

LITERATURE REVIEWS

Readers are invited to submit reviews of current literature relating to origins. Mailing address: ORIGINS, Geoscience Research Institute, 11060 Campus St., Loma Linda, California 92350 USA. The Institute does not distribute the publications reviewed; please contact the publisher directly.

BURGESS SHALE RE-EXAMINED

WONDERFUL LIFE. 1989. Stephen Jay Gould. NY and London: W.W. Norton and Co. 347 p., 118 illustrations. Cloth, \$19.95.

*Reviewed by R. H. Brown and Harold G. Coffin,
Geoscience Research Institute*

In 1909, Charles Walcott, a well-known scientist, discovered a most unusual Middle Cambrian fossil site about 3500 ft above Emerald lake in Yoho National Park, British Columbia, Canada. During several summers of work, he and his assistants extracted thousands of fossils that served as a basis for several scientific papers. In the last twenty years, renewed research on these fossils has been conducted by several paleontologists, including Harry B. Whittington of Cambridge University and two of his students, Simon Conway Morris and Derek Briggs. Their careful work has revealed a spectacular army of unusual animals so different from any that now exist that more than a dozen new phyla have been erected to classify them. Walcott's quarry has now been declared a "world heritage" site and no collecting is permitted. Indeed, no one may visit the site without an accompanying park warden.

Gould's volume is devoted to telling, in popular form, the exciting story of the rediscovery of the Burgess Shale animals, the significance of these unusual forms, and the reasons why their uniqueness and significance were not recognized by Walcott. Gould considers the Burgess Shale fossil location the most important in the world, a view that will have few challengers. Gould sees in the Burgess shale organisms remarkable confirmation of his innovative view of evolutionary progress. He challenges the conventional model of steady evolutionary development from the simplest beginning to continually more complex and more diversified organisms. He defends the view that fossils record a rapid development (sudden appearance) of a wide range

of diverse types of complex marine organisms from four Cambrian types which survived by chance.

Although Gould gives lip service to natural selection, he considers the survival of a few kinds and the extinction of many others a random process. He thinks that if the tape of life could be rewound and allowed to play again, many different scenarios would be the result. The chances of the same sequence of evolutionary development that led eventually to humans would be most unlikely. On page 14 of the Preface the author says that

...the 'pageant' of evolution [is] a staggeringly improbable series of events...utterly unpredictable and quite unrepeatable ...the chance becomes vanishingly small that anything like human intelligence would grace the replay [of this pageant].

Chapter I is an introduction to the Burgess Shale fossils and their significance. Several surprising statements are included in this chapter. An example:

The familiar iconographies of evolution are all directed — sometimes crudely, sometimes subtly — toward reinforcing a comfortable view of human inevitability and superiority (p 28).

Regarding the conventional, and still majority, view of gradual evolution, Gould says:

I cannot understand our continued allegiance to the manifestly false iconographies of ladder [continued progress through time] and cone [predictable development to greater complexity and increasing diversity] except as a desperate finger in the dike of cosmically justified hope and arrogance (p 45).

Some unnecessary and unwarranted arm waving and exaggerations to support a point are also present. Note these examples:

Darwin has been vindicated by a rich Precambrian record, all discovered in the past thirty years (p 57).

... the Burgess Shale provides our sole vista upon the inception of modern life in all its fullness (p 56).

The richness of Precambrian fossils is certainly debatable and many other outstanding Cambrian fossil sites are known.

Those who have climbed to the Walcott quarry may disagree with Gould's downplay of the effort needed to reach it:

The climb [to the Walcott quarry] has some steep moments, but it qualifies as little more than a pleasant stroll, even for

yours truly, overweight, out of shape, and used to life at sea level (p 68).

Perhaps the excitement of the scenery and the mystery of a look into the past have helped erase from his mind the exertion needed for what would surely be classified as strenuous for anyone except those in excellent physical condition for climbing. The trail from Takakkaw Falls to the Walcott quarry is not four miles (as stated on p 68) but over six miles and with a 2700 ft rise in elevation. The fastest way out is a 3500 ft drop in three miles to Emerald Lake.

Chapter II presents the enigmas of conventional geochronology. As conventionally interpreted, the geologic record does not provide “a tale of predicable progress: prokaryote first, then eukaryotes, then multicellular life.” Rather, it presents two disturbing questions:

Why did life remain at stage 1 for two-thirds of its history if complexity offers such benefits? Why did the origin of multicellular life proceed as a short pulse through three radically different faunas, rather than as a slow and continuous rise of complexity? (p 60; see also p 56).

