



Exposition

# The Ichthyosaur ... and more

Fossils and rocks provide information on the ancient environment where organisms used to live. The Ichthyosaur remains found on Monte Seceda were yielded by the Buchenstein Formation, Early Ladinian age, Middle Triassic, 240 million years. To better understand its original habitat, we have considered data provided by other approximately coeval fossil-bearing sites of the same unit: in particular, the fish site on the Grigna Settentrionale, Lombardy. We gained a wider view of the marine environment dwelled by our ichthyosaur, as well as a glimpse of the surrounding land, covered with lush vegetation. During the Ladinian the area we now call Dolomites was affected by intense volcanic activity, proved by lavas outcropping on Monte Seceda. At the time, the lavas flowed onto the bottom of a few hundred meters deep marine basin. While fossils can surely not be found in lavas, it is not uncommon to find beautiful crystals instead: these rocks on Alpe di Siusi yield geodes, small voids completely covered with crystals. On the basis of all the gathered information, we can picture that the Ladinian landscape appeared like a shallow water sea dotted with small islands: the Odle carbonate platform, now expressed by the Sciliar Dolostone. A very steep slope led from the platform to the bottom of the fairly deep basin where dark carbonate sediments deposited. These latter now form the calcareous, dark, often cherty, well stratified rocks of the Buchenstein Formation. Clearly visible today under the cross atop the Seceda, these rocks are overlain by the volcanic products outcropping just south of the gondola top station, as well as below 'Sella Cuca' along the ski track leading down to Ortisei.

## The Climbing Ichthyosaur

Despite its fragmentary body, the value of the Seceda ichthyosaur is really immeasurable! Ichthyosaurs were among the first marine reptiles to appear after the dramatic biological crisis that hit the Earth 252 million years ago. This global event is used as a marker to separate the Paleozoic from the Mesozoic era (or the Permian, the last Paleozoic period, from the Triassic, the first Mesozoic period). Ichthyosaurs were fairly abundant across a few million years, but they suffered an abrupt and drastic reduction around 240 million years ago (Lower Ladinian). So drastic, in fact, that this specimen is so far unique! Nonetheless, these huge animals were probably the best swimmers among the marine reptiles that conquered the Triassic oceans. Thus, after the momentary crisis, they had a new evolutionary radiation a few million years later (Late Ladinian). The fragmentary remains make a precise determination very difficult, but R. Motani – a major specialist for Triassic ichthyosaurs – believes they can be ascribed to the shastasaurids, a rather primitive group characterized by an elongate body and by the snake-like swimming.

## Grigna Settentrionale and its Fossil Fishes

The paleogeographic setting in the area of the Grigna Settentrionale (also called Grignone – Lecco – Lombardy) was pretty much the same as in the Odle-Seceda. Here the Buchenstein Formation has yielded a rich fish fauna alongside some crustaceans, plant remains, and a beautiful starfish. Saurichthys is among the most commonly

found fossil fishes. Up to 150 cm long, it was a large predatory fish similar to the modern Barracuda. Be as it may, there is evidence to suggest it was in turn preyed upon by a larger animal; specimens lacking part of the body, and others showing their skull smashed were in fact collected. We think the responsible may well be an ichthyosaur like the one found on the Seceda, but, unfortunately, we have not so far discovered any ichthyosaur remains on the Grignone. Also commonly found is *Ctenognathichthys* - a fish whose teeth were apt to pick little preys up from the sea floor - as well as the tiny *Placopleurus* and *Peltopleurus*. Isolated scales of these small fishes were also collected on the Seceda. The rich variety of benthonic (dwelling on the sea bed) organisms - shrimps, other crustaceans, the starfish, molluscs - suggest the shallow sea was thriving with life. In the superficial waters along the coasts, many kinds of fish, no matter their size, and the huge ichthyosaurs found their habitat. The rock unit representing the ancient carbonate platform is called Esino Limestone in Lombardy, and Sciliar Dolostone in the Dolomites. Yielding remains of terrestrial plants, mostly araucaria-like conifers, it proves the existence of isles that were lush with vegetation.

## Alpe di Siusi: Lavas, Crystals and Fossils

The Ladinian period also saw a massive volcanic activity involving the entire Southern Calcareous Alps, from Lombardy to Friuli, and reaching its peak during Late Ladinian in the Fassa Valley area. Nonetheless, big volcanic events are recorded as early as during the Buchenstein Formation

deposition in the form of submarine effusions and scattering of huge ash volumes from subaerial volcanoes. The wide Alpe di Siusi plateau is largely made up of the very dark, mafic lavas; the volcanic products reached the area of the Seceda, filling up the basin lying between the Odle and the Sassolungo-Sassopiatto groups. Inside lavas there are geodes, small cavities where circulating fluids deposited beautifully perfect, multicolored crystals. On the plateau some fossil-bearing beds are intercalated to volcanic units (from submarine volcanism): they are named 'Tufi a Pachicardie' after the very abundant bivalves contained. This unit, just a few million years younger than the Buchenstein Formation, shows rich fossil associations of the faunas colonizing the volcanic sands on the seabed of the carbonate platform margin. They subsequently somehow slid into the basin together with the sediment. These associations are missing or very scarcely found in the Buchenstein Formation, that mostly yields fishes and ammonoids, whose habitat was the basin waters. Hence the 'Tufi a Pachicardie' help us understand what the ecology on the platform margin was possibly like at the time of the Buchenstein deposition.