

The image features three stylized fish swimming in a diagonal line from the top-left towards the bottom-right. Each fish is filled with a complex, fingerprint-like pattern of grey and white lines. The pattern consists of numerous small, overlapping, curved lines that create a dense, textured appearance. The fish are set against a plain, light-colored background.

BOLCA 50 MILLION YEARS AGO THERE WAS A SEA

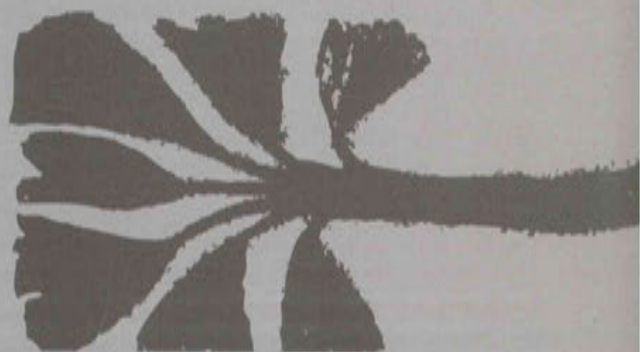
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VERONA

Domo R. Lorenzini



in the beginning there was the sea

About 50 million years ago, during the geological epoch that palaeontologists call the Eocene, there was a vast sea, the Tethys, that extended in an east-west direction. At the time of its greatest expansion this body of water stretched from America to North Africa and toward Indonesia, separating the northern supercontinent (Laurasia) from the southern (Gondwana). This ancient sea brought the present-day Atlantic ocean in contact with the Indian and Pacific oceans. The waters of the Tethys were transparent, hot, and rather shallow and were inhabited by a great variety of fish, shellfish, crustaceans, foraminifera and algae. Along the coastline of this ancient sea was the territory of Bolca; its position was roughly that of the present-day Persian Gulf. Just slightly to the south was the coast of Paleo-Africa which, in its slow northwest drift, would collide some tens of millions of years later with the coast of ancient Europe, leading to the rippling of its southern edge that eventually gave rise to the Alps. It is because of this gradual upheaval that the rocks on which the small town of Bolca is built are in the hills, at about 800 metres above sea level.

When speaking of Bolca and its fossils, a clarification is necessary with regard to the term generally used to identify the most important, best known paleontological site of the Eocene in the world. In reality, the Bolca fossils come mainly from three well-known locations that are near one and other, but distinct in age and environment: "Pesciara" (Pessàra, in the local dialect), the principal fossil fish deposit, Monte Postale, and Purga di Bolca-Vegroni, as well as other sites of lesser note (Loschi and Praticini).

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BOLCA: 50 MILLION YEARS AGO THERE WAS A SEA



ABOUT 50 MILLION YEARS AGO, THE BOLCA AREA WAS AFFECTED BY THE DEPOSIT OF CALCAREOUS SLUDGE FROM THE LOW SEA AND BY MORE OR LESS INTENSE VOLCANIC ACTIVITY. IN THE WESTERN AND CENTRAL AREAS OF THE VERONESE LESSINIA MOUNTAINS, THE VOLCANIC ACTIVITY DATES TO THE PALEOCENE-EOCENE, WHILE TO THE EAST IT CONTINUED UNTIL THE OLIGOCENE. IN FACT, IN THE VAL D'ALPONE THE VOLCANIC ROCK FORMATIONS ARE MUCH THICKER THAN THOSE OF SEDIMENTARY ORIGINS, GENERALLY REPRESENTED BY LIMESTONE FROM THE CRETACEOUS-EOCENE AGE.

1. the rocks tell a story



Careful clearing and restoration ▲
facilitate study of the fossils.

Drepanocarpus dacampi. ▲
A terrestrial plant that lived in proximity
to the coast of the ancient Bolca sea.

Layers of limestone of an ancient seabed ▲
that buckled during the upheaval
of the Alps.

Evidence of the ample and copious volcanic eruptions that occurred in this eastern portion of the Veronese Lessinia mountains can be found in the prevailing outcrop of basalt and other volcanoclastic remains. The carbonate marine formations, together with the volcanic rocks, were involved in a series of processes of deformation that often make the recognition and reconstruction of the local stratifications difficult.

