shell. In *Cypraea* (15) and related forms, the outer whorl completely overlaps the earlier ones.

<sup>1</sup> *Fissurella* spp. Sometimes under stones at low water, usually deeper (*Johnsonia*, 1, 10, 11; Smith, p. 75).

<sup>2</sup> *Diadora listeri*, 30 mm long; shell white, sometimes with brown streaks running up from base; under stones near low water and below (*Johnsonia*, 1, 11, p. 3; Smith, p. 75).

<sup>3</sup> *D. cayenensis*, 20 mm long, white, usually with black radial stripes; same habitat (*Johnsonia*, 1, 11, p. 5; Smith, p. 76 as *D. alternata*).

<sup>4</sup> *Hipponix antiquata*, 15 mm long; white; same habitat (Smith, p. 94).

<sup>5</sup> *Acmaea* spp., intertidal on exposed surfaces of (Smith, p. 74).

<sup>6</sup> *Siphonaria naufragum*, 20 mm. long; on exposed rocks between tide marks (Smith, p. 146).

	with darker brown rays	
9	Surface cancellated	<i>Serpulorbis decussata</i> <sup>8</sup>
	Surface with longitudinal ribs or striations	<i>Vermicularis striata</i> <sup>9</sup>
10	Siphonal notch or canal present	11
	No siphonal notch or canal	63
11	Aperture as long as shell, or almost so	12
	Aperture 4/5 of shell length or less	22
12	Lip rolled in on itself	13
	Lip not rolled in on itself	17
13	A prominent, more or less median ridge round shell	<i>Cyphoma gibbosa</i> <sup>10</sup>
	Middle of shell without ridge	14
14	Shell smooth, with porcellanous surface	15
	Shell with transverse ribs	16
15	Shell brown, with light spots, or rarely bands	<i>Cypraea exanthema</i> <sup>11</sup>
	Shell uniformly yellowish-tan	<i>C. spurca</i> <sup>12</sup>
16	Shell greyish-brown, with three pairs of darker spots down back	<i>Trivia pediculus</i> <sup>13</sup>
	Shell pink, with two pairs of spots on back	<i>T. quadripunctata</i> <sup>14</sup>
17	Columellar plaits present	18
	Columellar plaits absent	19
18	Over 1.5 inches long, usually much more	<i>Cassis spp.</i> <sup>15</sup>

<sup>7</sup> *S. alternata*, 15 mm. long; same (Smith, p. 146).

<sup>8</sup> *Serpulorbis decussata*, about 100 mm long, but shape makes this hard to estimate; brown; below low water (Smith, p. 102).

<sup>9</sup> *Vermicularia striata*, length hard to estimate, hard to estimate, but about 150 mm; colonies below low water; also single individuals in sponges; a small form, (? This species) common on rocks between tide marks (Smith, p. 102).

<sup>10</sup> *Cyphoma gibbosa*, 30 mm long; buff; on gorgonids below low water (Smith, p. 109).

<sup>11</sup> *Cypraea exanthema*, 50 - 130 mm long; under stones and ledges at, and below low water; the young have a thin lip and wide aperture like *Bulla* (Smith, p. 110).

<sup>12</sup> *C. spurca*, 25 mm. long, under stones at low water and below (Smith, p. 110).

<sup>13</sup> *Trivia pediculus*, 15 mm long; under stones at low water and below (Smith, p. 110).

<sup>14</sup> *T. quadripunctata*, 10 mm. long; under stones below low water (Smith, p. 110).

<sup>15</sup> *Cassis spp.*, 70 - 300 mm long, according to species; on sandy marl below low water (*Johnsonia*, 1, 16; Smith, p. 111).

