

# earth sciences

## Shapes of subduction zones

A Nova Scotia oceanographer believes that the shape of a developing subduction zone, where one crustal plate sinks below another, depends on the motion of the converging plates relative to the underlying mantle. This rate of motion, says R. D. Hyndman of Dalhousie University, can be estimated from the appearance of volcanism over mantle plumes.

When the overriding plate is stationary, he writes in the Aug. 4 *NATURE*, the leading edge of the other plate dips down at an angle where the plates meet. When both plates are moving toward the subduction zone, the upper plate overrides part of the sinking plate, forcing it into a zigzag shape, until the overridden part breaks off. The subduction zone then assumes a shape like the first case. When the top plate is moving toward the subduction zone but the other one is stationary or moving away at a slower rate, the first plate catches up to it and overrides it. Eventually the friction between the two plates becomes great enough to stop convergence and the plates become locked. Finally, if the sinking plate is moving toward the subduction zone but the other plate is moving away, a gap forms between the two that fills with upwelling from below. Hyndman gives examples of the convergence types.

## Dates on volcanism in Kenya

Recently a great deal of geophysical research has focused on Africa's Eastern Rift, a network of rifts and faults extending from Tanzania to the Red Sea. Several authors have attempted to relate development of the Red Sea to African rifting. The Kenya rift is part of the network and in the July 31 *NATURE PHYSICAL SCIENCE*, three researchers add considerably more detail to the chronology of volcanism in the region.

J. D. Fairhead of the University of Leeds, J. G. Mitchell of the University of Newcastle upon Tyne and L. A. J. Williams of the University of Nairobi (now at Lancaster University) have dated lava samples from southern Kenya. By adding their dates to previous results, they were able to outline the history of activity along most of the major faults of the area. Most of the action has occurred since about 3.5 million years ago.

Magnetic anomalies over the deep trough that runs the length of the Red Sea suggest that it was formed by sea-floor spreading between four million and two million years ago—roughly the same time as the formation of most of the Kenya rifts. The researchers suggest that the two events might be related.

## The flow of the Amazon

The Nile is the longest river in the world, but the Amazon ranks first in volume. Recent measurements by a team of U.S. and Brazilian hydrologists have confirmed the title. The hydrologists, headed by George F. Smoot of the U.S. Geological Survey used a relatively new technique involving current measurements from a moving boat rather than at fixed stations. They clocked the largest river flow ever measured—4 billion gallons per minute at the river's narrowest point. The Amazon's average flow of 2.6 billion gallons per minute, says Smoot, is more than four times that of the closest runner-up, Africa's Congo River, and 10 times the flow on the Mississippi.

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# behavioral sciences

## Diagnosing alcoholism

Alcoholism is slowly being accepted as a health problem or a disease that requires treatment rather than as a moral defect that requires punishment. With this designation, however, comes the need for a consistent set of criteria for diagnosis. Last year the National Council on Alcoholism established a committee to determine what these criteria should be. Their findings are reported in the August *AMERICAN JOURNAL OF PSYCHIATRY* and in the *ANNALS OF INTERNAL MEDICINE*.

Psychological and physiological manifestations are divided into major and minor criteria. Examples of major ones are the presence of the withdrawal syndrome, tolerance to the effects of alcohol, the presence of alcoholic blackout periods and continued drinking despite strong medical or social contraindication. Examples of minor criteria are such physiological disorders as cardiac arrhythmias and such behavior patterns as gulping drinks, taking drinks surreptitiously and automobile accidents. Satisfaction of one or more of the major criteria or several minor criteria of varying types are needed for the diagnosis. However, the council says a purely mechanical selection of items is not enough: the history, physical examination and other observations plus laboratory evidence must be used to ensure proper diagnosis.

## The kibbutz child

Because child rearing on a kibbutz is a collective responsibility some researchers have predicted that multiple mothering and diffusion of the mother image would lead to frustration and an inability by the child to form significant relationships in later life. Other researchers have suggested that multiple identification figures would lead to increased personality autonomy along with more subtle and complex personality characteristics. Either way, the homogeneity of the kibbutz life style was predicted to produce a distinctive and singular kibbutz personality prototype.

This is not happening, says Mordecai Kaffman of the Kibbutz Child and Family Clinic in Tel Aviv, Israel. He has spent 20 years studying developmental patterns and the incidence of emotional disorders in kibbutz children. In the July *AMERICAN JOURNAL OF ORTHOPSYCHIATRY* he concludes that kibbutz children do not reveal any specific personality type, developmental deviations or distinctive psychiatric syndromes.

## Dimensions of heterosexual attraction

Physical beauty has long been recognized as one of the main components of heterosexual attraction. But beauty cannot always be the deciding factor in selecting a mate. John C. Touhey of the University of Tulsa has attempted to identify and study variables that interact with physical attractiveness. Computer dating questionnaires were completed by 100 male and 150 female undergraduates. The subjects were then matched randomly and on the basis of maximum or minimum similarity for religious and sexual attitudes. Of 300 matches, 239 students kept their dates and subsequently rated their desire for the partner. Findings, in the July *JOURNAL OF PERSONALITY AND SOCIAL PSYCHOLOGY*, showed that similar religious attitudes accounted for the attraction of females to males, but that the attraction of males to females was associated with similar sexual attitudes.

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