

# earth sciences

## Continental nondrift

A number of geophysicists believe that certain features of the earth's crust, such as volcanic islands, are the surface expressions of movement of a crustal plate over a hot spot or plume in the mantle (SN: 3/13/71, p. 180).

In the Oct. 13 NATURE, K. Burke and J. Tuzo Wilson of the University of Toronto postulate that the African plate has been stationary relative to the mantle for the past 25 million years. Certain islands and undersea ridges west of Africa, they believe, may be hot spot trails. These trails appear to have ceased at 25 million years ago. About the same time, a fracture zone in the Indian Ocean became a new spreading ridge.

If volcanic activity on the continent is the result of underlying hot spots and if the plate has been moving, areas of volcanism younger than 25 million years should form tracks with a consistent age variation from one end to another. They do not. The absence of consistent age patterns in the remnants of another period of volcanism 200 million to 100 million years ago may record an earlier standstill, they say.

The African continent has a peculiar pattern of basins and swells. Burke and Wilson suggest that the rise of swells may be due to convection plumes that lifted part of the continent and so stopped its drift.

## A prehistoric magnetic excursion

The magnetic history of the earth is divided into long epochs of a single polarity interspersed with brief events of the opposite polarity. The present polarity epoch, arbitrarily defined as "normal," has apparently been interrupted by numerous very short reversals of the field. One was between about 108,000 and 114,000 years ago. Two others have been postulated: one that apparently occurred about 12,400 years ago, and another ending between 20,000 and 8,730 years ago. More recent evidence indicates that these last two may have been excursions of the field—changes in the direction of polarity that may not constitute a reversal.

Now, in the Oct. 6 NATURE, Michael Barbetti and Michael McElhinny of Australian National University report another candidate. Aboriginal fireplaces at Lake Mungo in Australia have preserved a record of a deviation of 120 degrees away from the axial dipole field direction 30,780 years ago. About 28,310 years ago the field direction was 80 degrees away from the dipole field. Sometime later the field returned to normal. The two conclude that there were at least two unusually large magnetic excursions during the past 35,000 years.

## Formation of the Imperial Valley

The Gulf of California is believed to have formed by spreading between the North American and Pacific crustal plates. Five researchers from the University of California at Riverside have now made an extensive geological and geophysical study of the landward continuation of the gulf, the Salton trough in California's Imperial Valley. In the Oct. 6 SCIENCE they propose a model for formation of the trough. In their model the continental crust is being thinned beneath a widening rift. Successive sections of the crust are being sliced off along strike-slip faults. These sections then move northwest and are transferred from the North American to the East Pacific plate.

# behavioral sciences

## Sociology of science

José Ortega y Gasset, the Spanish philosopher and humanist, hypothesized that "experimental science has progressed thanks in great part to the work of men astoundingly mediocre, and even less than mediocre." In other words, a few significant breakthroughs, by a handful of inspired scientists, are made possible by the minor contributions of many average researchers. Sociologists Jonathan R. Cole of Columbia University and Stephen Cole of the State University of New York at Stony Brook say little empirical evidence exists to substantiate these widely held beliefs.

If a minor work is to contribute to major work, it must be visible and be used by the outstanding scientists. This does not often happen, say the Coles in the Oct. 27 SCIENCE. Using the citation practices of academic physicists, they found that only 15 to 20 percent of the work cited in significant discoveries is produced by average as opposed to outstanding scientists. They cautiously suggest that a sharp cutback in the number of Ph.D.'s produced will help the job market and will not slow down the rate of scientific progress.

## Self-esteem and honesty

High self-esteem should deter immoral behavior because such behavior would be inconsistent with one's self-concept. Marvin Eisen, now at Michigan State University, attempted to relate self-esteem to honesty by examining cheating practices of sixth-grade children.

A dot-counting contest was devised that would allow the detection of cheating without the subjects being aware of it. The students corrected their own papers and had to falsify at least one answer in order to pass the test and win a prize. Eisen reports in the October JOURNAL OF PERSONALITY AND SOCIAL PSYCHOLOGY on 57 boys and 68 girls who took the test after being assessed on a self-esteem inventory. As expected, there was a strong positive correlation between high self-esteem and honesty among the boys. A similar proportion (44 percent) of girls cheated but self-esteem was not found to be related. Eisen concludes that either boys are more likely to act in accord with their self-esteem or there is a sex bias in the self-esteem inventory.

## Child development in Africa

African babies are usually developmentally more advanced in their first year than are their American counterparts. T. Berry Brazelton of Harvard Medical School studied Zambian and American infants during the first 10 days of life in an attempt to find out why.

He reported last month at the annual meeting of the American Academy of Pediatrics that although African infants show signs of prematurity at birth, by the tenth day they are as healthy as American babies and are becoming more attentive, especially to social stimuli, than American ones. Brazelton says this type of rapid development is partially due to child-care practices that stress maternal contact and other social stimuli. From as early as 24 hours after delivery, for instance, Zambian infants are carried about on their mother's hip and are receiving constant tactile and social stimulation. American babies, on the other hand, usually remain in the hospital for four days, and when taken home the emphasis is on quieting and protecting them.