# SIGNIFICANCE OF CONODONTS IN MICROFOSSIL HISTORY

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# FOSSILS

- The term fossil is derived from a old latin word *fossils* meaning 'something dug up'Fossils are the preserved remains or traces of animals (also known as *zoolites*), plants, and other organisms from the remote past..
- This word introduced by G.Agricola.Orginally refered to any subject that was dug out of the earth surface.

# CLASSIFICATION OF FOSSILS

BROADLY

- Macrofossil - Animal-Vertebrate, Invertebrate, Plant
- Microfossil - Groups

Types

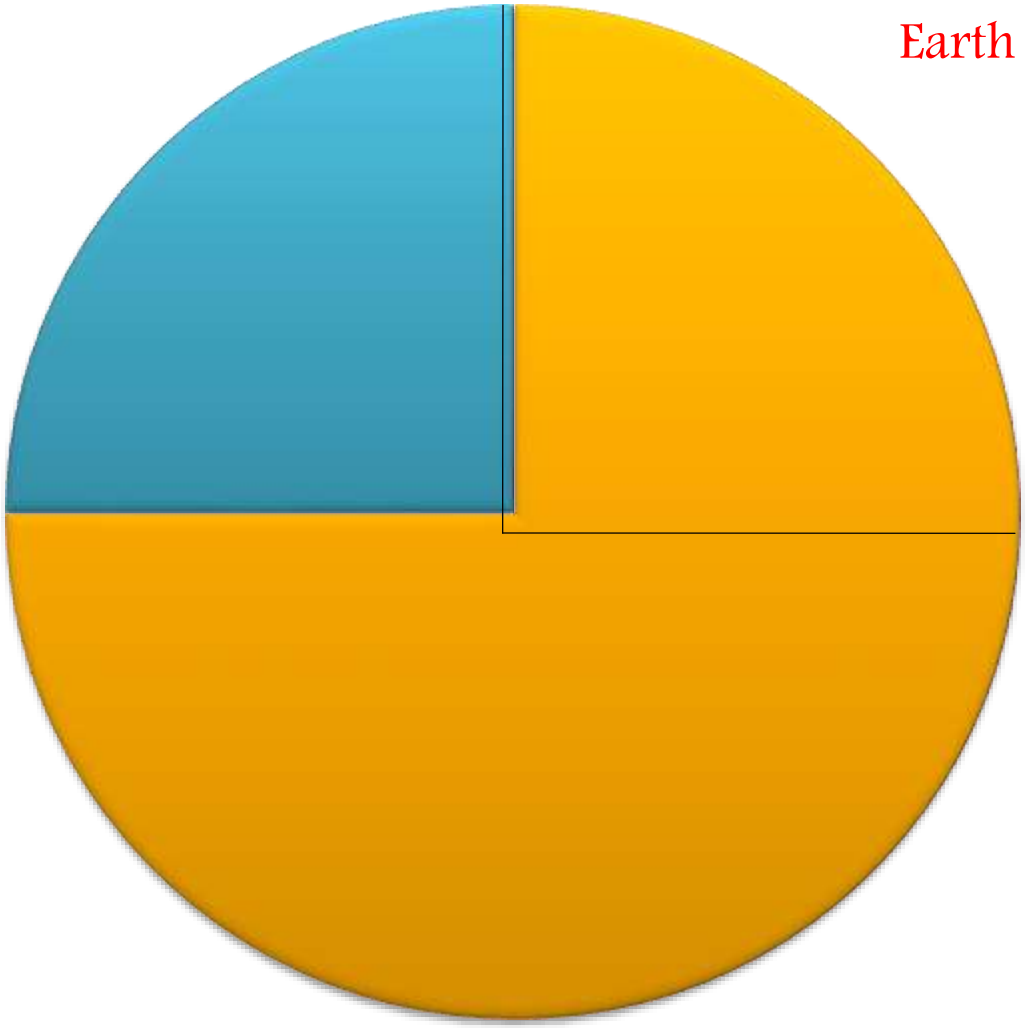
Extinct

Index

Synthetic

Persistence

Pseudo fossils



Earth Surface ¼ covered by

OOZE

Nothing but Organic Materials Like Microshells

# MICROFOSSILS

- Microfossils are tiny remains of bacteria,protists,fungi,plant &animals.
- Microfossils are a heterogeneous bunch of fossil remains studies as a single discipline because rock samples must be processed in certain way to remove them and microscope are must be used to study them.
- Thus, microfossils, unlike other kinds of fossils, are not grouped according to their relationships to one another, but only because of their generally small size and methods of study.

