

Phylum Brachiopoda

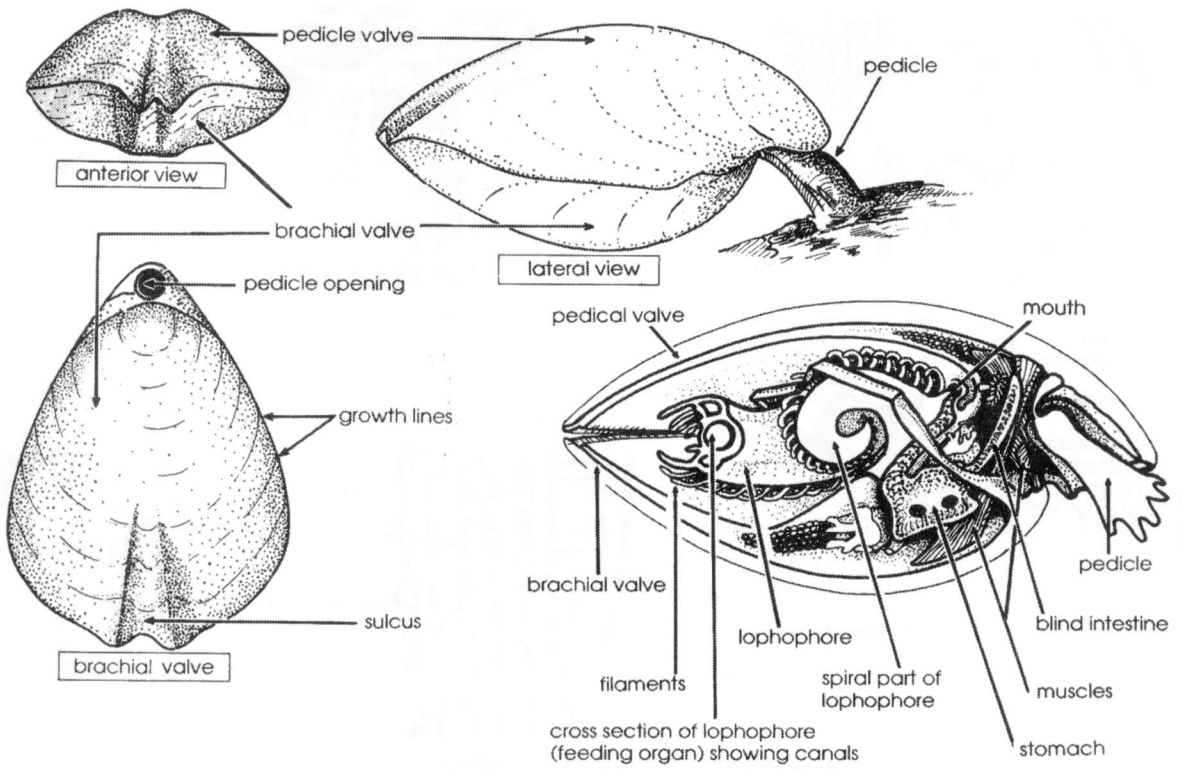
This phylum (see Figs. 4.19 and 4.20) ranges from early Cambrian to Recent. Marine articulate brachiopods are first found in the early Cambrian, are abundant in Ordovician, Silurian, and Devonian marine strata, but are reduced in numbers after the Devonian. The phylum sustained major extinctions at the end of the Paleozoic. Only two orders survive to the Recent.

Brachiopods are bivalved, with the plane of symmetry running through the center of each valve. The pedicle valve is the larger and often has an opening for the pedicle, or stalk, which attaches the shell to the substrate or to another shell. The brachial valve is smaller and contains an internal support for the lophophore. The lophophore is a coiled organ with comblike filaments that are covered with cilia. The cilia keep a current of seawater coming into the body of the brachiopod when the valves are open. The lophophore traps microorganisms, passes them to the mouth, and obtains oxygen from the water. The mantle is the internal organ that secretes calcite for the shell in articulate brachiopods [see Fig. 4.19 (a)].

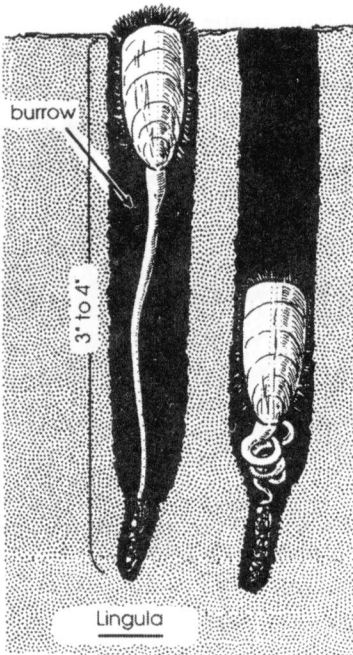
Articulates have two muscle systems for shell maneuvering, diductors for opening the valves, and adductors for closing them. Many articulates show a ridge or fold on one valve and a corresponding groove or sulcus on the other. Major brachiopods include the following groups.

