

Hydrograph

limestone cliffs. If such cliffs are the result of continuous slow erosion over hundreds of thousands of years, we might expect a progressive increase in the decomposition of talus on the benches away from cliffs. Such boulder aging has not been demonstrated. Instead, we see shale benches which appear to have been swept clean of larger rocks by large flooding. Then after significant flood modification, a recent talus has accumulated.

When I favored the antecedent river and precocious gully theories, I had the problem of explaining where the products of 70 million years of river erosion went. I could not find appropriate erosional or depositional features to the west or east of the Grand Canyon which would have been produced by the long-continued action of the primeval Colorado River, and I knew that such incessant river action would erode and deposit one million cubic miles of material. With the catastrophic drainage theory there is no requirement for the Colorado River to erode for tens of millions of years because the river only needs to be thousands of years old. The lack of features which would be produced by an old river is an argument for a young river. The vast erosion off the plateaus could be produced by sheet flooding when the flood water retreated off the plateaus. It would have removed the sediment far from the plateaus. We would expect no stream deposits adjacent to the plateau. Then, after the Kaibab Upwarp occurred, impounded water behind the plateau was released by catastrophic breaching and drainage. The Grand Canyon and the establishment of the Colorado River through northern Arizona would be very recent geologic features. This explains why the products of the Colorado River's erosion and sedimentation are confined to near-surface sedimentary layers.

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CONCLUSION

There will need to be more investigations of how the Grand Canyon was eroded. The notion that the Colorado River carved the canyon, as the antecedent river theory assumes, over millions of years is untenable and now recognized so by most geologists. The concept of Grand Canyon erosion from stream capture by enlargement of a gully involves an accident of incredible improbability. The explanation of recent erosion of the canyon in association with catastrophic drainage from a great flood seems to integrate and coordinate a great number of facts in believable fashion. I found that the statements of Scripture provide an acceptable framework for interpreting the erosion of the Grand Canyon.

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Gould*

BIBLIOGRAPHY ON GRAND CANYON EROSION

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(Review of the catastrophic drainage legend of the Havasupai who live in the Grand Canyon.)

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(Analysis of blocked and breached drainage of the North Fork of the Toutle River which has a miniature "Grand Canyon" formed by catastrophic erosion since 1980.)