At the end of the Upper Cretaceous the eastern Lessinia mountains and, thus, the entire territory of Bolca, were characterized by a stratigraphic lacuna that lasted until the Upper Paleocene when the so-called Alpone-Agno *graben* or *half-graben* was formed. This ample depression is bounded to the west by the Castelvero fault which, along with other sub-parallel faults, subdivides the area into various zones, causing a significant lowering of the eastern zone. Near the Castelvero fault (right bank of the Valle dell'Alpone), a deep depression that permitted the deposit of volcanic material some 400 metres thick can be observed.

Within this depression, at least seven distinct cycles have been identified in which volcanic activity alternates with local episodes of marine sedimentation (malm and marly limestone). Subsequently, in the Early and Middle Eocene, carbonate material consisting primarily of calcarenities

(limestone nummulites), was deposited within the *graben*. During one of these intervals of exclusively carbonate sedimentation, the limestone sludge that characterizes the famous fossil beds of Pesciara and Monte Postale was deposited.

The intense volcanic activity that took place in the Bolca area during the Middle-Late Eocene greatly deformed the previously deposited rocks. It is probable that these volcanic eruptions also provoked a series of extensive underwater landslides that broke up the original, fossil-rich limestone into the "blocks" which constitute the present day hills of Pesciara and Monte Postale.

The territory surrounding Bolca is characterized by the abundance and extension of volcanic rock of various types. Among these are basalts that contain numerous minerals, in particular splendid green olivine crystals. The intense volcanic activity took place mainly under water. In the final stages volcanic activity usually becomes subaerial, following the emergence caused by the abundant production of lava and other volcanic rock.

This environment is documented



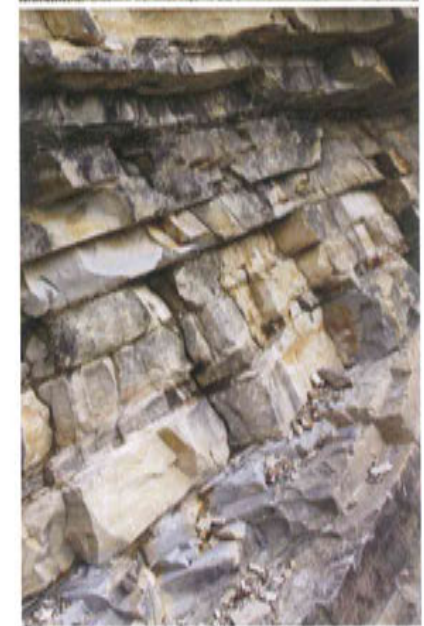
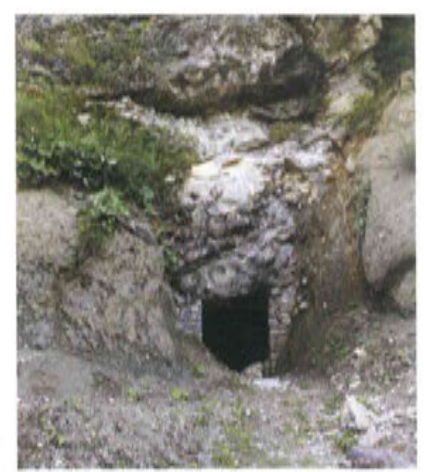
in great detail in a description from 1873 by the geologist Antonio Stoppani who writes: "... Those basaltic tufa stones alternate with lignites that are nothing but peat moss from ancient lagoons, inhabited by freshwater shells, tortoises, crocodiles, and belts of low lands with thick forests of palm trees, populated by land-shells...".

In addition, a distinctive palaeographic reconstruction on a regional scale is described in the chapter "Conclusioni" of the 1915 monograph, *Il Paleogene del Veneto*, by Ramiro Fabiani, that relates: "...The most obvious evidence comes from the freshwater and terrestrial formations of Bolca, Roncà, etc. The shore line was situated many kilometres from the Bolca region, toward the southeast; where in the lower and middle periods of the Middle Eocene the sea extended, the earth emerged with pools populated by crocodiles and shaded by the luxurious vegetation of palm trees and other tropical plants. It is interesting to note that in this same area that was slowly emerging and in the area immediately surrounding it there were repeated volcanic eruptions which had already begun at the end of the Cretaceous period. These produced the massive basaltic and pyroclastic formations that proliferate in the region ...".