	Under one inch long; porcellanous; no teeth inside outer lip	<i>Marginella spp.</i>
	Under one inch long; not porcellanous; teeth inside outer lip	<i>Molampus spp.</i> (see #46)
19	Siphonal canal drawn out into a tail	20
	Siphonal canal not drawn out into a tail, body whorl conical, apex pointed	<i>Conus spp</i> (see #61)
20	Shell paper-thin; apex flat or slightly depressed	<i>Ficus papyratia</i> <sup>16</sup>
	Shell strong; apex elevated	21
21	Shell left handed	<i>Busycon perversum</i> <sup>17</sup>
	Shell right handed	<i>B. pyrum</i> <sup>18</sup>
22	Lip of adult thickened or flared out	23
	Lip of adult not thickened or flared out	42
23	Plaits or teeth on columella	24
	No plaits or teeth on columella	30
24	Teeth inside outer lip	25
	No teeth inside outer lip	<i>Marginella spp.</i> <sup>19</sup>
25	Columellar callus present	26
	Columellar callus absent	27
26	Adult shell well over one inch long, with broad, strongly granulated columellar callus, free on its lower left margin	<i>Phalium granulatum</i> <sup>20</sup>
	Adult less than 0.75 inch long; columellar callus adherent, and extending as a glazed area as big as the aperture	<i>Nassa vibex</i> <sup>21</sup>
	Adult less than 0.75 inch long; columellar callus about as wide as the thickened outer lip	<i>N. hotessieri</i> <sup>22</sup>

<sup>16</sup> *Ficus papyratia*, 150 mm high; tan; on sand and mud below low water (Johnsonia, 1, 2, p. 1; Smith, p. 112).

<sup>17</sup> *Busycon perversum*, 250 mm high; cream to pale grey, with yellow-brown to brown-black markings; on sand below low-water (Smith, p. 124).

<sup>18</sup> *B. pyrum*, 150 mm, high; cream with light brown markings; same habitat (Smith, p. 123).

<sup>19</sup> *Marginella spp.*, see #18.

<sup>20</sup> *Phalium granulatum*, 70 mm. high; white with brown markings, callus pure white; sometimes more than one varix; on sand below low water. (Johnsonia, 1, 16, p. 6; Smith, p. 111).

<sup>21</sup> *Nassa vibex*, 15 mm high; yellow-brown with white callus; on mud at and below low water (Smith, p. 121, as *Nassarius*).

<sup>22</sup> *N. hotessieri*, 10 mm high; cream with brown markings; same habitat. (Smith, p. 121, as *Nassarius*).

27	Aperture oval	28
	Aperture length at least four times as great as width	29
28	Small columellar plaits along length of columella	<i>Cantharus tinctus</i> <sup>23</sup>
	Small plaits restricted to siphonal region of columella	<i>C. cancellaria</i> <sup>24</sup>
29	Spire elongate; shell at least twice as long as wide	<i>Pyrene rusticoides</i> <sup>25</sup>
	Shell short; length not over 1.5 times width	<i>P. mercatoria</i> <sup>26</sup>
30	Teeth inside outer lip	31
	No teeth inside outer lip	35
31	Shell black or dark brown, purplish inside aperture; surface nodular; varices absent or sporadic	<i>Sistrum nodulosum</i> <sup>27</sup>
	Shell cream to brown or grey-brown; two prominent, opposite, plate-like varices, giving shell a flattened appearance	<i>Eupleura caudata</i> <sup>28</sup>
	Shell cream to brown; varices always present but never opposite	32
32	Varices rounded; inter-varical region evenly rounded in apical view	33
	Varices are projecting plates, drawn out to a spur at shoulder; inter-varical region humped, giving shell a triangular appearance in apical view	<i>Cymatium femorale</i> <sup>29</sup>
33	Seven single teeth inside outer lip; siphonal canal long	34
	Seven double teeth inside outer lip; siphonal canal short	<i>C. aquitile</i> <sup>30</sup>
34	Siphonal canal sharply upturned at about 45° from plane of aperture; one	<i>C. tuberosum</i> <sup>31</sup>

<sup>23</sup> *Cantharus tinctus*, 25 mm high; dark brown to black; low water and below (Smith, p. 122).