# CLASSIFICATION OF MICRO FOSSILS

- The main source of these microfossils are the Carbonate rocks like Dolomite and limestone, Fine grained sandstone,Blackshales,Coal.
- Some times reworked metasediment samples also bear microfossils.
- The study of these microfossils provides the main evidence for organic evolution, biostratigraphic indication, defection of oil bearing deposits.
- These microfossils can be classified depending upon their chemical composition of test or shell. It is mainly divided into

  - Organic walled
  - Inorganic walled

## Contd...

- An organic walled fossil covers spores-pollens, Acritarchs, chitinozoans ,dinoflagellates.
- Inorganic walled may be calcareous, siliceous, chitinous, phosphatic,carbonaceous.
  - Calcareous –Foraminifera
  - Silicious –Ostrocoda
  - Chitinous-Chitinozoa
  - Phosphatic-Conodont.

## Contd...

- **Calcareous Micro fossils**
  Calcareous microfossils where test (wall) made up of $CaCO_3$ .eg: Foraminifera
- **Siliceous Micro fossils**
  Siliceous Micro fossils those shell and walls made up of silica eg: Radiolarian
- **Chitinous Micro fossils**
  It is made up of Chitinous material. They called as Chitinozoa.
- **Phosphatic Micro fossils**
  The test of phosphatic microfossils made up of Phosphatic material eg: *Conodonts - tooth like cone like*

