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# *Lottia digitalis* (= *Acmaea*)

A fingered limpet (Rathke, 1833)

Phylum: Mollusca  
Class: Gastropoda, Prosobranchia  
Order: Archeogastropoda, Patellacea  
Family: Lottidae

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## Description

**Size**—about 25 mm (one inch); largest 30 mm (Haven 1971); average under 15 mm; this specimen 20 mm (Ricketts and Calvin 1971).

**Color**—greenish gray to dull brown; large solitary animals sometimes more brilliantly marked (Ricketts and Calvin 1971); ribs usually not lighter than spaces between them (Carlton and Roth 1975); always a solid brown spot 'owl-shaped' inside shell on the apex (fig 3); a horseshoe-shaped muscle scar open at the anterior end (fig. 3) (Keen 1971).

**Shell Shape**—oval, caplike, fairly high elevation (but not all as high as this specimen, fig. 2); apex above or even overhanging anterior margin, forming hook. Strong rough ribs on posterior slope, forming moderately scalloped edge (fig 1), may be absent on anterior slope. Posterior convex, anterior concave (fig 2).

**Body**—no dark spots on head or sides of foot: species characteristic; a pair of uncini (flap-like structures) on basal plate of radula (inside mouth), a remnant of marginal teeth (Keen 1971): genus *Lottia*. This characteristic observable only by a drying and staining lab preparation (not figured).

## Possible Misidentifications

There may be as many as 16 species of rocky intertidal limpets on our coast; few are as adaptable as *L. digitalis* in tolerating different habitats, especially in estuaries. (*L. digitalis* and *L. pelta* are the only limpets that penetrate very far into Coos Bay's estuary).

*Lottia pelta*, sometimes estuarine, has heavy ribs like *L. digitalis*, but lacks the concave anterior slope of the latter (its anterior slope is convex). Its apex is subcentral, not near the anterior margin; its ribs are usually equally developed on all slopes, and it is smoother than *L. digitalis*. It can have a pattern of radial bands or of white checks. It occurs at lower tidal levels than does *L. digitalis*.

The above limpets of the family Acmaeidae differ from the Patellidae in having only a single ctenidium (feather-shaped gill)

(figure 4). Other genera of Acrriaelidae besides *Lottia*, above, cannot be keyed by shell alone: differences in radula are important as well (Keen 1971). General ways of distinguishing them by shell include the following:

*Acmaea* sp. have a nearly central apex, the shell is white to pink-rayed, and the radula is adapted for browsing on coralline algae. They are chiefly sublittoral. (The name *Acmaea* once encompassed those limpets now called *Lottia* and *Notoacmea*. These have now been divided: *Lottia* sp. have uncini (marginal teeth) on the radula; they have fine to heavy radial ribs and an apex anterior to the center as well as a convex posterior slope. *Notoacmea* lack the uncini on the margin of the radula; they are not heavily ribbed, the apex can be subcentral to quite anterior.) *Notoacmea persona*, a nocturnal limpet preferring shade and caves as a habitat, has an anterior apex directed anteriorly, and a straight anterior slope; the posterior slope is convex. The surface has fine regular striae, not strong ribs. *N. persona* can be large (53 mm) and is found above *Lottia* in the tidal zone (Fritchman 1961). It is chiefly an inhabitant of the open coast, but has been found in quiet waters in Puget Sound (Kozloff 1974b).

*Notoacmea scutum* is a thick shelled, rather flat limpet with a subcentral apex, a coarse sculpture of flat ridges (actual radial lines). It is occasionally found in bays (Puget Sound) (Kozloff 1974b).

Two other species of *Lottia* have heavy ribbing, and could be confused with *L. digitalis*; they also inhabit similar territory, at least on the outer coast. The chief inhabitant of the high splash zone is the rough limpet *L. scabra*, with strongly projecting ribs, a strongly scalloped margin, low profile, and both posterior and anterior slope being convex. It has distinctive black spots on its head and on the sides of its foot. It prefers gently sloping or horizontal surfaces. Its range is generally too far south for Oregon.

*L. strigatella*, formerly *C. paradigitalis*, was once thought to be a 'hybrid' of *L. digitalis* and *L. pelta* (Carlton and Roth 1975). It is the closest species to *L. digitalis*, but is smoother, has fine radial lines, but no ribs; a convex posterior, slightly concave anterior slope, and is only to 20 mm in length. Its apex is often eroded. The interior is glossy, bluish white with brown stains, and with the outside pattern showing through (Keen 1971). The animal is completely white. This species is found with *L. digitalis* at Coos Head, just inside the bay entrance, under marine conditions (Frank 1965a).

### Ecological Information

**Range**—Unalaska Island south to Guadalupe Island, Baja California.

**Local Distribution**—outer coast; bays: Coos Bay-Coos Head, lower South Slough.

**Habitat**—prefers steep slopes in upper (splash) zone (Haven 1971); pilings (in bays); tolerates 'variable and hazardous' conditions (Frank 1965c); mud, swirling sand, debris, industrial pollution, sewage, strong wave action. In lower levels (zone 2 in Ricketts and Calvin 1971) lives among barnacles, algae on flat surfaces. This specimen on a log. Avoids dessication but tolerates and requires aerial conditions (Haven 1971). Found on 'virtually all hard substrates' (Haven 1971).