These historical descriptions accurately reflect the ancient environment in which the main sub-aerial volcanic structures of the Val d'Alpone were formed. Mon-

te Calvarina, along with Monte Crocetta and Monte Duello, in fact, formed a majestic, active volcanic complex that emerged from the ancient Tethys sea about 40 million years ago. The Bolca area contains other volcanoes of note (the so-called *purghe* of Bolca, Vegroni and Durlo), comprised of rocks that were formed between the Eocene and the Lower Oligocene. In particular, the basalts that form the top of the volcanic chimney of the Purga di Bolca have been dated to about 36 million years ago. *Purga* is a Cimbrian toponym that derives from the Middle High German *burc* "rock-fortress", declined as *kar Purge*, "to the fortress-to the rock".

Subsequently, during the Late and Middle Oligocene, volcanic eruptions began again in the area, even if they are more extensively documented further to the east. At the end of the Cenozoic (Pliocene), the Alpine orogeny determined the complete emergence of the Veronese territory with the uplifting of the rock to such a degree that it reached and surpassed the present day altitude. At the same time that this upheaval was taking place, the entire territory was affected by the action of exogenous agents (water, wind, and ice) that modelled it into its present-day form.



- ▲ Entrance to an ancient tunnel of the Pesciara deposit.
- ▲ *Sphyræna bolcensis*, similar to the present day barracuda.
- ▲ Limestone layers of the ancient seabed of the Pesciara site, thrust upward to the actual quota during the Alpine orogenesis.
- ◀ *Maffeja ceratophylloides*. Plants similar to the fossil exemplar live today in the great rivers of South America.

PESCIARA: 100.000 REMAINS FOUND IN THE FOSSILI- FEROUS LEVELS



THE GREAT QUANTITY OF FOSSILIZED FISH (WELL OVER 100,000) FOUND IN THE FOSSILIFEROUS LEVELS OF THE PESCIARA AND MONTE POSTALE HAVE ALWAYS INTERESTED SCHOLARS AND MUSEUM VISITORS. WITH SUCH A LARGE BODY OF REMAINS TO CONTEMPLATE, THE MOST FREQUENTLY ASKED QUESTIONS ARE, FIRST OF ALL, WHY DID THEY DIE AND SECOND, WHY HAVE THESE FOSSILS SURVIVED TO THE PRESENT DAY? MANY THEORIES HAVE BEEN PUT FORTH TO ANSWER THESE QUESTIONS, YET NONE IS YET CONSIDERED DEFINITIVE.

2. the ancient environment



The excavated Eocene limestones are numbered, sampled, and classified according to their characteristics and date. ▲

The present day fish are quite similar to the ichthyoliths from Bolca, which appear, however, more primitive. ▲

When the limestone layers separate under the precise strikes of the hammer, the fossils divide into two symmetric parts called impression and counter-impression. ▲

The Pesciara deposit consists of a stack of calcareous layers about 19 metres thick, but with an extension of just a few hundred square metres. The fossils, primarily of fish and plants, can be found within five superimposed levels, consisting of fine-grained, densely layered limestone intercalated with detrital calcareous layers within which can be found only the remains of invertebrates, above all shells of bivalves and gastropods. The fact that fine-grained limestone layers, subdivided into numerous laminae, alternate with detrital calcareous layers testifies to a cyclic alternation of different environmental situations. In fact, we can observe evidence of a sequence over time of environmental conditions characterized by calm waters similar to those of a well-protected gulf, in which fine-grained sediments were deposited, alternating with conditions typical of intense waves. The latter situation is evidenced by the presence of coarse debris.

The reconstruction of the ancient environment that hosted the fish in Bolca is not simple, as the great variety and forms of the fish fossils suggest. Some are similar to those that live today in coral reef areas, while others are characteristic of the shallow sandy ocean bottoms with abundant marine plants similar to those of the southern Mediterranean coasts. The most famous theories have attempted to justify the abun-

dance of fish within the stratifications of the Pesciara site by hypothesizing repeated "catastrophic" events over time. One of the first theories suggested the presence of volcanic activity (exhalations of gas, eruptions, etc.) to explain the death of the marine organisms. In truth, within the numerous laminae with fish fossils, there is no trace of either ashes or other volcanic by-products.

Another important theory has suggested that in Bolca, as occurs today in the calm bays and lagoons of tropical seas, there must have been periodic natural poisonings of the waters, known as "red water", on an annual or seasonal basis, or even for just a few days, caused by the sudden development of planktonic organisms. This phenomenon led to the death of all, or the majority, of the organisms present in the area, due primarily to the removal of oxygen from the waters. The presence of weak currents permitted the transport of the dead organisms toward seabeds with oxygen-poor waters where they could be covered by thin limestone slurry without being eaten by those animals that generally live on the ocean floor and feed on corpses.