<sup>24</sup> *C. cancellaria*, 25 mm high; usually mottled brown, but variable; same habitat (Smith, p. 122).

<sup>25</sup> *Pyrene rusticoides*, 16 mm high; white with brownish margins, but variable; under rocks below water (Smith, p. 119).

<sup>26</sup> *P. mercatoria*, 14 mm high; white with brownish markings, but very variable; same habitat (Smith, p. 119).

<sup>27</sup> *Sistrum nodulosum*, 15 mm high; under rocks at low water (Smith, p. 113).

<sup>28</sup> *Eupleura caudata*, 25 mm high; below low water, particularly on oyster bars (Smith, p. 115).

<sup>29</sup> *Cymatium femorale*, 150 mm high; brown, on grassy bottoms below low water (Smith, p. 112).

<sup>30</sup> *C. aquitile*, 100 mm high; cream, with brown markings; on grassy bottoms below low water (Smith, p. 112).

	row of spiral sculpture very prominent, giving shell a keeled appearance in side view	
	Siphonal canal slightly upturned, about 10°, whorl uniformly rounded in side view	<i>C. cynocephalum</i> <sup>32</sup>
35	Shell tall; (excluding siphonal canal) at least three times width	36
	Shell not tall; length (excluding siphonal canal) not more than twice width	38
36	A deep groove between siphonal canal and columella	<i>Batillaria minima</i> <sup>33</sup>
	At most a slight depression between siphonal canal and columella	37
37	One slight varix in the form of a broad, low bulge, on opposite side of shell to lip; no ribs; several rows of nodules	<i>Cerithium variable</i> <sup>34</sup>
	One varix in the form of a low bulge on side of shell opposite to lip; one row of large, raised nodules just below suture, and sometimes a second row at center of whorl	<i>C. literatum</i> <sup>35</sup>
	One low, wide varix at side of shell opposite to lip; one prominent row of nodules below suture and one on shoulder, several rows of smaller nodules	<i>C. floridana</i> <sup>36</sup>
	One low varix on side of shell opposite to lip; evenly spaced, angular ribs, crowned with nodules, most prominent at middle of whorl, giving shell a keeled appearance.	<i>C. algicola</i> <sup>37</sup>
	Several unevenly spaced varices; spiral rows of nodules, with row at middle of whorl usually enlarged to give shell a keeled appearance	<i>C. eburneum</i> <sup>38</sup>

<sup>31</sup> *C. tuberosum*, 50 mm high; pinkish-cream; same habitat (Smith, p. 112).

<sup>32</sup> *C. cynocephalum*, 60 mm high, cream; same habitat (Smith, p. 112).

<sup>33</sup> *Batillaria minima*, 12 mm high; black, or variably marked with whitish; intertidal and below low water (*Johnsonia*, 1, 5, p. 7; Smith, p. 106 as *Cerithium*).

<sup>34</sup> *Cerithium variable* as for *B. minima* (*Johnsonia*, 1, 5, p. 9 in notes on *Batillaria*; Smith, p. 106).

<sup>35</sup> *C. literatum*, 30 mm high; whitish with brown blotches; on sand and mud below low water (Smith, p. 106).

<sup>36</sup> *C. floridana*, 40 mm high; mottled brown on whitish; same habitat (Smith, p. 106).

<sup>37</sup> *C. algicola*, 25 mm high; mottled brown on whitish; same habitat (Smith, p. 106).

<sup>38</sup> *C. eburneum*, 25 mm high mottled brown on whitish; same habitat (Smith, p. 106).

