

tions, from all possible sources, to help the public separate those of merit from wild claims made by charlatans. Roger N. Hunter, a geophysicist with the Service, says that "because wrong predictions tend to be forgotten, the result of a correct prediction could be instant fame and a great deal of harmful public credulity."

Predictions are given a score based on the amount of information that has been given correctly, and the score is analyzed for its probability based on the usual seismic activity in an area. So far 171 predictions from 32 authors have been recorded, but Hunter says that none achieved a "high enough rating to merit any sort of consideration."

Predictions for the file are being gathered from standard scientific sources as well as from newspapers, reports of psychic visions and private submissions by letter. Predictions can be sent to Roger Hunter, USGS National Earthquake Information Service, Mail Stop 968, Box 25046, Denver Federal Center, Denver, Colo., 80225. "One thing which will not be considered," Hunter says, however, "is a prediction which is only made known after the fact."

* * * * *

Last week NBC-TV aired a story on its nightly television news in which one Henry C. Minturn claimed to have successfully predicted several earthquakes and said that one will hit Southern California on Dec. 20. As a result of the broadcast residents were flooding government and university offices with anxious telephone calls.

Science writer George Alexander examined Minturn's claims and credentials more carefully for an article in the Dec. 5 Los Angeles Times. He found little cause for alarm:

- The only credentials of expertise that Alexander could establish for Minturn were that he had worked as a technical assistant in the geophysical-oil exploration field more than a decade ago.

- The theory on which his predictions are based—that the moon's motion triggers quakes—is an old one that has been tested extensively and unsuccessfully for years by established scientists.

- The data for his predictions reportedly come from a maintenance mechanic, an amateur astronomer who gathers the data from various magazines.

- Minturn is rather cavalier about the size and exact location of his predicted quakes. Of being off his target by 2,400 miles, he is quoted as saying "we hit it right on the nose." At that rate the "Southern California" quake might hit Alaska. He has also predicted a quake—without specifying the size—for the Solomon Islands on Dec. 19. The Solomons experience quakes of magnitude 3.75 or greater on the average of three per day.

- He hopes to be hired as an earthquake predictor for "a simple living . . . something like \$34,000 per annum." □

Iapetus Ocean: History of opening

In the mobile world of plate tectonics, earth scientists know that before the ancient continental mass split 200 million years ago and the Atlantic began opening to its present width, there was a previous sequence of ocean opening and closing along nearly coincident boundaries. During that time the Appalachian Mountains were born, and in 1970 geologists John F. Dewey and John M. Bird showed how the Appalachians contain traces of all the units of that early ocean's floor (SN: 8/15/70, p. 145).

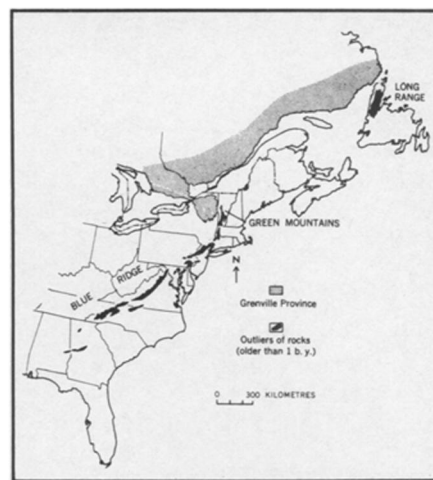
Despite obliteration of much of the evidence by the present cycle of opening, geologists have continued to accumulate a record of the opening and closing of that proto-Atlantic ocean. To avoid confusion with the present Atlantic, it is often termed the Iapetus Ocean.

One of the geologists deciphering that record, Douglas W. Rankin of the U.S. Geological Survey in Reston, Va., last year published in the *AMERICAN JOURNAL OF SCIENCE* (275-A:298) an extensive report outlining evidence from the southern Appalachians of the early episode of rifting. He also showed that the later suturing of the two continental plates left what he termed "some rather startlingly large pieces of the African plate" thrust onto the North American plate. These pieces of Africa, he says, form the modern Piedmont province, along the eastern flank of the Appalachians in Maryland, Virginia and North Carolina.

Now Rankin reports a further unraveling of the mysteries of the late Precambrian continental breakup and opening of the Iapetus Ocean. They concern a series of pronounced bends in the Appalachian structure that have long attracted geologists' attention.

In the Nov. 10 *JOURNAL OF GEOPHYSICAL RESEARCH*, Rankin reports evidence that these bends in the Appalachians are inherited from the initial breakup of a continental mass beginning about 820 million years ago. The evidence indicates, he says, that the breakup occurred at the intersection of rift valleys radiating from what earth scientists call triple junctions—the point at which three crustal plates intersect—at the start of the opening of the Iapetus Ocean.

Rankin suggests that the western margin of a major rift system coincides roughly with the trace of axes of ancient Precambrian rock extending from Tennessee to Newfoundland. He calls this the Blue-Green-Long axis, for the Blue Ridge Mountains, the Green Mountains of Vermont and the Long Range of Newfoundland. The rift system east of this axis, Rankin says, probably did not open far enough to produce significant ocean crust but was an initial stage in the opening of an ocean basin ultimately located still farther east.



Blue-Green-Long axis: Old rift margin.

From composition of the rocks along this axis, Rankin has identified five major bends in Appalachian structural trends that are candidates for former triple junctions generated by hot plumes in the mantle beneath them. Of these five bends, two are in southwestern Virginia (one near Mt. Rogers and one near Roanoke), one in Pennsylvania, one in southeastern New York near New York City, and one in southern Quebec.

These five bends are all potential sites of past triple junctions, Rankin says, and the two convex ones, near Roanoke and near New York City, are triple junctions whose failed arms have been carried away.

Rankin concludes by noting the persistence through time of zones of weakness. Not only are the histories of the opening of the Iapetus and the Atlantic similar; so are the geometries and locations. "The incipient opening of the present Atlantic was essentially parallel to and nearly coincident with the incipient opening of the Iapetus," says Rankin. "In fact some of the same fracture zones may have been involved in both openings." □

Alcoholism: A biochemical marker

Although alcoholism has been defined by many criteria (physiological, clinical, behavioral, psychological, attitudinal), a universally accepted, practical definition has been woefully lacking. Now a team of biomedical researchers at the Bronx (N.Y.) Veterans Administration Hospital has produced a biochemical marker. They believe that it will provide a means of detecting and treating alcoholism early as well as of objectively evaluating the success of different treatments.

A few months ago, two of the researchers, Spencer Shaw and Charles S. Lieber, observed an alteration in the con-