# CLASSIFICATION BASED ON PROVINANCE

1 Fresh water organism

(a) Lentic

(b) Lotic

2 Marine water organism

(a) Pelagic organism

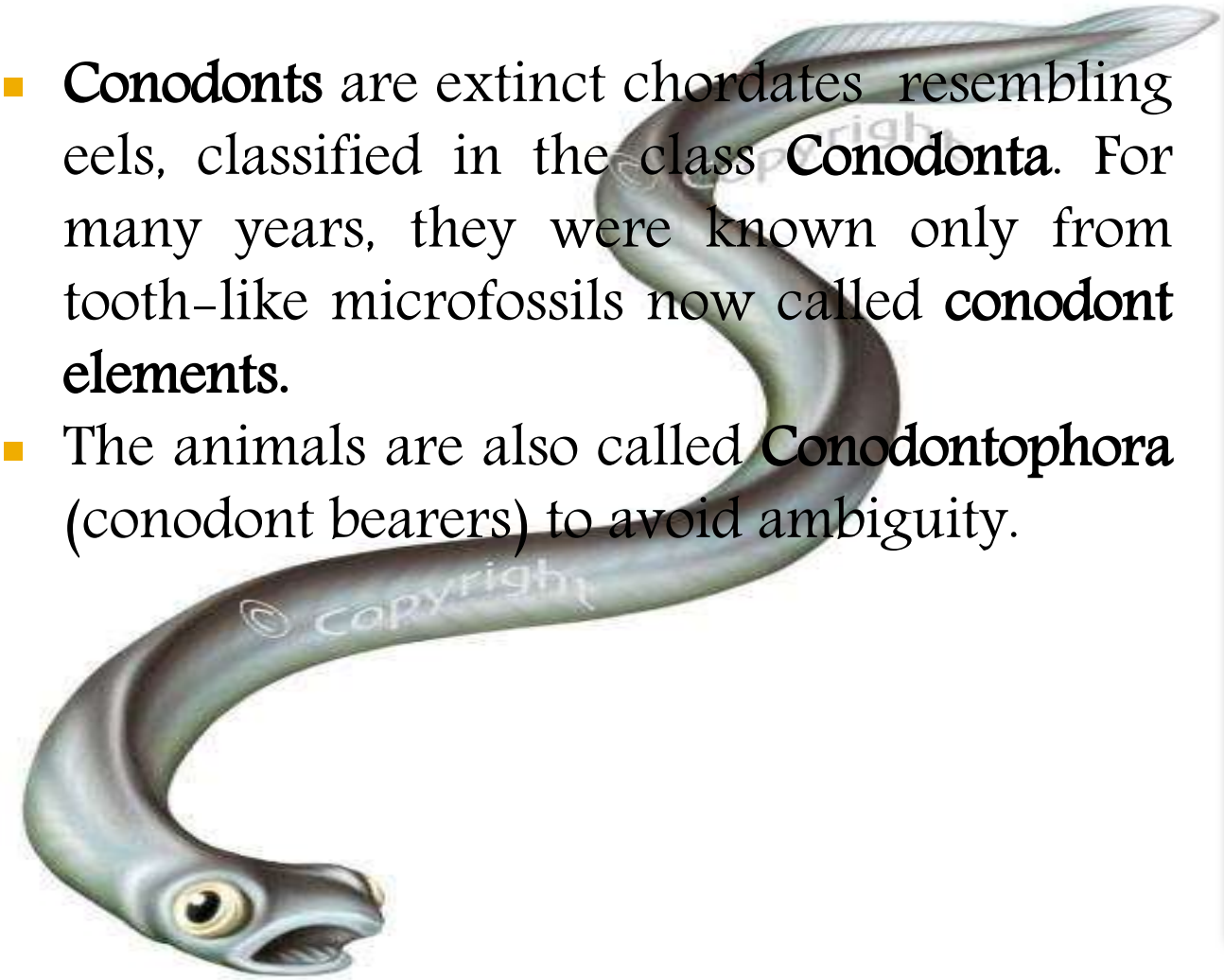
- Planktonic –eg:foraminifera
- Nektonic

(b)Benthonic

- Vagile
- Sessile

# CONODONTS (PHOSPHATIC)

- **Conodonts** are extinct chordates resembling eels, classified in the class **Conodonta**. For many years, they were known only from tooth-like microfossils now called **conodont elements.**
- The animals are also called **Conodontophora** (conodont bearers) to avoid ambiguity.