	Frequent varices for several whorls, irregularly spaced; evenly spaced raised ribs, crowned with nodules; interstices with brown, punctate lines	<i>C. muscarum</i> <sup>39</sup>
38	Varices absent	39
	Varices present	41
39	Adult over six inches long; lip greatly flared; prominent row of spines or sharp knobs at shoulder	<i>Strombus gigas</i> <sup>40</sup>
	Adult less than five inches long; lip moderately flared	40
40	Two shoulder spines immediately behind lip much larger than the rest; color mottled	<i>S. raninus</i> <sup>41</sup>
	Shoulder spined variable in arrangement, but none outstandingly prominent; color orange-brown, more or less banded with pale; often showing brown zigzag markings	<i>S. pugilis alatus</i> <sup>42</sup>
41	Siphonal canal more than twice as long as aperture, very slender varices rounded, with a few small, recurved spines	<i>Murex recurvirostris rubidus</i> <sup>43</sup>
	Siphonal canal about 1.5 times length of aperture varices and canal edged with a row of prominent, foliate spines	<i>M. florifer</i> <sup>44</sup>
	Siphonal canal about length of aperture, varices rounded, with three prominent ridges between; four varices per whorl	<i>M. pomum</i> <sup>45</sup>
	Siphonal canal about length of aperture; about eight rounded to rather sharp, equal varices per whorl	<i>M. cellulusus</i> <sup>46</sup>

<sup>39</sup> *C. muscarum*, 25 mm high; white to light brown with spiral rows of dark brown dots; same habitat (Smith, p. 106).

<sup>40</sup> *Strombus gigas*, 250 mm, high; brownish to white outside, pink to salmon inside; below low water on grassy sand, occasionally at low water, especially immature specimens; in immature *Strombus spp.*, the lip is not flared out, and the colors are often brighter in the adults (Johnsonia, 1, 1, p. 12; Smith, p. 108).

<sup>41</sup> *S. raninus*, 100 mm high; on sand below low water (Johnsonia, 1, 1, p. 2; Smith, p. 108).

This subspecies is commoner in the area than the typical form.

<sup>42</sup> *S. pugilis alatus*, 90 mm high; on sand below low water (Johnsonia, 1, 1, p. 7; Smith, p. 109).

<sup>43</sup> *Murex recurvirostris rubidus*, 30 mm high; pinkish, but, dead shells tend to bleach to white; on muddy bottom at and below low water. (Johnson, 1, 17, p. 6; Smith, p. 114).

<sup>44</sup> *M. florifer*, 55 mm high; brown, but dead shells bleach to white; under stones at and below low water (Johnsonia, 1, 17, p. 32; Smith, p. 114 as *M. rufus*).

<sup>45</sup> *M. pomum*, 80 mm high; mottled brown on white; under rocks below low water (Johnsonia, 1, 17, p. 26; Smith, p. 119).



42	Plaits or teeth on columella	43
	No plaits or teeth on columella	51
43	Teeth on inner side of outer lip	44
	No teeth on inner side of outer lip	47
44	Aperture oval	45
	Aperture elongate, more than three times as long as wide	46
45	Surface cancellate; columellar plaits very prominent	<i>Cancellaria reticulata</i> <sup>47</sup>
	Surface with a row of prominent, raised knobs, columellar plaits small	<i>Leucozonia cingulifera</i> <sup>48</sup>
46	One columellar plait near base, and one higher up; aperture 2/3 length of shell; spire rather long	<i>Melampus coffeus</i> <sup>49</sup>
	One columellar tooth near base and one higher up, with a very small one just below it; aperture 3/4 shell length; spire short	<i>M. bidentatus</i> <sup>50</sup>
47	Shell highly polished	48
	Shell not highly polished	49
48	Aperture 0.75 length of shell; adult usually well over one inch long	<i>Oliva sayana</i> <sup>51</sup>
	Aperture 0.5 length of shell; length under one inch	<i>Olivella spp.</i>
49	Shell a long, slender spire; length more than four times width	<i>Terebra dislocata</i> <sup>52</sup>
	Shell massive, with a row of heavy spines at the shoulder and another just above the base; only slightly longer than wide	<i>Vasum muricatum</i> <sup>53</sup>

<sup>46</sup> *M. cellulosus*, 20 mm high; whitish with some brown marks, under stones, at and below low water (Johnsonia, 1, 17, p. 53; Smith, p. 115, as *Tritonalia*).

