

## Geologic Time and Life of the Past

High up in the land of Svithjod, there stands a rock. It is a hundred miles high and a hundred miles wide. Once every thousand years a little bird comes to sharpen its beak.

When the rock has thus been worn away, then a single day of eternity will have gone by.

—Hendrik van LOON: THE STORY OF MANKIND

The concept of the enormity of geologic time is a relatively new one in the western world. In fact, if one were to ask a geologist what has been the unique contribution of his science to our understanding of the universe, he might find it difficult to give a single answer. It would be a great temptation to select the facet of the science which is his chief concern, and to say that his specialty outshines the others. Viewed dispassionately, however, a consensus probably could be reached that perhaps the distinctive contribution of geology is an appreciation of the enormous length of the river of time that recedes into the darkness of the past. Unfortunately—or perhaps it is just as well—we have so limited a consciousness of how vast this parade of years is that it is as incomprehensible to us as are the limitless dimensions of space.

Some of our ancestors worried about the duration of past ages; others apparently were not at all concerned. The Hindus thought the world had an age of 2 billion years (this was the seventh part of a great cycle of 4.32 billion years,

which was to be the entire universe—or one “day” in the life of Brahma)—quite a commendable effort in estimating the length of past time, especially when compared with early opinions in western Europe. There, even as late as the seventeenth century, a widely accepted belief was that the Earth was created in the year 4004 B.C. This was a figure worked out by Archbishop Ussher (1581-1656) of the Irish Protestant Church who arrived at this value by adding up the genealogies recorded in the Old Testament and setting up a system of dates based on the length of each generation.

With the emergence of geology as a science, men became aware that a tremendous length of time was needed to accomplish the changes they recognized as having occurred. The deposition of sedimentary rocks is an example. When it was acknowledged that these strata were layers that had accumulated one by one, then if we know the rate at which such sediments were deposited, as well as their total thickness, we would then have an approximate measure of the length of time erosion and deposition had operated on the surface of the Earth.

Unfortunately, there are a number of things wrong with such a direct approach. No one knew then—or now, for that matter—the rate at which sediments are deposited. Obviously, it must be different for a conglomerate made of

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*Fremontia fremonti* (Walcott), a trilobite from the Lower Cambrian Latham Shale, Marble Mountains, Cadiz, California. Length, 4½ inches. (Photograph by Takeo Susuki.)