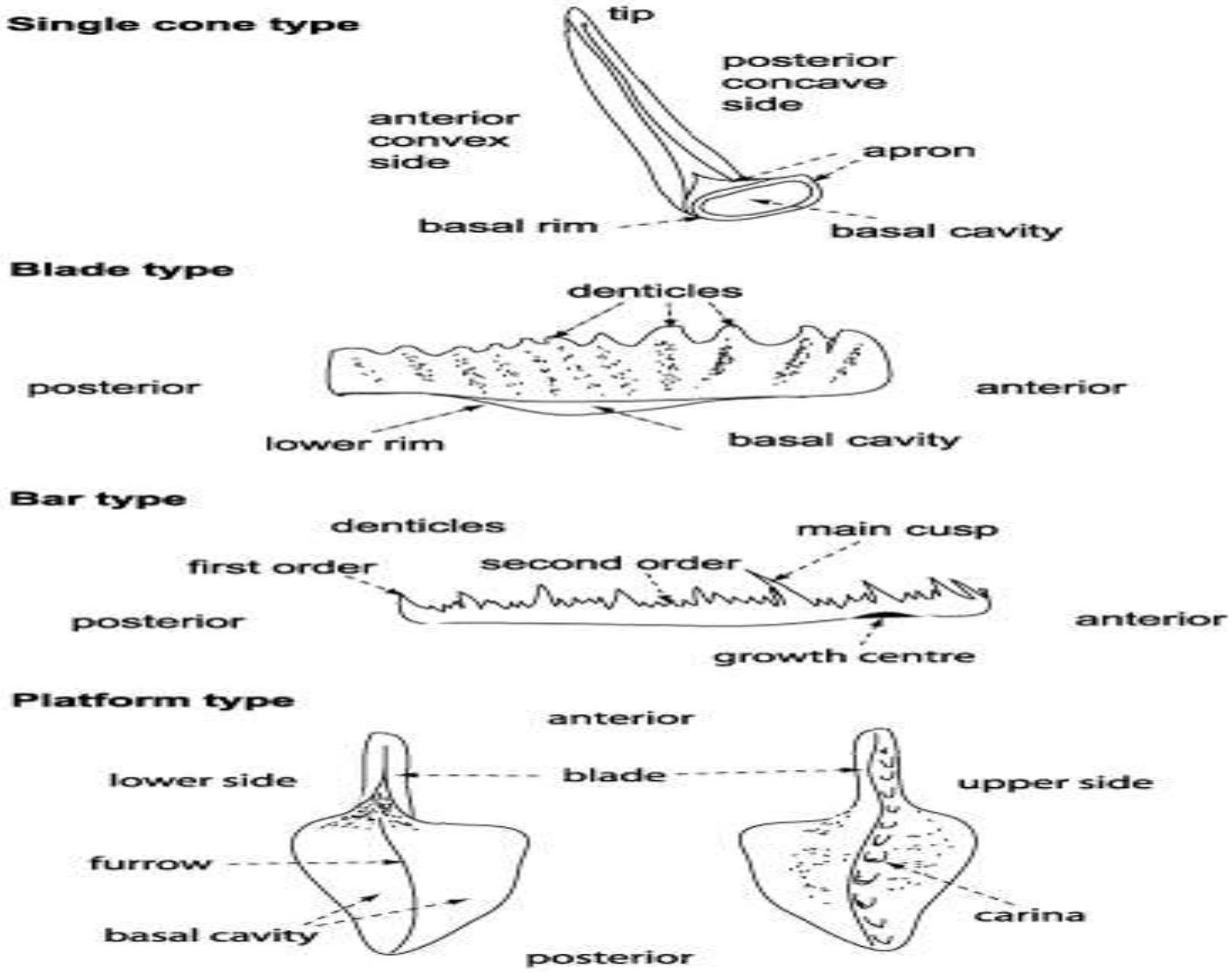
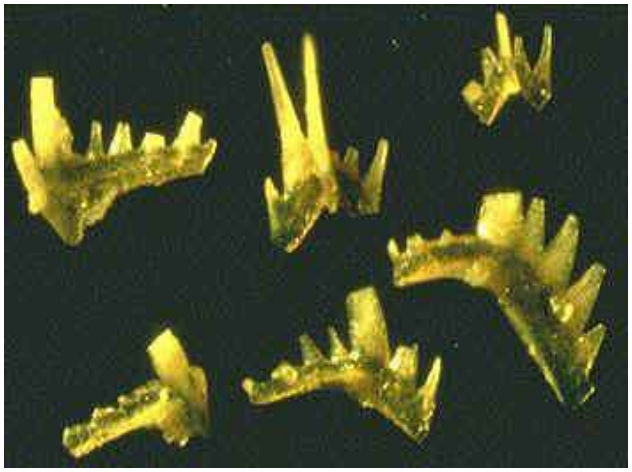



