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# The earliest colour image of Bryozoa

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1. Introduction: early nature illustration
  2. Early illustrations of bryozoans
  3. Giorgio Liberale's paintings of Ferdinand II's natural history collection
  4. Conclusion
- References

## **1. Introduction: early nature illustration**

The passion of biologists for their favorite groups of living organisms is well-known, and this feeling often co-exists with a deep interest in the history of science. It is fascinating to discover which is the first description, or first ever drawing, of a certain animal or plant? As researchers examine early documents and artifacts, more hitherto unknown discoveries are being uncovered.

Naturally, the large vertebrates were the major heroes of the ancient artists, who painted them on the walls of caves. The first invertebrate ever pictured is thought to be a honey bee swarm, whose image adorns a Spanish cave, and dates to 15,000 BC.

Many invertebrates were illustrated by the ancients: scorpions on the Sumerian memorial stellas, dragon-flies and scarab-beetles on the Egyptian pyramids' walls, crabs, octopuses and, again, honey bees on the Ancient Greek coins and vases. This list can be continued. Among dragons and other monsters, invertebrates appeared on the pages of the Medieval bestiaries, and the development of scientific books came next.

## **2. Early illustrations of bryozoans**

Modern-day bryozoologists are fortunately lucky since a reasonable volume of information is known about their pioneers. When Guillaume Rondelet (1507-1566), Professor of Medicine at the University of Montpellier published his famous *Universae*

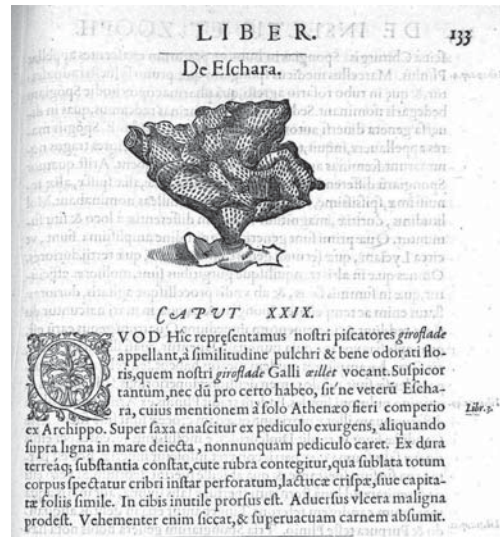
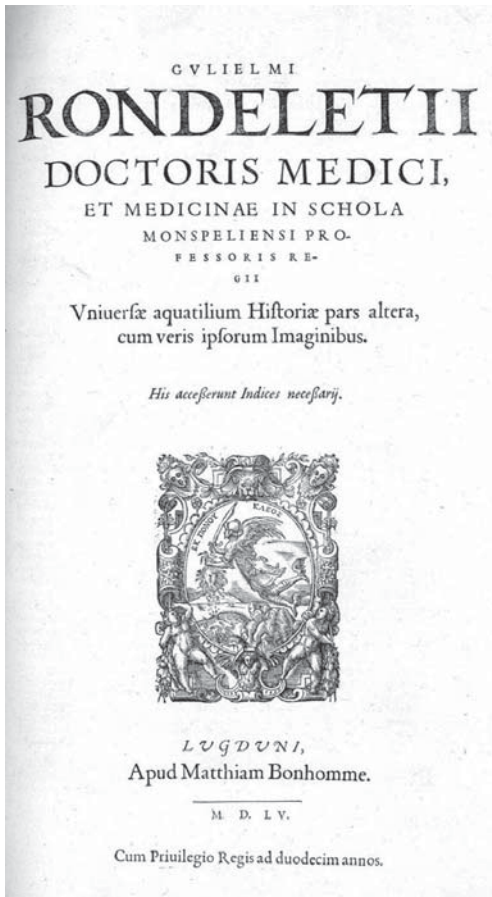