At this point all of the processes began that transform sediment into rock, and of fossilization, which permitted their conservation until the present day. Subsequently, conditions of normal oxygenation returned and the waters were repopulated. Despite the large numbers of fish found at Pesciara, one cannot speak of mass mortality, as some scholars have suggested. In fact, in the deposits where this series of catastrophic events occurred, which usually caused the death of all of the organisms present in a given environment, the fish completely cover the surface of a lamina, with hundreds of fish near one and other. In the Pesciara deposit, conversely, considering the large number and extension of laminae present, the more than 100,000 fish uncovered evidence the presence of roughly one fish for every 10 m² of lamina. This value is characteristic of an environment very rich in fauna, with normal mortality, in which good conditions for fossilization have been maintained over time. Once dead, the fish must have reached the ocean floor gradually and rather quickly, because the majority of them are preserved with their various parts anatomically connected. Only in some cases have examples been found that are lodged for some centimetres within the laminae of the floor, evidence that the sediments were "soft".

It seems that no predators who could have eaten the carcasses lived on the ocean floor. This fact can be explained by hypothesizing the presence of waters without, or low, in oxygen, with a high salt content and a rapid sedimentation of the limestone sludge that buried the fish, thus protecting them from the external environment.

We still do not know what really happened in the Pesciara deposit 50 million years ago. We hope that the excavations now underway can answer this stimulating question.



- ▲ *Pycnodus platessus*. The Bolca exemplars represent the last evidence of the group prior to its extinction.
- ▲ The layers with fish also contain numerous remains of marine plants, and finds from both freshwater and dry land.
- ▲ *Eoplatax papilio*, considered one of the symbols of the Parco Naturale Regionale della Lessinia, is among the rarest and most beautiful ichthyoliths from Bolca.

**MONTE
POSTALE
AND
PESCIARA:
THE MOST
FAMOUS
FOSSILIFEROUS
DEPOSITS**

3. the principal fossil deposits



There are numerous well-known fossiliferous localities in the immediate vicinity of Bolca which are notable for the great variety of remains found there and for the extraordinary state of their preservation. Pesciara, Monte Postale, Monte Purga and Monte Vegroni, Spilecco, Praticini, Loschi, and Possette, among others, are the deposits that have attracted the interest of scholars and collectors for centuries. Of these, Pesciara and Monte Postale are certainly the most famous and important. They are two deposits located just a few hundred metres apart, of marine origins, and with fairly similar characteristics. In fact, the fauna are very similar even if the Pesciara can be considered the fossil bed that best symbolizes Italian paleontology because the excavations during the twentieth century

were undertaken here almost exclusively. After a long break, new excavations with scientific criteria began at the start of the present century, both in the open air on Monte Postale and in the tunnel of the Pesciara bed. The fish of Monte Postale (for example the angel fish *Eoplatax*, the barracuda *Sphyræna*, and the skate *Narcine*, etc.) are found in limestone layers of predominantly off-white colour and, unlike those found at Pesciara, are often disjointed, with their scales scattered around the body. This leads to the hypothesis of an environment that was not conducive to fossilization, characterized by a certain degree of decomposition of the organic substances. It has not yet been possible to ascertain whether the levels with fish fossils at Monte Postale are contemporary with those of Pesciara



▲ The southern side of Monte Postale where new paleontological excavations have been opened.

▲ *Eoplatax papilio*. Five remarkably well preserved exemplars of exceptional size were recently found.





or slightly more recent. Other important fossiliferous deposits are those of Monte Purga di Bolca and Monte Vegroni, where argillaceous rocks, volcanic tuff, and lignites with fresh-water and terrestrial mollusks emerge. Up until just after the First World War, the lignites were extracted and sold for fuel. During the mining, above all in the tunnel, numerous, stupendous palms (*Latanites*, *Phoenicites*, etc.) several metres tall and with fan-shaped or pinnate leaves were found along with tortoises (*Trionyx*, known as "soft-shelled" tortoise) and crocodiles (*Crocodilus vicetinus*). In 1946 Massimiliano Cerato discovered a wonderfully preserved crocodile fossil that is held to be the most

complete exemplar of this species in the world. The presence of lignites indicates an environment with fresh or brackish waters and an abundance of plants that accumulated over time and gave rise to carbon deposits dating to about 40 million years ago.