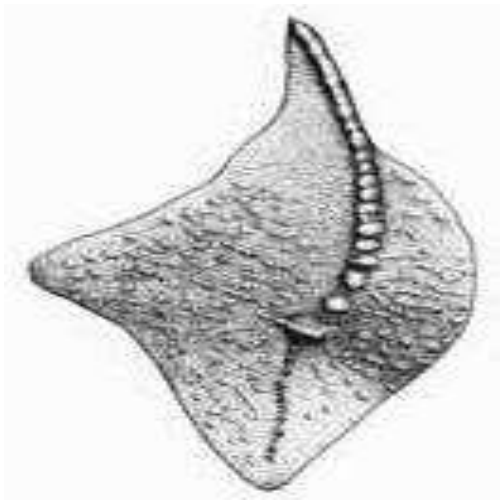

Diagram showing morphological terminology redrawn from Muller 1978

Range – Camb-U. Triassic

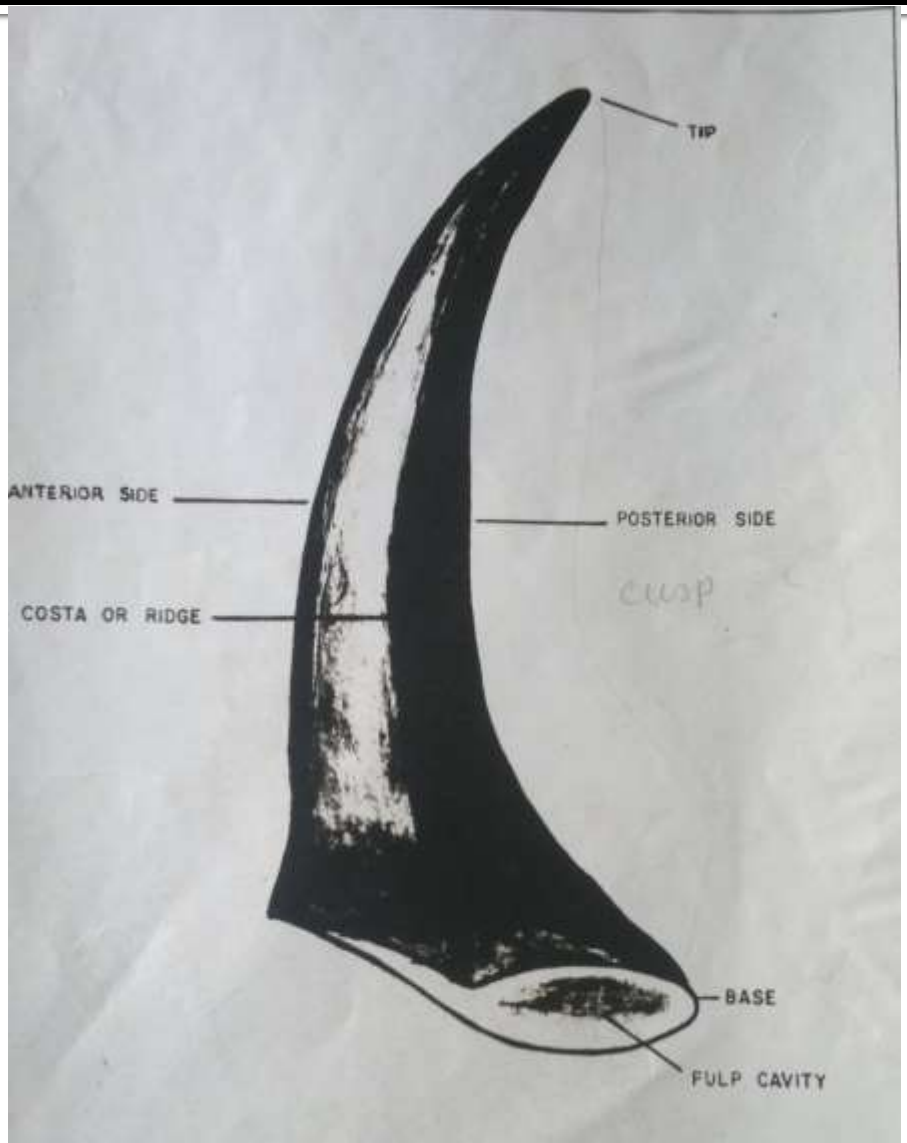
Size - .1-2.0 mm

Composition – Ca phosphate





# Morphological terms used in description of simple conodont



# IMPORTANCE

- Conodonts can be used to help correlate areas of time in the Paleozoic.
- Conodonts elements can be used to figure out the climate changes in the Paleozoic.
- Water depth or distance from shore.
- Global rises and falls in sea level.
- The great abundance helps with understanding the evolutionary relationships.
- Understanding geochemical characteristics of Paleozoic oceans.