<sup>47</sup> *Cancellaria reticulata*, 50 mm high; spiral and radial bands of white on brown; below low water (Smith, p. 138).

<sup>48</sup> *Leucozonia cingulifera*, 40 mm. high; brown to black; on rocks between tide marks and below low water (Smith, p. 126).

<sup>49</sup> *Melampus coffeus*, 16 mm high; brown, usually with three whitish bands near shoulder; under stones and wood at high water; typically in mangrove swamps (Smith, p. 146)

<sup>50</sup> *M. bidentatus*, Greyish-brown with a variable number of whitish bands from shoulder to tail; same habitat (Smith, p. 146).

<sup>51</sup> *Oliva sayana*, 60 mm high, brown zigzag pattern on buff, but variable; burrowing in sand below low water (Smith, p. 131).

<sup>52</sup> *Terebra dislocata*, 35 mm high; purplish-brown; on mud and sand below low water (Smith, p. 132).

	Shell about 2.5 times as wide as long	50
50	Shell with prominent, elongate, rounded knobs running down from shoulder	<i>Fasciolaria gigantea</i> <sup>54</sup>
	Shell smooth, with marbled pattern, and about 5 to 6 thin, dark spiral lines superimposed	<i>F. distans</i> <sup>55</sup>
	Shell smooth, with marbled pattern, and numerous thin dark lines superimposed	<i>F. tulipa</i> <sup>56</sup>
51	Teeth inside outer lip	52
	No teeth inside outer lip	60
52	Shell smooth and shiny; dark brown or black	53
	Shell sculptured; color grey-white to medium grey-brown, sometimes with darker markings	54
53	Color black or dark brown, with white spots	<i>Nitidella cribraria</i> <sup>57</sup>
	Color light brown, with numerous dark brown spiral lines	<i>Planaxis lineatus</i> <sup>58</sup>
54	Sculpture consists of rounded, radial ridges	55
	Sculpture consists of knobs	57
55	Small, oval aperture sharply demarked from narrow, siphonal canal	56
	Wide aperture blends into siphonal canal	<i>Muridicea multangula</i> <sup>59</sup>
56	Height not over twice width	<i>M. ostrearum</i> <sup>60</sup>
	Height, 2.5 times width	<i>Urosalpinx perrugatus</i> <sup>61</sup>
57	Aperture very wide and 2/3 to 0.75 length of shell; a large flattened callus on columella; about six spiral rows of knobs, the lowest a little smaller, but others about small in size	<i>Thais patula</i> <sup>62</sup>

<sup>53</sup> *Vasum muricatum*, 80 mm high; white, with brown on spines covered with brown periostracum when alive; on sand below low water (Smith, p. 127).

<sup>54</sup> *Fasciolaria gigantea*, 400 mm high; orange-brown; on grassy sand below low water (Smith, p. 126).

<sup>55</sup> *F. distans*, 50 mm high; on grass and mud at, and below low water (Smith, p. 126).

<sup>56</sup> *F. tulipa*, 150 mm high, color very variable; same habitat (Smith, p. 126).

<sup>57</sup> *Nitidella cribraria*, 10 mm high; brown; under rocks near low water (Smith, p. 120).

<sup>58</sup> *Planaxis lineatus*, 8 mm high, dark brown; on and under rocks between tide marks (Smith, p. 103).

<sup>59</sup> *Muridicea multangula*, 25 mm high; buff; on gravel and grass below low water (Smith, p. 116).

<sup>60</sup> *M. ostrearum* 25 mm high; buff; same habitat (Smith, p. 116).

<sup>61</sup> *Urosalpinx perrugatus*, 25 mm high; buff; same habitat (Smith, p. 116).