**Salinity**—tolerates a wide range, from concentrated sea water to fresh water (Wolcott 1973).

**Temperature**—a cold water species; tolerates high temperatures less well than does *L. scabra* (Wolcott 1973). Found more commonly in winter than summer (central California) (Haven 1971).

**Tidal Level**—oldest and largest animals are found highest; found from higher high tides up into splash zone (zone 1 in Ricketts and Calvin 1971); adapted to dessication better than most limpets, and is never found permanently submerged: lower limit: zone 2, at about mean high water (Frank 1965c; Keen 1971).

**Associates**—in flat areas of zone 2: algae, barnacles, amphipods *Orchestoidea*, *Orchestia*; gribble *Limnoria*, littorine snails, insects (springtails). On vertical rock surfaces, Coos Head: *L. paradigitalis* (*strigatella*), *Balanus glandula*, *Littorina scutulata*, *L. pelta* (at lower limit) (Frank 1965c). On pilings:

*Balanus*. In California: *L. scabra*, *L. gigantea* (at lower limit) (Haven 1971).

### Quantitative Information

#### Weight—

**Abundance**—most common upper intertidal limpet in Oregon (Frank 1965c); within its range, common from Monterey north (Ricketts and Calvin 1971). Tends to aggregate (Millard 1968).

### Life History Information

**Reproduction**—separate sexes; eggs and sperm shed into sea; length of planktonic life unknown (Haven 1971). Spawning winter and spring; peak recruitment: spring (Fritchman 1961).

**Growth Rate**—very consistent (Frank 1965c), fastest fall and winter, stopped in summer; growth decreased by crowding.

**Longevity**—occasionally 6 years (Frank 1965a).

**Food**—encrusting microalgae: blue greens, diatoms (Frank 1965c).

**Predators**—sea stars, oyster catchers; shorebirds, *Pachygrapus* (Morris et al 1980).

**Behavior**—does not 'home' precisely like *L. scabra*, but has a home range (Haven 1971). Has a seasonal vertical migration: higher in winter (with higher waves). Secretes mucus sheet between itself and substrate to aid in slowing dessication and because it doesn't fit precisely into the rock. Can accumulate large concentrations of lead (*ie.* animals under Golden Gate Bridge) (Morris et al 1980).

### Bibliography

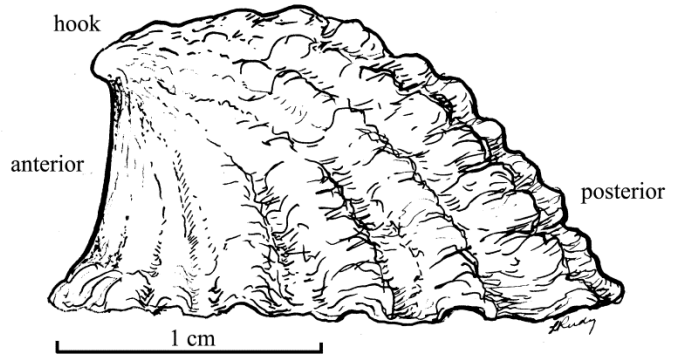
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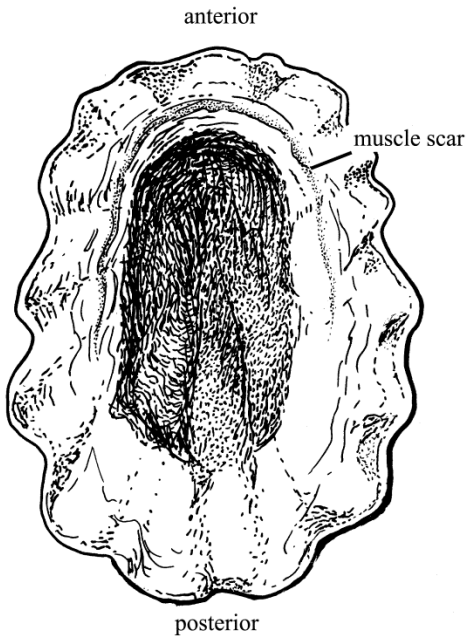
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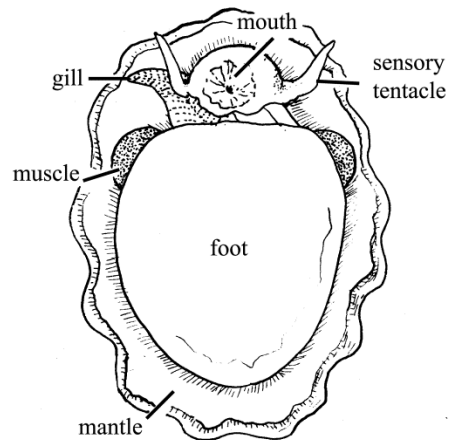
1. *Lottia digitalis* (dorsal view, L:2cm) x4:  
strong ribs; scalloped edge; rough surface.



2. (Lateral view) x4:  
moderate elevation; apex hook-like, near  
anterior end; anterior slope concave; posterior  
slope convex.



3. Shell interior x4:  
solid brown spot at apex;  
horse-shoe shaped muscle  
scar.



4. Schematic of animal (ventral view)