Figure 1 (left). Title page of Rondelet (1555).  
 Figure 2. Woodcut illustration of the cheilostome bryozoan *Reteporella* sp. from Rondelet (1555, p. 133)

*aquatiliū Historiæ pars altera, cum veris ipsorum Imaginibus* (Illustrated Natural History of Aquatic Animals) in 1555 (Figure 1), he included a woodcut image of the cheilostome bryozoan *Reteporella* sp. (Figure 2). It is in the section “Insectis et Zoophytis” being accompanied by a short description on page 133. The 2nd (French) edition of this wonderful book was published in 1558 as *L’Histoire entiere des poissons* (Complete History of Fishes) in which the corresponding description of *Reteporella* was given on page 93 (kindly translated by J.-G. Harmelin):

What is represented, our fishermen name it Giroflade de mer, from its similitude with the beautiful and good smelling flower that we name in our language Giroflade, in French Carnation. I think (but I am not sure) that it is Eschara, named from Archippe in Athena. It grows on rocks, having a tail, sometimes on woods floating at sea, sometimes without a tail. It is made of a hard terrestrial substance, and covered with a red skin which, when removed, it can be seen that this body is pierced as a sieve and contorted as a lettuce.

What is clear from this piece is that (Mediterranean) bryozoans were known since the Ancient Greek times under the name *Escharas*. The bowl-like shape of some *Phidoloporidae* resembled the portable hearth for burnt sacrifice that stood on graves in Ancient Greece and these were called *Eschara*. The same name was used for the sacrificial brazier-like stone altars in Roman times (P. Bock, personal communication, 2013).

What should also be stressed is that Rondelet introduced numerous Latin names for animals (both generic and specific), later used by Linnaeus, and often employed binary nomenclature (for example, distinguishing *Pinna magna* and *Pinna parva*) (two centuries before Linnaeus). Unfortunately, he did not employ such a nomenclatural scheme for the bryozoan described and illustrated.

In 1599 images of three more Mediterranean bryozoans under the names *Retepora*, *Fron dipora* (both with a subtitle *Eschara marina*) (p, 722) and *Poro Cervino* (p. 721) were published by Ferrante Imperato (1550-1609), the Naples naturalist, in his multivolume work *Historia Naturale* (Figure 3). The 2nd edition appeared in 1672. Creator of one of the first “Museo” or Cabinet of curiosities in Europe, Imperato published nine volumes of his *Historia* on alchemy and 19 more on mining, minerals, “marine productions” and