- ▲ *Crocodilus vicetinus*. A rare exemplar from Monte Purga di Bolca.
- ▲ Numerous remains of palm trees have been found in the lignite mines, active until the start of World War II.
- ◀ The area around Pesciara, as it now appears after recent reorganization.
- ◀ *Pescharichthys punctatus*. An extremely rare exemplar found at Pesciara during the 2010 excavations.
- ◀ Palm fossil found in a mine of Monte Purga di Bolca.



Fano dei coralli

4. the fossil museum



▲ The Fossil Museum in Bolca is a destination for thousands of visitors from Italy and other countries.

▲ The "jewels" case contains very rare exemplars.

▲ In the upper room of the museum the fossils are exhibited according to their characteristic environments.

▲ Many remarkably preserved fossils are on view in the museum galleries.

A visit to the museum is a voyage through time and space to discover a particular moment in the life of our planet, as well as its nature and evolution. The main protagonists in this museum are fish: living fish that swim in two aquariums and fossilized fish. The new Fossil Museum, built by the Comunità Montana della Lessinia, the managing entity of the Parco Naturale Regionale, and inaugurated in 1996, extends for some 700 square metres and comprises three ample exhibition spaces on two floors, was designed by the illustrious palaeontologist Lorenzo Sorbini according to modern museum criteria. The museum can be visited on various levels. The simple viewing of the specimens exhibited may be accompanied by the reading of texts juxtaposed with colour illustrations of present day fauna. In addition, it is possible to complete the visit by viewing a film that recounts the geological history of Bolca and large panels that reconstruct the environment as it appeared 50 million years ago. The visit begins in the first gallery where the geographical and geological aspects of the territory are illustrated. The "Jewels of Bolca" exhibition case affords a sampling of the stupendous exemplars that the visitor can see. Continuing in the main gallery one can learn about the principal paleontological deposits of the Val d'Alpone (Roncà, S. Giovanni Ilarione, and Spilecco) and view

and read descriptions about selected rock samples from the local strata including exhaustive information about the process of fossilization and the techniques for extracting fossils. Following this is a splendid room devoted to systematics in which the fauna found in Pesciara and Monte Postale are presented according to their respective scientific classifications. Two large marine aquariums, one with marine fauna from the Mediterranean environment and the other containing tropical fauna, allow the visitor to compare some present-day marine fauna exemplars with those that thrived 50 million years ago. The upper level of the museum showcases the great variety of fauna and flora from Pesciara and Monte Postale. Fish, terrestrial plants, lobsters, shrimp, jelly fish, bird feathers, insects, worms, and other species are arranged by environments and accompanied by numerous colour images.





- ▲ The panorama of the Val d'Alpone and the Colli Euganei as seen from the Fossil Museum.
- ▲ One of the two large aquariums inside the museum.
- ▲ A rare exemplar belonging to the family of the surgeonfish.

- ◀ A view of the upper gallery of the museum where one can observe numerous fish, plants, insects, and jellyfish.
- ◀ The fish that populate the two aquariums in the museum are related to the fossil-fish found at Bolca.
- ◀ The numerous fossils on public view have been chosen from amongst the most rare and important exemplars.

PESCIARA AND MONTE POSTALE: THE TWO MAJOR EOCENE FOSSIL BEDS



ABOUT TWO KILOMETRES FROM BOLCA, IN THE EXTREME EASTERN PORTION OF THE LESSINIA NATURAL PARK WHICH STRADDLES THE PROVINCES OF VERONA AND VICENZA, ARE THE TWO MOST FAMOUS EOCENE FOSSIL BEDS IN THE WORLD: PESCIARA AND MONTE POSTALE.

5. the paleontological park



Adults and children can easily enrich their visits to the Fossil Museum and venture into the historic Pesciara site with a side trip to the nearby area where for centuries fossils have been extracted and where paleontological excavations have recently begun again in this nature reserve within the Lessinia park that is used extensively for educational purposes. This fascinating area is rich in history, with tunnels that develop within limestone strata following the slope of the layers and in which natural and artificial rock columns made of stone, or using wood and steel supports, hold up the tunnel roofs.

"Paleontological Walk" conceived by the managing entity of the Lessinia park and inaugurated in 2004, allows visitors to follow an itinerary that develops in three rings with different learning levels and durations; each of these begins at the Fossil Museum. Each itinerary is planned in detail, and includes panoramic stopping points where thematically organized topics are treated on the various outdoor notice boards.