	Aperture not very wide and 0.5 to 2/3 length of shell; columellar callus not marked, shoulder row of spines alone, or with next lower row, much more prominent than any others	58
58	Shell and knobs heavy; color white with broad, spiral black bands	<i>T. deltoidea</i> <sup>63</sup>
	Shell and knobs not heavy; color brownish	59
59	Internal color, purplish-white	<i>T. rustica</i> <sup>64</sup>
	Internal color, peach	<i>T. haemastoma</i> <sup>65</sup>
60	Aperture slit-shaped	61
	Aperture oval	62
61	Less than 1.25 inches long; spiral grooves on at least lower half of body whorl	<i>Conus jaspideus</i> <sup>66</sup>
	Over 1.25 inches long; apex almost straight-sided	<i>C. floridanus</i> <sup>67</sup>
	Over 1.25 inches long; apex strongly concavesided	<i>C. spurios atlanticus</i> <sup>68</sup>
62	Knobs to sharp spines on shoulder, sometimes around base also	<i>Melongena corona</i> <sup>69</sup>
	Length over two inches; about 1.5 times as long as wide; shell very thin, with spiral grooves but no other sculpture	<i>Tonna maculosa</i> <sup>70</sup>
	Not over 1.5 inches long, length over three times width, sculpture, fine	<i>Clathrodrillia ostrearum</i> <sup>71</sup>

<sup>62</sup> *Thais patula*, 30 mm high; grey, with interior of aperture reddish-brown; on rocks at low water (Johnsonia, 2, 23, p. 64; Smith, p. 117).

<sup>63</sup> *T. deltoidea*, 40 mm high; on rocks near low water (Johnsonia, 2, 23, p. 8; Smith, p. 117).

<sup>64</sup> *T. rustica*, 40 mm high; exterior brown; on rocks near low water (Johnsonia, 2, 23, p. 80).

<sup>65</sup> *T. haemastoma*, 70 mm high; exterior brown; same habitat (Johnsonia, 2, 23, p. 73; Smith, p. 117, as *T. floridana*).

<sup>66</sup> *Conus jaspideus*, 18 mm high, mottled brown on white; under rocks below low water (Johnsonia, 1, 6, p. 10).

<sup>67</sup> *C. floridanus*, 35 mm high; yellowish brown, often with whitish bands; on and under rocks below low water (Johnsonia, 1, 6, p. 27; Smith, p. 133).

<sup>68</sup> *C. spurios atlanticus*, 80 mm high; rows of orange to dark brown spots on white; on grass below low water (Johnsonia, 1, 6, p. 20; Smith, p. 133, as *C. proteus*).

<sup>69</sup> *Melongena corona*, 80 mm high; sculpture very variable; purplish-brown, with white bands; on sand and mud, at and below low water (Smith, p. 129).

<sup>70</sup> *Tonna maculosa*, 130 mm. high; mottled brown on white or cream; burrowing in sand below low water (Johnsonia, 2, 26, p. 169; Smith, p. 112, as *T. perdix*).

	radial ribs crossing finer spiral ridges	
63	Shells or pebbles cemented to upper surface	<i>Xenophora trochiformis</i> <sup>72</sup>
	Shell not so masked	64
64	Apex covered by last whorl which overlaps previous whorls	65
	Apex not covered by last whorl	66
65	Shell pinkish-brown, spotted; a small, white porcellanous patch at base of columella	<i>Bulla occidentalis</i> <sup>73</sup>
	Shell pellucid, white or pale amber, no porcellanous patch on columella	<i>Haminoea elegans</i> <sup>74</sup>
66	Shell bright purple	<i>Ianthina ianthina</i> <sup>75</sup>
	Shell not bright purple	67
67	Shell width (excluding any spines) more than twice height	68
	Shell width less than twice height	70
68	Shell a flat plate, eight or more times as wide as high; white	<i>Crepidula plana</i> <sup>76</sup>
	Shell domed; width about four times height; brown	69
69	Surface with rows of spines	<i>C. aculeata</i> <sup>77</sup>
	Surface without rows of spines	<i>C. fornicata</i> <sup>78</sup>
70	Shell polished	71
	Shell not polished	75
71	Umbilicus absent	<i>Neritina virginica</i> <sup>79</sup>
	Umbilicus present	73
	[NUMBER 72 NOT IN ORIGINAL	

<sup>71</sup> *Clathrodrillia ostrearum*, 25 mm high, reddish brown; under stones, at and below low water (Smith, p. 135).

