

GENERAL SCIENCE NOTES

UNUSUAL FOSSILS FROM A MOUNTAINTOP*

Harold G. Coffin
Geoscience Research Institute

What are sea bottom animals doing 8000 ft. high in the mountains of British Columbia, Canada? When the sheets of rock are split apart, outlines of unusual animals are seen on the surfaces of the slabs. The imprints are so clear that even the soft parts are visible, like small x-ray films.

The array of animals that has come to light high on the mountains in Yoho National Park, eastern British Columbia, are strange. A marine biologist, if confronted with these animals in a modern ocean, would recognize almost nothing, many creatures would be unfamiliar. There in the distance would be an animal with long arms sporting large pinchers. But the body and mouth are very different from that of a crab. *Anomalocaris* could be the largest Cambrian animal — nearly a yard long. And here is a nondescript creature with worm-like legs and sticks on its back. Whoever first described it thought it so bizarre that he named it *Hallucigenia*! Another animal attracts attention by its wineglass shape. Various crab and shrimp-like creatures (but significantly different from modern crabs and shrimp) are swimming around. Further observation, and exploration in the muddy bottom reveal many others unfamiliar creatures.

The rocks in which these creatures are buried are considered Middle Cambrian, 540,000,000 years ago according to the evolutionary time scale. Early in the 20th century, Dr. Charles Walcott discovered the main quarry while riding a horse over the mountain pass. Major excavations were carried on from 1909 to 1914, and again in 1966 and 1967. More recently as the uniqueness of these fossils has become better understood, more exploration and digging has been done.

Dr. Walcott placed the animals into modern classification units. Consequently their strangeness was overlooked until recently when restudy of the Burgess Shale fossils has surprised researchers by their unusual body types. Not only are they new species but some of them even are new phyla. Others are new classes and orders. Major new classifications have had to be created to accommodate them.

*Updated October 1999

According to the theory of evolution, living organisms have changed gradually over millions of years. Finding such unusual sea animals in the Cambrian might appear to support this theory. But there are two major problems. According to the theory of evolution, life started out with one or only a few simple forms. Living organisms that were buried and preserved as fossils back in the Middle Cambrian should be a few simple types if the theory of evolution is correct. That is not what paleontologists are finding. Although there are more species of animals and plants living today, Cambrian fossils, including these in Burgess Shale, represent a greater variety of basic body forms. We thus have to conclude that in the prediction, based on the theory of Evolution, that life started out with one or a few simple forms is not born out by the fossils of the Burgess Shale. Evolution has not been increasing the major categories of organisms. They were more numerous in the past than now.

Secondly, these dwellers in the Cambrian seas were anything but simple. They are just as complex as their nearest modern relatives if they have any modern relatives. Those that are new cannot be considered simple any more than modern crabs, worms, starfish, etc. can be called simple. This also is contrary to the predictions from the theory of evolution. These animals from the Middle Cambrian should be more simple than modern sea animals but they are not. Where are the simple ancestors that should have led up to the complexity of modern organisms? They are not found in the Burgess Shale. Nor can they be found in rocks considered older than the Burgess shale.

Modern sea bottom animals burrow through the mud, or reside in a hole in the bottom sediments. This movement and digging in the bottom sand and mud causes disturbance to the sediments (bioturbation). It is a common feature of modern ocean bottom sediments and also can be seen in many sediments deposited in the past that have now hardened to rock. The Burgess Shale contains no bioturbation. Apparently the organisms were dead when they were buried. And the burial must have been rapid enough to prevent decay. The usual explanation for this situation is that the animals fell (were washed) into a basin of water low in oxygen where they quickly died and were preserved without decay. Recent research suggests that this is not a satisfactory answer. Note this quotation: "Soft-bodied organisms must be protected from the attention of scavengers; this usually comes about through a lack of oxygen or by rapid burial. Although anaerobic [devoid of oxygen] conditions may eliminate scavengers, they do not prevent decay. Indeed, anaerobic decay is the norm, and can consume soft tissues in a few weeks" (Allison 1998).

Organisms similar to the Burgess Shale animals, are being found in other parts of the world. Thus these fossils in British Columbia are not an isolated situation but are part of a cosmopolitan array of great variety and complexity. The picture emerging clearly fits better into a Creation/Catastrophism model than into an Evolution/Uniformitarian model.



Looking down from the Walcott Quarry high to Emerald Lake over 3000 feet below.



Snow bank in the Walcott Quarry high on the mountains of British Columbia, Canada.

Trilobites are numerous from the Burgess Shale of Mt. Stephen.



Ottoia, a priapulid worm, one of many interesting sea bottom creatures found in this location.