The longest itinerary, which extends for some nine kilometres with a vertical drop of 405 metres, requires about four hours of walking. The various observation points include Monte Postale, Pesciara with its tunnels, Monte Purga di Bolca with its basalt columns and the strata where the famous crocodile exemplar and a tortoise fossil were discovered in 1946, and Monte Spilecco, the site of the oldest deposit in the area, which testifies to the existence of a beach rich with little sharks teeth.

The walk includes aspects of historical interest, as it passes through the districts of Brusaferrì and Loschi, while from the summit of the ancient volcano, Monte Purga, it is possible to enjoy a beautiful panorama that extends over the Val d'Alpone and the nearby hills, the Colli Euganei.

In the debris from Pesciara, ▲
it is not unusual to find remains of organisms
that lived 50 million years ago.

The entrance to the area of Pesciara ▲
where new excavations in the tunnel
were recently begun.

A view of the ancient Pesciara tunnel ▲
that is now open to guided tour groups.



6. the resumption of the excavations

After the suspension of the paleontological excavations in Bolca in 1988 due to the adoption of new criteria for granting excavation permits set down by the Ministry of Culture, the Museo Civico di Storia Naturale in Verona resumed scientific work in the area. In fact, the ongoing excavations and research on the part of the institution are taking place by government concession. These were initially conducted by the museum's director, Lorenzo Sorbini. After his premature death they were taken over in 1999 by Roberto Zorzin, curator of the Geology and Paleontology Section. In fact, in the summers of 1999 and 2000, the Geology and Paleontology Section of the Verona museum, in collaboration with the Earth Sciences Department of the Universities of Milan and Pisa, and with the operative and technical advice of Massimo and Erminio Cerato, carried out a series of geological tests and surveys in the area surrounding Pesciara in order to verify where the fossiliferous strata emerge. Following these site visits, it was possible to identify two areas: an open-air site on the southern side of Monte Postale, in the municipality of Altissimo (a province of Vicenza) and another in the tunnel of the famous Pesciara. Finally, in 2003, after a long interruption and following an agreement signed in the same year by the Superintendence for

Archaeological Heritage for the Veneto, the Veneto Region, the Comunità Montana della Lessinia - Parco Naturale Regionale della Lessinia, and the Museo Civico di Storia Naturale in Verona, the excavations near Pesciara were resumed. The area chosen for excavation during this recent research period is located right above the tourist entrance to Pesciara. The layers extracted belong to the same level as those visible in the touristic tunnel known as the "Upper Quarry", excavated during the entire second half of the twentieth century by Massimiliano Cerato. The new stratigraphic observations have evidenced the need for a deep analysis of those processes which have affected the organisms from the time of their death through their preservation (taphonomic analysis), and sedimentological and stratigraphic studies of the entire Pesciara complex. The actual excavation area is characterized by an interval consisting of some 140 cm of laminated limestone that separates two powerful massive banks of limestone. As of today, we do not know the real extension of this interval or its stratigraphic relationship to the rest of the limestone that surrounds it. A detailed analysis has led to the identification of thirteen strata that can be distinguished from one and other by important lithological variations. Overall, the fossil content reflects the

historically known associations. The excavation methods utilized permit the researchers to determine the actual frequency of fossils, layer by layer, and the eventual reasons for these differences.

The recent excavations in Bolca (Pesciara and Monte Postale), carried out thanks to financing from the Veneto Region, the Municipality of Verona and, beginning in 2006 from the L.R. n. 730.06.06, will continue to play a role in the promotion of paleontology and, in close collaboration with the local Fossil Museum, offer an important educational opportunity in the area. In particular, the new excavations and research along with the didactic activities carried out should lead to a significant increase in scientific knowledge and bring important benefits to the local community. For the future, it will be important to design and realize models that come to fruition and infrastructures for the development and valorisation of the geological and paleontological heritage of Bolca.

◀ Cleaning and restoration of a vegetal fossil fragment found in the recent tunnel excavations.

CERATO: THE ART OF EX- TRACTING FOSSILS FOR 6 GENERATIONS



THE EXISTENCE OF THE BOLCA FOSSILS HAS BEEN KNOWN FOR A LONG TIME, YET WE DO NOT KNOW WHEN THE FOSSIL DEPOSIT WAS FIRST DISCOVERED.