Inarticulata have calcite or aragonite shells with poorly developed teeth, sockets, and pedicle. An example is *Lingula*, “living fossil,” which has an apatite shell, and burrows in sediment of shallow shelf waters. It attaches to sediment in its burrow by a long pedicle. Its range is early Cambrian to Recent [see Fig. 4.19 (b)].

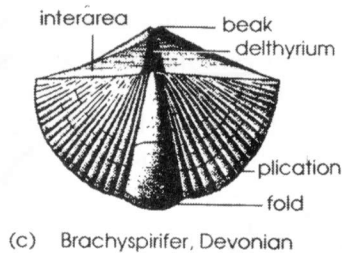
Articulata dominated brachiopod faunas by the Ordovician. Examples from Figure 4.20 are *Strophomena* (m), *Mucrospirifer* (k), and *Atrypa* (l). In the late Devonian a crisis developed in existing orders with the extinction of some groups. After the Devonian the productids arose, curious forms with spines on their valve exteriors. An example is *Juresania* [see Fig. 4.20 (d)].



(a) Brachiopod: Morphology of Shell and Soft Parts



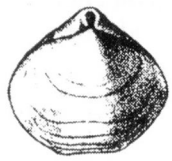
(b)



(c) Brachyspirifer, Devonian

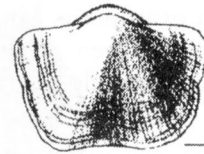
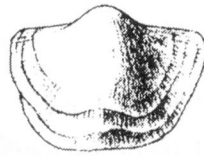
CENOZOIC		
MESOZOIC	CRETACEOUS	
	JURASSIC	
	TRIASSIC	
PALEOZOIC	PERMIAN	
	PENNSYLVANIAN	
	MISSISSIPPIAN	
	DEVONIAN	
	SILURIAN	
	ORDOVICIAN	
	CAMBRIAN	

PHYLUM BRACHIOPODA



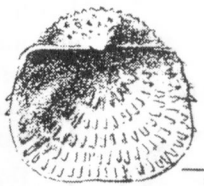
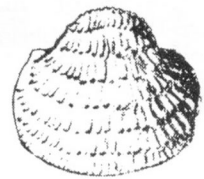
1 cm

(a) *Composita* (Miss-Perm)



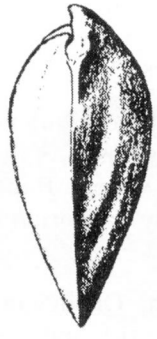
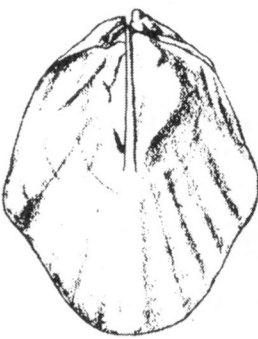
2 cm

(c) *Hebertella* (Ord)



2 cm

(d) *Juresania* (Penn-Perm)



2 cm

(b) *Pentamerus* (Sil)



1 cm

(e) *Enteletes* (Penn-Perm)



1 cm

(f) *Rhynchotrema* (Sil)



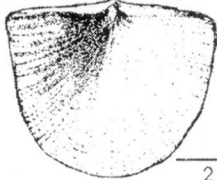
2 cm

(g) *Dielasma* (Miss-Perm)



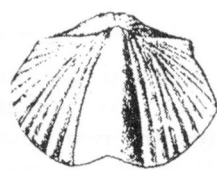
2 cm

(h) *Platystrophia* (Ord-Sil)



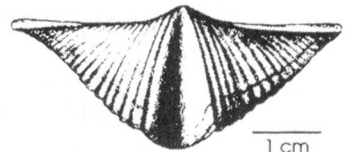
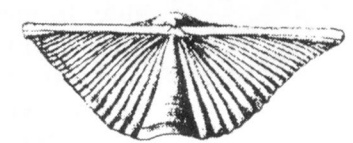
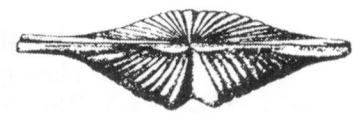
2 cm

(i) *Rafinesquina* (Ord)



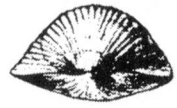
2 cm

(j) *Paraspirifer* (Dev)



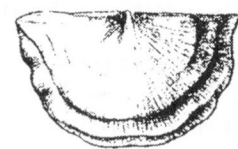
1 cm

(k) *Mucrospirifer* (Dev)



2 cm

(l) *Atrypa* (Sil-Miss)



1 cm

(m) *Strophomena* (Ord)

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Figure 4.20 Phylum Brachiopoda