disconcerting: in a changing environment, scientists share the general human need for fixed points of reference like *up* and *north*. So perhaps it is not surprising that the idea of polarity reversals was forced upon the geophysicist by observations and did not spring from theory.

The first evidence came from paleomagnetism. Working on lava flows several million years old or less in France, Japan, and Iceland, early paleomagnetists found that only half of the flows were magnetized in a northerly direction; the other half were magnetized in exactly the opposite direction. Having the courage to trust their observations, several early paleomagnetists proposed that the earth's magnetic field could switch or reverse its magnetic polarity. During times of normal polarity, the field is that of a magnetic dipole directed toward the geographic south pole, as it is today. During times of reversed polarity, the field is that of a dipole directed toward the geographic north pole. The clear implication of this research is that if the tool users who lived in Olduvai Gorge in East Africa a million years ago had been clever enough to make compasses, these compasses would have pointed south instead of north.

When this startling hypothesis was advanced more than half a century ago, the response of most geophysicists was neither acceptance nor rejection but rather silence. After all, no viable theory had yet been presented to explain why the earth's magnetic field even exists. Since geophysicists did not know why the magnetic field points north, they were not in a position to reject a proposal, based on observations, that it had once pointed south.

Interest in geomagnetic reversals reawakened in the late 1950s because of accelerating interest in the new field of paleomagnetism. With the discovery of reversed remanent magnetization in dozens and then in hundreds of rock strata of different ages, it became ever harder to dismiss reversals as some rare and inexplicable form of geologic noise.

However an alternative explanation, the **self-reversal hypothesis**, was advanced in the late 1950s that did not require a change in the polarity of the earth's magnetic field. Self-reversal refers to the ability of certain minerals to become magnetized backwards—in a magnetic field directed toward the north, these minerals acquire a remanent magnetization directed toward the south. Several synthetic minerals and a few natural minerals were discovered in the 1950s to have this strange self-reversal property. According to the self-reversal hypothesis, these minerals are present in all reversely magnetized rocks.