

The Earth As It Is

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GEOLOGY ILLUSTRATED

By John S. Shelton

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The reviewer is assistant professor of physics at Walla Walla College, College Place, Washington. He received the doctor of philosophy degree (1968) in physics from Stanford University.

Shelton's book, "addressed to thoughtful and observant people who enjoy the outdoors," is serious, but it is simple enough to be appreciated by a wide range of readers. It is easy and enjoyable to peruse; yet spontaneously one will want to study it slowly in many places to absorb its full impact.

The book owes much of its digestibility to the splendid illustrations that occupy nearly half of its total space. Particularly stunning are the examples of medial moraines on the Greenland icecap outflow and of zigzag ridges in the Pennsylvania Appalachians. The author is an aerial photographer as well as a geologist, and he uses many pictures he himself has taken specifically in order to demonstrate the point at hand.

Shelton is good about presenting the physical evidence, independently of the theories, and encouraging the reader to draw his own conclusions.

The discussion of the Spokane Flood and its relation to glaciation seems particularly enlightening. Perhaps this portion appeals to me because I have seen this part of the country for the first time only recently and the local topography seems new and strange. The "channeled scablands" that have been eroded across the Columbia River basalt flows must represent one of the most violent floods that has ever taken place on the earth. The multiple channels separating and reconnecting in braided flow, some twenty miles wide; the twenty-foot boulders moved fifty miles; the "ripple marks" that are hundreds of feet from crest to crest — all indicate a rate of flow far greater than anything seen in modern times. This flood must have occurred sufficiently later than the lava flows so that a blanket of fine windblown deposits (over a hundred feet thick in places) could be laid in the intervening time. Also, there is a natural explanation for this flood in the emptying of glacial Lake Missoula, which was formed when the Pleistocene ice advance blocked the Clark Fork River.

The Spokane Flood discussion illustrates a point that is often forgotten by those who criticize the inadequacies of what they think is uniformitarianism. The principle does *not* say that all things have always happened in the same way and at the same rate as at the present time. Rather, it says that the same basic physical laws have always applied; and the operation of these laws will actually bring about catastrophic events from time to time. Thus the knowledgeable uniformitarian by no means rejects catastrophism; he only sees it as arising from natural causes rather than from supernatural intervention.

Another point that stands out in a consideration of the Spokane Flood is the contrast between it and the Grand Canyon of the Colorado River. The latter needs to have been cut slowly in order to have its present form. Those who would attribute

the Grand Canyon to the receding waters of a Noachian Flood must explain how a sufficient amount of water to create the canyon could pass through in a very short time and yet be confined to a single channel. Instead, it ought to have spread out over the surrounding plateaus in braided flow.

My overall reaction to Shelton's book is one of delight, and I am emboldened in my enthusiasm by noting the favorable reviews that have appeared in *Science*, *Geotimes*, and *Scientific American*. *Geology Illustrated* should be a useful book to all who are interested in studying for themselves the important evidence preserved in the earth's surface about its history.