<sup>72</sup> *Xenophora trochiformis*, 100 mm wide; brown; in gravel and on grass below low water (*Johnsonia*, 1, 8, p. 2; Smith, p. 94 as *X. conchyliophora*).

<sup>73</sup> *Bulla occidentalis*, 30 mm high; in mud below low water (Smith, p. 140).

<sup>74</sup> *Haminoea elegans*, 40 mm high; same habitat (Smith, p. 141).

<sup>75</sup> *Ianthina ianthina*, 30 mm high; floating at surface in open ocean (Smith, p. 85, as *Janthina janthina*).

<sup>76</sup> *Crepidula plana*, 30 mm wide; white, on, or usually inside dead shells below low water (Smith, p. 96).

<sup>77</sup> *C. aculeata*, 20 mm wide; brown with darker dots; on rocks below low water (Smith, p. 96).

<sup>78</sup> *C. fornicata*, 40 mm wide; pinkish-brown on white, but variable; on rocks and shells below low water (Smith, p. 95).

<sup>79</sup> *Neritina virginica*, 20 mm high; variable pattern of fine black zigzag lines on cream; between tide marks, mainly near the mouths of estuaries (Smith, p. 83; Russell, p. 374).

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73	A dark brown callus on umbilicus, sometimes almost completely occluding it	<i>Polynices duplicata</i> <sup>80</sup>
	Callus on umbilicus white	74
74	Shell white, higher than wide	<i>Polynices lactea</i> <sup>81</sup>
	Shell cream, with spiral bands of brown markings, as wide as high	<i>Natica canrena</i> <sup>82</sup>
75	Umbilicus absent	76
	Umbilicus present	77
76	Shell without sculpture	<i>Tegula fasciata</i> <sup>83</sup>
	Sculpture, both above and below shoulder, consists of fine, raised spiral threads, crowned with minute knobs, shape conical, with sharp shoulder on last whorl; shell brown, pearly inside	<i>Calliostoma. jujubinum</i> <sup>84</sup>
	Sculpture of spiral ribs, crowned with prominent knobs; shoulder rounded; color grey, smoky brown inside	<i>Tectarius muricatus</i> <sup>85</sup>
	Sculpture coarse spiral ribs above end below shoulder, those above crossed by radial ridges; shoulder often projects as a sharp keel	<i>Modulus modulus</i> <sup>86</sup>
77	A row of pointed spines at shoulder	<i>Astraea longispina</i> <sup>87</sup>
	Shoulder spines absent	78
78	Teeth on columella	79
	No teeth on columella	82
79	An orange stain between teeth on columella	<i>Nerita peleronta</i> <sup>88</sup>
	Orange stain absent	80
80	Margin of columella convex	<i>Nerita versicolor</i> <sup>89</sup>

<sup>80</sup> *Polynices duplicata*, 50 mm high; greyish; burrowing in sand and mud below low water (Smith, p. 92).

<sup>81</sup> *Polynices lactea*, 25 mm high; white; burrowing in sand below low water (Smith, p. 92).

<sup>82</sup> *Natica canrena*, 30 mm high; regular brown markings on white, same habitat (Smith, p. 91).

<sup>83</sup> *Tegula fasciata*, 12 mm high; color variable; on grass below low water (Smith, p. 78).

<sup>84</sup> *Calliostoma jujubinum*, 25 mm high; brown to reddish-purple; on and under rocks, at and below low water (Smith, p. 79).