According to Gould, with far fewer species than now exist, the Burgess Shale quarry

...contains a disparity in anatomical design far exceeding the modern range throughout the world! (p 62).

Chapter III contains 161 of the 323 pages of text in the book. It presents the scientific analysis on which the radical shift in Gould’s thinking is based, and gives an intriguing story of the repeated role of bias in science. According to the dominant evolutionary thinking for over 70 years, the Burgess Shale fossils

...represent the primitive ancestors of nearly every class of arthropod as well as several other animal Phyla (Y. O. Fortier quote on p 114).

From the new perspective, “disparity reached its peak at the outset and...life’s subsequent history has been a tale of decimation, not increasing variety in design” (p 120); and “the watchword for the Burgess arthropods was ‘uniquely specialized,’ not ‘primitively simple’” (p 176).

Gould asks two major questions: How could the Burgess diversity have developed (evolved) so quickly? (p 227); and Why, of some 25 basic body plans in Burgess arthropods, did only four become enormously successful, including the dominant animals of our world

today, and all the others die out without issue? (p 238). Without answering the first question, Gould devotes major attention to the second. It is remarkable for an aggressive, deeply committed evolutionist to conclude his analysis stating:

...we have no evidence that the winners [among the Burgess organisms] enjoyed adaptive superiority, or that a contemporary handicapper could have designated the survivors. All that we have learned from the finest and most detailed anatomical monographs in twentieth-century paleontology portrays the Burgess losers as adequately specialized and eminently capable (p 239).

Chapter IV is a study of the man who developed the Burgess Shale Quarry and is responsible for the interpretation of Burgess Shale fossils that has been promoted from the scientific community until the last decade. Charles Walcott was a devout Presbyterian, an ardent theistic evolutionist, and distinguished director of the Smithsonian Institution for twenty years until his death in 1927. In this chapter Gould forcefully points out how evolutionary models have represented “a philosophy of life, not the empirical record of organisms” (p 269).

Gould categorizes Walcott’s interpretation of the Burgess fossils as the finest

...illustration of the most important message taught by the history of science: the subtle and inevitable hold that theory exerts upon data and observation. Reality does not speak to us objectively, and no scientist can be free from constraints of psyche and society. The greatest impediment to scientific innovation is usually conceptual lock, not a factual lack (p 276).

It seems that this statement applies just as much to Gould’s concept of evolution as it does to Walcott’s. The sudden diversity of Burgess Shale organisms could easily be interpreted as suggesting their separate creation, but this possibility is not even considered by Gould.

The extended discussion of Walcott as a person, his view of evolution, his attempt to ‘shoehorn’ all the Burgess Shale animals into the modern classification, and his subsequent failure to complete the study of the fossils he collected make an interesting contribution to the history of American paleontology. However, Gould may be too severe concerning Walcott’s rigidity in classification. Hindsight is always better than foresight. Considering the orthodoxy of evolutionary thinking that

dominated in Walcott's time, he did what one might expect. Furthermore, the crowding out of research by administrative responsibilities is an easily understandable problem that many can sympathize with. Among many responsibilities he was director of the U. S. Geological Survey, and head of the Smithsonian Institution. In the perspective of time, we may surmise that his greatest contribution to science was in the work he did aside from his study of the Burgess Shale fossils. His impact on science as an administrator in some of the major science institutions of the nation must not be underrated.

The final chapter, V, presents speculations which attempt to explain an evolutionary transition from the world of the Burgess Shale fossil organisms to the world of modern organisms. For many readers this chapter will be noted for multiplication of words, and will suffer in contrast with the stimulating prose of the previous four chapters. But it contains many choice and stimulating statements. For example, on page 307 the author says:

I also strongly suspect that in a great majority of cases, the traits that enhance survival during an extinction do so in ways that are incidental and unrelated to the causes of their evolution in the first place.

Accordingly,

Unpredictability must rule if geological longevity depends upon lucky side consequences of features evolved for other reasons (p 308).

Although written by an outstanding and committed evolutionist, this book fosters the conviction that one must believe in "evolution" without any reasonable model for that belief; that despite this crucial lack such belief must be held if one is unwilling to accept any other explanation for our origin. Readers of this review should recognize that a committed evolutionist will make somewhat different assessments from those which have been developed from our viewpoints.

The book combines interesting narrative, careful research and even suspense (the labored philosophy of Chapter V excepted). Furthermore, it presents a picture largely consistent with the origin of life by sudden creation (although Gould did not have this intention when he wrote it). We highly recommend its reading.