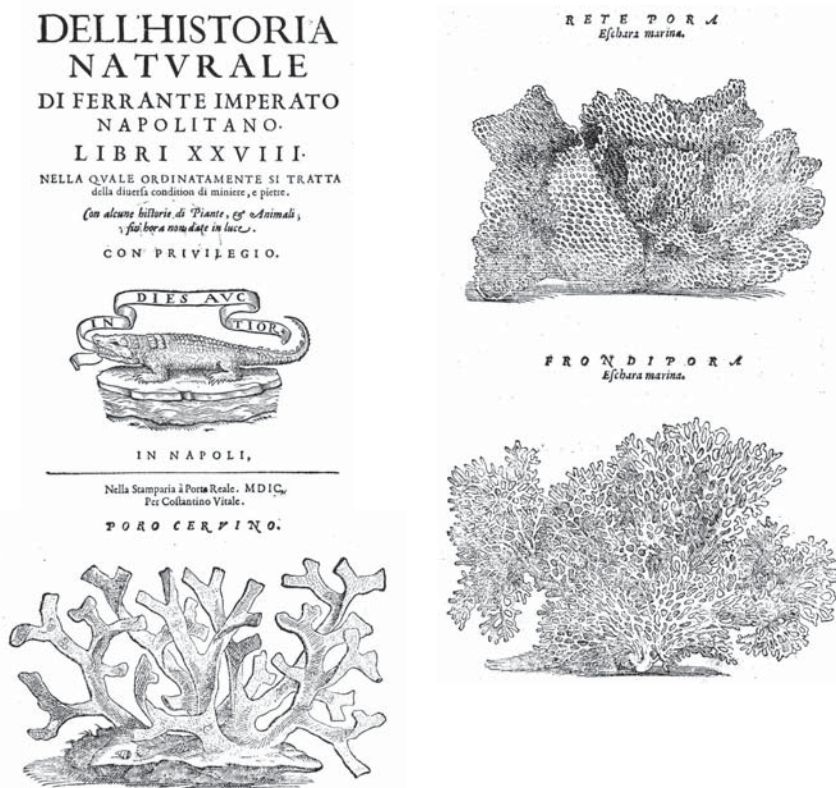


Figure 3. Top-left: Title page of Imperato (1599) (top-left) with his illustrations of *Poro cervino* (bottom-left), *Retepora* (top-right) and *Fron dipora* (bottom-right).

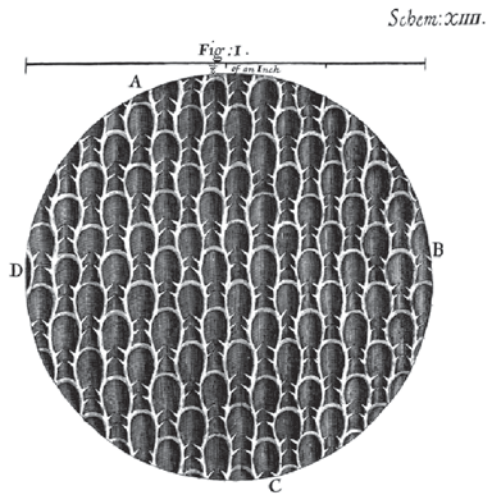
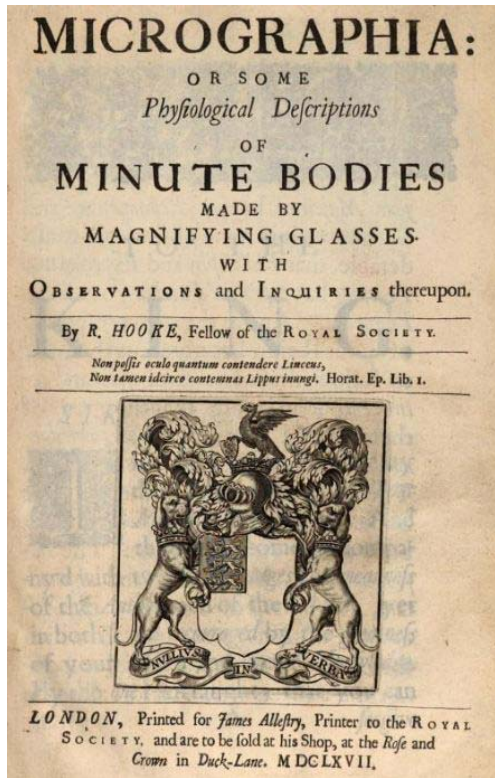


Figure 4. Title page of Hooke (1665) (left) with his illustration of the microscopic structure of the bryozoan *Flustra foliacea* (above).

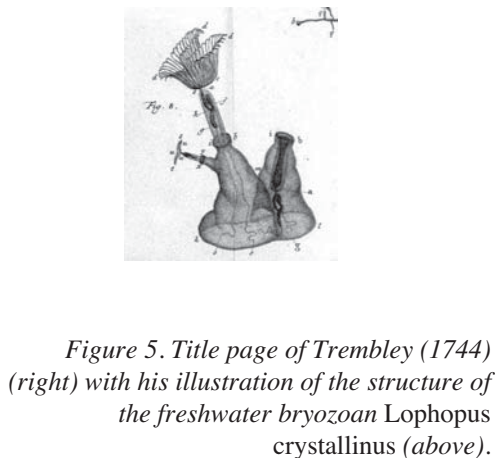


Figure 5. Title page of Trembley (1744) (right) with his illustration of the structure of the freshwater bryozoan *Lophopus crystallinus* (above).



plants. Bryozoan images and short notes about them appeared in the 27th volume together with corals, sponges and algae. The quality of the images is very high, and one is able to recognize *Reteporella*, *Fron dipora verrucosa* and *Adeonella calveti* in them. It also seems that *Fron dipora* may be the oldest currently accepted bryozoan name.