7. nearly 500 years of documented history



The earliest certain references to the site can be found in a document from 1555 in which the Sienese doctor Andrea Mattioli wrote: ".... I recall in addition that Signor Don Diego Urtado di Mendoza, oratore Cesareo, who at that time was in Venice, showed me some stone slabs brought there from the Veronese area containing (when split in half) various species of fish sculpted with every detail transformed in stone ...". Because these were objects present in a private collection, we can assume that the petrified fish of Bolca had been known for some time to enthusiasts, even beyond the Val d'Alpone. In addition, dating to 1571 is the important collection of the Veronese pharmacist Francesco Calzolari who exhibited some fish from Bolca amongst the various materials in his museum (the first known naturalistic museum in the world). One of the exemplars, with a distinctive oval shape, is still preserved in the Museo Civico di Storia Naturale in Verona. Although knowledge of these fossils dates to classical antiquity, they only acquired their modern significance in the seventeenth century when, once their organic origins were recognized, they were identified as remains of organisms that had

lived in the past.

At the end of the eighteenth century the Marquis Scipione Maffei,^{*} his secretary Jean Francois Seguiet, and the archpriest of Grezzana (Verona), Gian Giacomo Spada, showed great interest in the Bolca fossils which led to the definitive recognition and awareness of the deposit.

During the same period, Count Giovanbattista Gazola gathered an extraordinary collection of fossils that Serafino Volta illustrated in the excellent monograph, *Ittiolitologia Veronese*, begun in 1789 and considered the first important work on fossil fish published in the world. The notoriety of the Bolca fossils spread quickly, even abroad, leading Napoleon Bonaparte to requisition the Gazola collection, rich with more than 1200 ittiolites (stone fish), to transfer it to Paris. It was in this period that the Cerato family, which had immigrated from the Altopiano dei Sette Comuni, rented the "Maffei Quarry" or "lastrara", the future *Pessàra*, from Maffei in order to extract the fossils. More precisely, in 1843 the Gazola family entrusted Giuseppe Cerato to undertake the excavations.

Positioning the flat extremity ▲
of the scalpel parallel to the stratification
facilitates the opening of the layers.

For six generations, the Cerato family ▲
has been extracting fossils. Their name is thus
linked forever to the history of Bolca.

Massimiliano Cerato in the modern ▲
restoration laboratory within the Fossil Museum.



From this moment, and for some six generations, the Cerato family has passed down the extraordinary ability to extract fossils which, over time, has become a true art.

In fact, for more than 200 years the Cerato family has been involved in the patient, difficult, but equally exciting work of extracting the fossil remains from Bolca and, in particular, Pesciara. This is tiring work that requires a particular kind of excavation technique involving the separation of the various calcareous plates that hold the remains of the fossilized organisms. In the processes of extraction, research, and restoration of the fossils, the Ceratos have always been specialized professionals as well as the most knowledgeable connoisseurs in the territory. Their particular ability also derives from an oral tradition within the family that has endured for generations.



- ▲ The restoration of paleontological material from the recent excavations in Bolca is carried out by Massimo and Erminio Cerato.
- ▲ The exhibition, "Monte Bolca: die versteinerte lagune", installed in 2007 during Mineralientage Munchen (Germany).
- ▲ The fossil-containing stone slabs that break during excavation or opening are recomposed using special glues.
- ◀ Restoration of a rare exemplar of *Pygaeus* found in Pesciara during the 2010 excavations. No protective substance is applied to the fish and plant fossils.



megalitismo

studi

calchi - sepolture

8. the importance to the world of the Bolca paleontological collections

The Bolca fossils constitute a scientific and cultural heritage of global importance; in fact, they are present in museums and private collections around the world. The largest collection is that of the Museo Civico di Storia Naturale in Verona, which has gathered the historically important private collections from the city and conserves, on behalf of the Italian state, the numerous and important paleontological finds of recent decades. There are nearly 700 exemplars, chosen from the rarest and most significant of the more than 9000 held in Verona, on view in the civic museum and in that of Bolca.

Among the other institutions with significant collections of Bolca fossils are the Muséum National d'Histoire Naturelle in Paris, the Dipartimento di Geologia e Paleontologia at the University of Padua, the British Museum in London, the Carnegie Museum in Pittsburg (USA), and many more.

Also numerous are the scholars who for more than thirty years have formed scientific collaborations with the Museo Civico di Storia Naturale in Verona in order to study the historical and modern paleontological collections from Bolca. In fact, there is great interest in the important material from the recent excavations which continue to bring new fauna to light.