# TECHNIQUES

- ## Preparation Techniques

Since conodonts are resistant to mechanical and chemical attack preparation techniques can utilise acids such as acetic, formic, or monochloric to release the elements from their host rocks, which are commonly carbonates. Conodonts are commonly between 200 microns and 5 millimetres in size and can be sieved from finer materials and further concentrated by heavy liquid or ultrasonic techniques.

- ## Observation Techniques

The cleaned specimens can then be viewed using a reflected light microscope and manipulated and mounted in slides in the same manner as foraminifera. Conodonts can also be observed in thin sections.

# History of Study


- The name "conodont" was coined by C.H. Pander (a Russian) in 1856, who worked on Silurian fish fossils of Eastern Europe.
- Ulrich and Bassler (1926) described many new species from North America and were the first to recognise their biostratigraphic usefulness.
- In 1934 Schmidt and Scott discovered groups of individual elements preserved together on the same bedding plain.
- This importantly led to the theory that the individual elements were in life held in pairs (termed an apparatus) often likened to mouth parts. From the 1960's onwards conodonts have developed into one of the most important biostratigraphic tools available in Palaeozoic and Triassic rocks.

# Range – Time Markers
# First Report from Tremadoc (U.Cambrian-L.Ordovician)

- The very earliest conodonts are known from rocks of probable Precambrian age in Siberia, they are found more commonly in Cambrian deposits, diversity increased in the Ordovician and again during the Devonian.
- The conodont-bearing organism clearly survived the Permo-Triassic boundary extinctions but became extinct during the late Triassic.
- It has been noted that the extinction of the conodonts coincides with the diversification of dinoflagellates and first appearance of calcareous nannofosils.
- The most primitive conodonts are single cones, which dominate early Ordovician assemblages and reach a peak in the Arenigian (late Early Ordovician).
- The first platform type conodonts occur around this time as well. Conodont diversity and abundance declined in the Silurian.
- In the Permian the conodonts almost became extinct, however, they made a recovery in the early to middle Triassic only to disappear in the late Triassic.

# Applications

- The fact that conodonts are relatively common in rocks of Palaeozoic age, a period when other microfossil groups are either not present or scarce, has made them extremely useful stratigraphic tools.
- Together with acritarchs, chitinozoa and spores, conodonts are the primary microfossils available to palaeontologists working on Ordovician to Permo-Triassic strata.

# Classification

- Conodonts have been assigned to their own Phylum, Conodonta, divided into two Orders based on chemical and ultrastructure differences.
- One hundred and eighty genera have been recognised. It must be remembered that any classification of conodonts is an un-natural one, as it is based on morphology only.
- Morphologically, four main groups of conodonts can be distinguished.
  - Simple cones: formed by a single tooth, or denticle.
  - Blade-type: elongate, laterally compressed units for fused except at their tips.

  - Bar-type: thin bars with or without a bent shaft which is commonly branched.
  - Platform: it is thought these forms evolved from bar and blade-type conodonts by the developement of broad flanges into plates.

# Conclusion


- Conodonts are type of micro fossil fore runner for first aquatic vertebrates. Phylogenicaly very important group
- Conodonts are extinct chordates resembling eels, classified in the class Conodonta.
- Short lived but time markers in Stratigraphy
- First appearance in Tremadoc (Late Cambrian– Early Ordovician)
- The name "conodont" was coined by C.H. Pander (a Russian) in 1856
- Like Mineralogical / Geological / Paleontological societies in Canada Pander Society is for Conodont Research.

# REFERENCES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# THANKS.....