Other early depictions of Bryozoa are the schematic image of *Flustra foliacea* that appeared in 1665 in the famous *Micrographia* of Robert Hooke (Figure 4), the illustration by Antoni van Leeuwenhoek (1694) of what was later recognized as *Conopeum reticulum* (Cadée 2002), and very detailed picture of the living colony of *Lophopus crystallinus* by Abraham Trembley (1744) (Figure 5) (Cadée 2002). Noticeably, the depiction of *Lophopus* is the first ever image of the freshwater bryozoan and, also, the first ever image of the living feeding bryozoan.

All these images were black and white engravings, and it was John Ellis whose fascinating depictions of Corallines (Ellis 1755; French and Dutch editions 1756; German edition 1767) were thought to be the first to be coloured (using a watercolour wash on lithographs) (Figure 6). It has recently come to light, however, that an earlier artist, working two centuries before Ellis, had executed colour images of bryozoans.

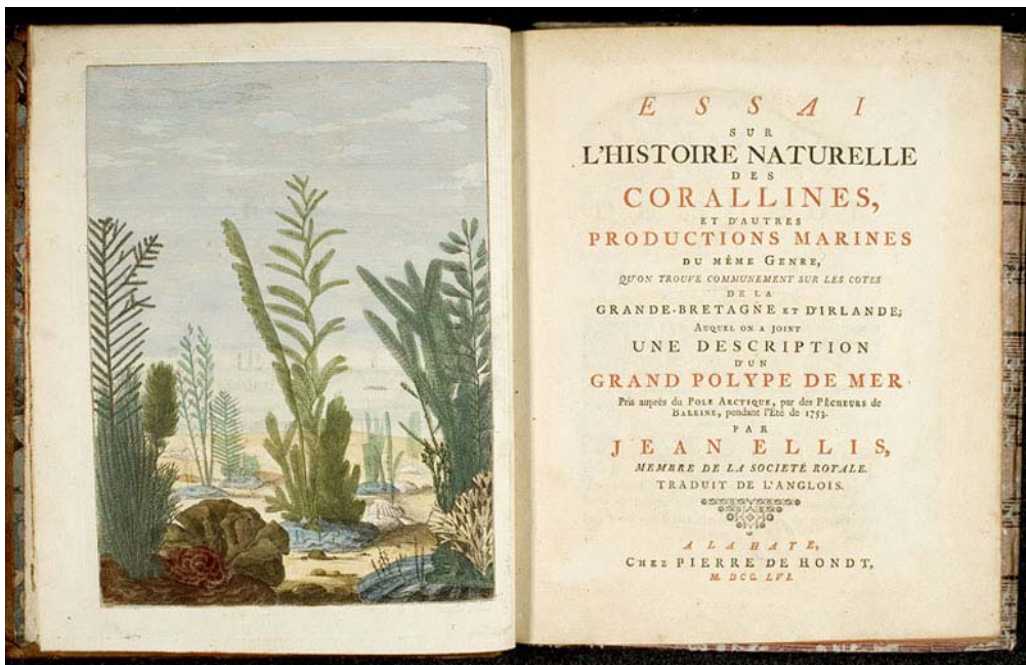


Figure 6. Title page of Ellis (1756) showing the hand-coloured frontispiece illustrating various bryozoans and hydroids

