

Brachiopods

Fact Sheet



Large collection of *Echinalosia* shells or fossil brachiopods. Image: Susan Parfrey.

Introduction

Brachiopods (brack-ee-oh-pods) Technical Name: Phylum Brachiopoda. Common Name: Lamp Shells.

Brachiopods are marine organisms which have two shells or valves of different sizes, shape and ornamentation. These valves are hinged together and the animal resembles bivalve molluscs such as clams and oysters. The difference between the two groups can be seen most easily when looking at the planes of symmetry. In bivalves the plane of symmetry is between the shells (they are mirror images). However, in brachiopods the plane of symmetry divides the valves in half. The two valves are held together with an interlocking teeth and socket arrangement and muscles. At the back of the shell there is often a fleshy stalk called the pedicle which emerges from the ventral (lower) or pedicle valve. The opposing dorsal (upper) or brachial valve is normally smaller than the ventral valve. Attached to it is a spiral or looped apparatus which they use to feed and breathe. Brachiopods feed by sucking seawater through the gap between their shells and filtering out tiny organisms using their internal, coiled feeding organ called a lophophore (*lo-fo-for*).



Photo A. Image: Susan Parfrey.

Age

Brachiopods first appear in the fossil record in the Early Cambrian (545 million years ago) and along with trilobites are among the first animals to evolve hard parts. There are an incredible 30,000 different fossil species of brachiopods and some 300 species are still alive today. Their numbers were decimated in the worst extinction of all time at the end of the Permian, some 250 million years ago.

Distribution and habitat

Brachiopods are benthic animals, living on or near the sea bed. Some brachiopods live in burrows but most are attached to rocks or the ocean floor by the pedicle which they use to adjust their position. Other brachiopod

species developed spines to stabilise themselves in mud. Brachiopods tend to live in clusters and their reproduction involves releasing eggs and sperm into the sea and leaving fertilisation to chance. They were so abundant in the Palaeozoic that they formed part of the ancient reefs. Today they can be found in areas of clear, cold water such as southern Australia, Antarctica and New Zealand.

Fossilisation

Fossil brachiopods are commonly preserved in rocks such as limestone, sandstone or mudstone that formed from marine sediments. Brachiopods are often found fossilised as preserved shells, internal and external moulds, as well as casts.

In places they occur in such numbers they formed banks of shells. A drill hole shown above has cut through a large collection of shells called *Echinalosia*; sediments containing accumulations of this type are called coquinites. They were the dominant shelled animals living in the Palaeozoic seas. Their abundance, extraordinary variety of shapes, and rapid evolution makes them ideal for dating rocks and as indicators of ancient environments.

Australian brachiopods

There are many different species of brachiopods with a wide variety of shell shapes and sizes. The phylum is divided into three subphylum and eight classes.

Photographs of some common Queensland and Tasmanian species of fossil brachiopods are displayed here.

A. A Permian spirifer called *Aperispirifer parfreyi* from central Queensland. Spirifers such as this died out at the end of the Permian. Width = 82 cm

B. Drill hole from near Springsure Queensland. (See image at the top of the page.)

C. GSQF2160 *Lingulella marcia* var. *templetonensis* from Templeton River north Queensland. Cambrian.



Photo C.
Image: Susan Parfrey.

D. GSQF13101 *Taermostrophia patmorei* from near Mount Coolon, central Queensland. Internal mould of a ventral valve. Early Devonian.



Photo D (above) and E (below).
Images: Susan Parfrey.

E. GSQF13110 *Mesoleptostrophia (Paraleptostrophia) clarkei* internal dorsal valve from the same locality as D. Early Devonian.

F. *Atrypa* sp shows the fine ornament of a ventral valve from Fanning River north Queensland. Devonian.

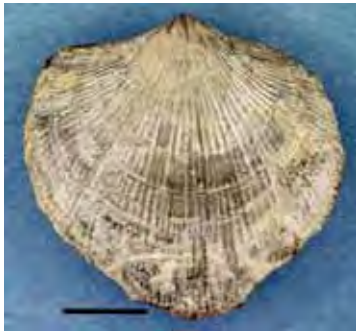


Photo F. Image: Susan Parfrey.

G. *Levipustula levis* external of a ventral valve showing the ornament of spines from near Yarrol, Queensland. Carboniferous.



Photo G. Image: Susan Parfrey.

H. GSQF10462 *Stegacanthia leviatha* the colour change is due to weathering across the specimen. Carboniferous.



Photo H. Image: Susan Parfrey.

I, J. The inside of a dorsal valve of a *Wyndhamia jukesi* shows scars where the muscles were attached and the brachial ridge where the lophophore was attached. The strainer spines would have been used to keep sediment out of the shell while feeding. Specimen collected from near Hobart, Tasmania. Permian.

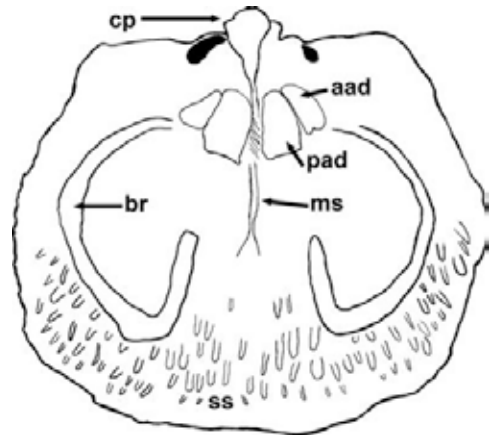


Illustration I. Image: Susan Parfrey.

cp= cardinal process
br = brachial ridge
ms = median septum
ss = strainer spines
aad = anterior adductor muscle scar
pad = posterior adductor scar
dam = dendritic adductor muscles scar
rs = rhizoid spines used to hold the shell in sediment. Scales shown = 1cm



Photo J. Image: Susan Parfrey.

K. *Tomioopsis* sp shows the details of internal dorsal valve now that the shell has weathered away.



Photo K. Image: Susan Parfrey.

L. *Taeniothaerus subquadratus* from near Springsure central Queensland. Here part of the ventral valve is preserved with large rhizoid spines on the outside of the shell which would have acted like roots to secure the shell in the sediment. The internal of the dorsal valve shows the large dendritic pattern left where the adductor muscles attached to the shell.



Photo L. Image: Susan Parfrey.

M, N. GSQF2270 *Maorielasma globosum* from near Bowen River, north Queensland. Permian. The shell shows the hole (foramen) at the tip of the valve (umbo) where the slender cord of the pedicle could pass through and tether the shell to the ground. The shape of this type of brachiopod is similar to an ancient Roman oil lamp, which gave the group its common name of lamp shells.



Photo M (left) and N (right). Images: Susan Parfrey.

Further Information:

Museum of Victoria <http://www.museum.vic.gov.au/prehistoric/time/brachiopods.html>

Brachiopods from New Zealand

<http://www.treasuresofthesea.org.nz/brachiopods-or-lamp-shells>

University of Californian Museum of Paleontology <http://www.ucmp.berkeley.edu/brachiopoda/brachiopodafr.html>

Author: Susan Parfrey

Queensland Museum
PO Box 3300, SOUTH BRISBANE QLD 4101
Phone: (07) 3840 7555
<http://www.qm.qld.gov.au/>