- ▲ The exhibition, "I Fossili di Bolca - Nuovi tesori dalle rocce", installed during the Salone Beni Culturali - Verona, November 2008.
- ▲ The exhibition, "Monte Bolca: die versteinerte lagune", installed in Munich in 2007.
- ▲ The exhibition, "Meraviglie del mare: origine ed evoluzione dei pesci", installed in Modena in November 2006.
- ◀ The Museo Civico di Storia Naturale in Verona holds the most important collection of paleontological finds from Bolca.

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Cerato family

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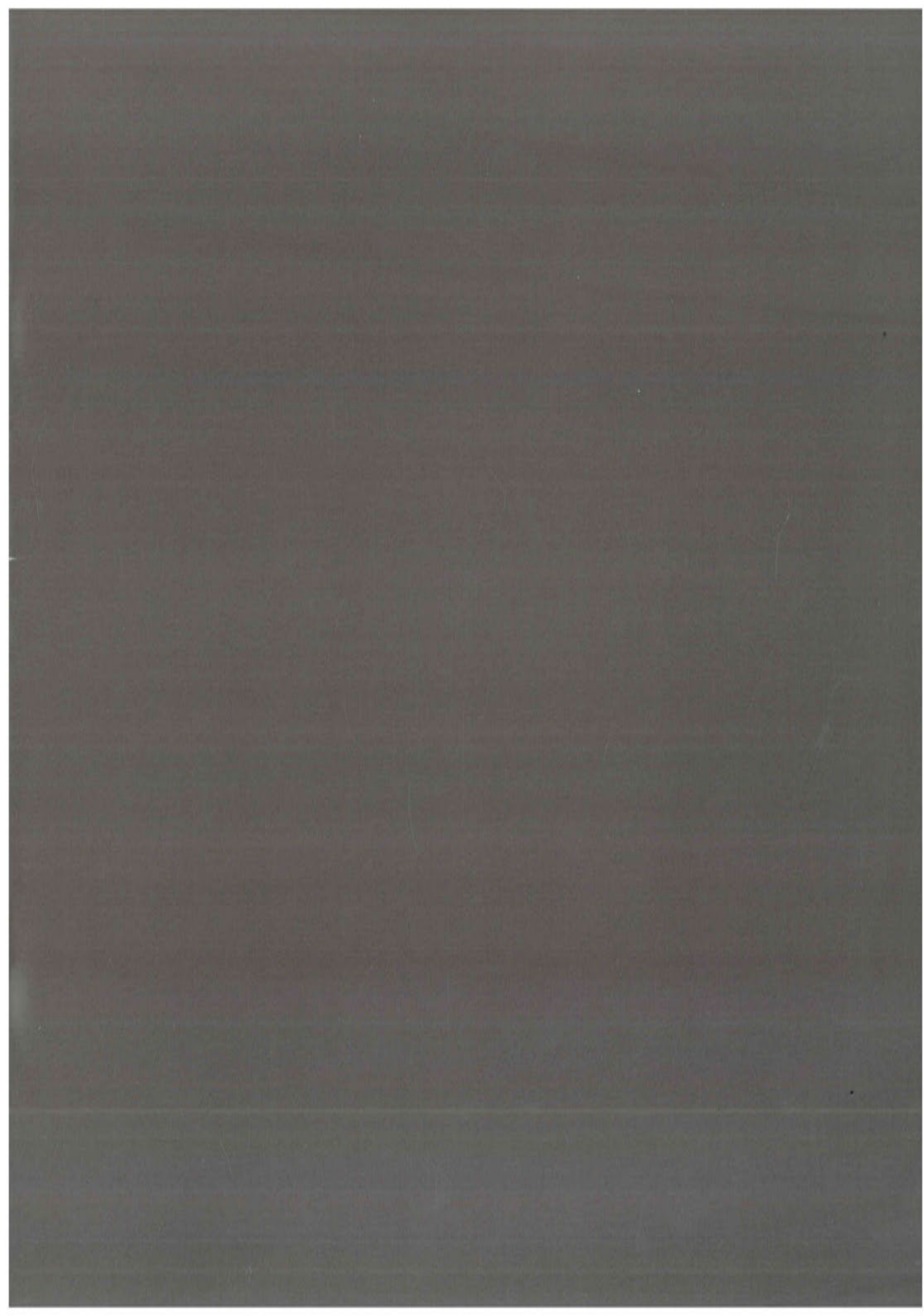
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