### 3. Giorgio Liberale's paintings of Ferdinand II's natural history collection

Animalistic painting has always been one of the chief interests of the authors of this paper, so a visit to an exhibition devoted to it that happened to be mounted in Vienna was, naturally, visited. Moreover, "Cabinets of curiosities" are definitely a recent focus for the contemporary art community, as highlighted at the last Biennale in Venice, "The encyclopedic palace". That is where scientific and artistic approaches meet nowadays. The exhibition *Fish, Birds, and Reptiles - Masterpieces from the Imperial Collections* took place in the Stateroom of the Austrian National Library, and a well-produced catalogue (Weiler 2011) accompanied it. We decided to buy a catalogue as a Christmas present for one of us. At home, leafing through it, we unexpectedly discovered an image of Bryozoa, coloured, like all the other images in the book. The story behind is as follows.

The Italian artist Giorgio Liberale (1527-ca 1580) from Udine, being at the court of Ferdinand II, Archduke of Austria, was asked to produce an album of animalistic paintings. The Archduke had a University education and patronized the arts and science. He also had assembled a large collection of curiosities, with a special emphasis on paintings of people with interesting deformities—this collection remains as the Chamber of Art and Curiosities at the Ambras Castle in Tyrol, near Innsbruck.



Figure 7. Water-colour painting by Liberale showing a variety of marine invertebrates including Bryozoa



Figure 8. Detail of Figure 7 showing reteporellid colony with small white crisiids attached.

Liberale was already experienced in such work, having already sketched in pencil more than a thousand images of plants that were used by Meyerpeck for the xylographic (woodcut) illustrations for the translation of Dioscoride's famous 1st-century herbal, *Materia medica*. This important volume was translated into Italian and considerably added to by Pier Andrea Mattioli who was a personal physician of the Archduke.

In the course of several years' work for Ferdinand II, 100 parchment sheets (64 x 86 cm) with wonderful watercolour pictures on both sides were prepared. There are more than 1100 images. While many land insects were depicted, most animals were aquatic, including a sperm whale, a dolphin, a seal (eating grapes), a crocodile (naturally, with human bones nearby) and various fishes. Fish and marine invertebrates were from the Adriatic Sea whose coastline (being depicted in the background) and landscapes are easily recognizable.

The quality of the images varies, but generally it is rather high. It was clearly an attempt to combine an artistic and documentary approach but this was not always successful. Most invertebrates, however, were painted very well (Figure 7). It is especially interesting that Liberale pictured not only large invertebrates like crabs, lobsters, cephalopods, jellyfishes and large gastropod shells, but virtually everything including caterpillars, millipeds, moths and their pupae, as well as tube-worms, corals, ascdians, sponges and bryozoans.

Turning pages, we have found our old friend – Rondelet's *Eschara* or Imperato's *Retepora*. The exact period during which the water colour images were painted can be accurately determined. It is mentioned in the catalogue that Liberale started his work in 1562 (Weiler 2011). Another indicator is the 20 May, 1569 the date Liberale's parchments were mentioned in the inventory of the Archduke library. Thus, his is the earliest image of living bryozoans, and is significant in that it shows their original colouration and that they were pictured close to the sea shore. Liberale also figured three tiny crisiid colonies attached to the reteporellid colony (Figure 8). Thus, he was also the first who produced an image of a cyclostome bryozoan. Other invertebrates depicted on the same sheet also have natural coloration, suggesting that all of them had been recently collected. These colour images post-date, by only ten years Rondelet's publication of the *Eschara* woodcut image.



## 4. Conclusion

The recently restored collection of Liberale's paintings is kept in Tyrol. The large exhibition of 2011-2012 in Vienna was not able to exhibit all the images, but thanks to Christina Weiler, who prepared a wonderful illustrated catalogue that contains many, but not all of the original paintings, such that the first colour bryozoan images, were published. Ultimately we need to be grateful to both Giorgio Liberale and Ferdinand II, whose curiosity and love of nature resulted in a wonderful collection of paintings that included an image of our favourite animals.

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