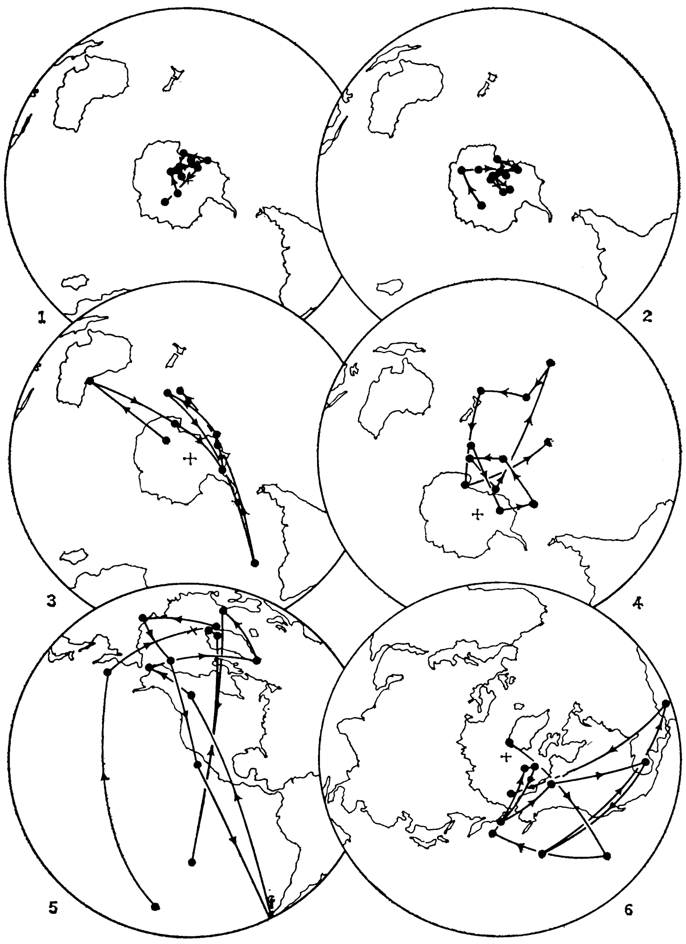
November. Clinical literature is showing more drug interaction studies. Physicians are worrying over interactions in medical journals. And when it comes to interactions triggered by combination drugs, the U.S. Food and Drug Administration is really getting fired up.

On Feb. 17 the FDA proposed that fixed drug combinations be removed from the market unless their manufacturers prove each ingredient contributes to a medication's therapeutic effectiveness, usage or the prevention of drug abuse, or diminishes side effects by being in combination. Briefly, what the FDA wanted is better-defined required tests for effectiveness of both prescription and nonprescription combination drugs. The agency has been deluged with letters from physicians about the proposed tighter stringencies on combination drugs. One American Medical Association faction holds that prescription combination drugs have a place in medical practice. Another AMA faction is for chucking all prescription drug combinations that don't have a rational purpose.

What an FDA crackdown on prescription or nonprescription drugs would mean to the over-all drug interaction problem remains to be seen. What is certain, though, is that with increasing drug production, drug consumption and medical specialization, drug interactions will be commanding attention on many fronts. □

THOUSAND-YEAR JOURNEY

Following the trail of a magnetic reversal



As the earth's magnetic field reversed 14.7 million years ago, the magnetic south pole followed a meandering path to its new northern position.

Science

Reversals of the earth's magnetic field have been shown to be related to an increasing number of other phenomena (SN: 4/10/71, p. 251). A thorough understanding of the processes and time scales involved in reversals could be useful in the study of sea-floor spreading, continental drift, ocean core stratigraphy and even evolution. It is also essential to understanding of the field itself.

It is known that a reversal takes several thousand years and that during the reversal the intensity of the field diminishes. But a high-resolution continuous record of a reversal has just now been obtained for the first time.

J. R. Dunn and Drs. Michael D. Fuller, Haro Ito and V. A. Schmidt of the University of Pittsburgh have studied reversals recorded by the natural remanent magnetization—the direction of polarity recorded—in rocks at about a dozen locations in the Pacific Northwest. They obtained records of two reversals. The first, recorded in rocks near Mount Hood in Oregon, occurred about 8.2 million years ago, and was from reverse to normal polarity (normal polarity is defined as that existing today). The record of this reversal, however, was somewhat confused, they report in the May 21 SCIENCE.

The second reversal was recorded in rocks in Mount Rainier National Park in Washington. The age of the rocks is about 14.7 million years. This reversal was also from reverse to normal. A section about half a mile from the main outcrop in which they studied the reversal was investigated for evidence of variations in the field prior to reversal. They found that the intensity of the remanent magnetization decreased. During the major part of this intensity decrease, the direction of magnetization did not change significantly.

The earth scientists then traced the path of the magnetic south pole during a reversal by determining the virtual geomagnetic poles (VGP) of progressively older rock samples. As certain molten rocks cool, they become magnetized in the direction of the prevailing magnetic field. The VGP is thus the spot on the globe where the magnetic fields in rocks of a certain age point—the magnetic pole.

As the field intensity diminished, the magnetic south pole began to move around the Antarctic Continent. During the final stages of the decrease in intensity, it began to swing back and forth like a pendulum, describing arcs of a great circle. While still swinging back and forth, the pole then moved northward, tracing a complex path through the Pacific to the opposite side of the earth. There it eventually settled down to its final position as the magnetic north pole. During the latter part of this process, the researchers report, the path traced by the pole was very similar to variations in the magnetic north pole that have been observed in the recent past. Soon after the magnetic field achieved its new polarity, its intensity increased.

Assuming that the VGP is a true measure of the movements of the magnetic poles and that the cyclic motions of the pole that are recorded in the rocks at Mount Rainier took about the same amount of time as similar motions observed in the recent past, the researchers speculated on the duration of the reversal. The transition in direction from reversed to normal took about 1,000 to 4,000 years, they estimate. This is in general agreement with earlier paleomagnetic results. The time scale of the intensity changes was longer—about 10,000 years. □