<sup>85</sup> *Tectarius muricatus*, 20 mm high; greyish; intertidal on rocks (*Johnsonia*, 1,4, p. 1; Smith, p. 100).

<sup>86</sup> *Modulus modulus*, 10 mm high; brown markings on white; on grass below low water (Smith, p. 104).

<sup>87</sup> *Astraea longispina*, 40 mm wide, greyish, same habitat (Smith, p. 81).

<sup>88</sup> *Nerita peleronta*, 24 mm high; blue-grey markings on white; on rocks between tide marks (Smith, p. 82; Russell, p. 359).

	Margin of columella not convex	81
81	Operculum black	<i>N. tessellata</i> <sup>90</sup>
	Operculum blue-grey (ribs generally more numerous than in other species, but there is too much variation for this to be a certain character)	<i>N. fulgurans</i> <sup>91</sup>
82	Shell smooth or with fine spiral grooves	83
	Shell with many spiral rows of knobs	84
	Shell with coarse, knobbly radial ribs	<i>Astraea americana</i> <sup>92</sup>
	Shell with many, erect, sharp varices	<i>Epitonium spp.</i> <sup>93</sup>
83	Shell length under 0.5 inch; color variable, but typically white or pale grey with a fine black zigzag pattern	<i>Littorina ziczac</i> <sup>94</sup>
	Length over one inch; color variably, but typically pale brown with dark brown to black diagonal bands	<i>L. angulifera</i> <sup>95</sup>
84	Height over one inch; shell brown; a strong spiral row of knobs just below the suture, and below this every second or every fourth row more prominent	<i>Turbo castaneus</i> <sup>96</sup>
	Height under 0.5 inch, shell grey, with spiral rows of white to buff knobs usually rather sharply pointed, and the two rows at the middle of the whorl usually the largest; a polished columellar callus present	<i>Tectarius tuberculatus</i> <sup>97</sup>
	Height 0.75 inch; shell dark grey to black, with spiral rows of whitish knobs, rather irregularly arranged; almost no columellar callus	<i>Echininus nodulosus</i> <sup>98</sup>

<sup>89</sup> *Nerita versicolor*, 20 mm high; blue-grey markings on white; often with pink spots; same habitat (Smith, p. 82; Russell, p. 361).

<sup>90</sup> *N. tassellata*, 14 mm high; blue-grey markings on white; same habitat (Smith, p. 83; Russell, p. 365).

<sup>91</sup> *N. fulgurans*, 20 mm high; same color; same habitat. (Smith, p. 83; Russell, p. 363).

<sup>92</sup> *Astraea americana*, 40 mm high; grey; under rocks and on grass, at and below low water (Smith, p. 82).

<sup>93</sup> *Epitonium spp.*, 10-20 mm. high; usually white or light tan; under rocks at and below water (*Johnsonia* - in press; Smith, p. 83).

<sup>94</sup> *Littorina ziczac*, 15 mm high; many populations much smaller than this; grey and white zigzag pattern; on rocks between tide marks (*Johnsonia*, 1, 7, p. 14; Smith, p. 100).

<sup>95</sup> *L. angulifera*, 35 mm high; variable greyish-brown; above high water, usually on mangroves. (*Johnsonia*, 1, 7, p. 23; Smith, p. 100).

<sup>96</sup> *Turbo castaneus*, 20 mm high; reddish-brown; under rocks and in grass below low water (Smith, p. 31).

<sup>97</sup> *Tectarius tuberculatus*, 15 mm high; brown; on rocks between tide marks. (*Johnsonia*, 1, 4, p. 2; Smith, p. 100, as *T. trochiformis*).

<sup>98</sup> *Echininus nodulosus*, 10 mm. high; greyish-brown, on rocks between tide marks (*Johnsonia*, 1, 4, p. 4; Smith, p. 100, as *Echinella*).

