

## Alpha training for the elderly

The abundance of EEG alpha rhythm (SN: 11/6/71, p. 308) tends to decrease with age. Some researchers feel this slowing of brain-wave frequency is of great importance in the aging process. Changes in brain-wave frequency may precede age changes in cognitive and intellectual abilities, memory, attention and arousal, personality and speed of timing of behavior. If so, bio-feedback training in alpha production might help reverse these age changes.

Young subjects have been successfully trained to increase alpha production but little research has been done with old subjects. Diana S. Woodruff and James E. Birren of the University of Southern California tested 15 subjects between the ages of 18 and 29 and 15 subjects between 60 and 81. They reported at the meeting of the American Psychological Association in Hawaii that all subjects were equally able to increase and decrease alpha production. Because the older subjects were able to do this, the researchers concluded that the slowing of EEG alpha rhythm does not always represent irreversible deterioration in the nervous systems of elderly individuals. Experimental manipulation of brain-wave frequency, they say, should lead to alterations in behavior similar to alterations that occur developmentally.

## Therapist-patient sex relationships

Sex between therapist and patient has generally been considered an unacceptable practice but in an era of rapidly changing moral values the issue is once again coming to the fore. Some therapists argue that patients should be encouraged to experiment sexually, that therapists should help patients to act on sexual fantasies and that therapists should be models of sexual freedom.

Arthur A. Seagull of Michigan State University disagrees. He says having sexual intercourse with a patient is destructive, is an acting out of adolescent fantasy on the therapist's part and never helps the patient. Using examples from Masters and Johnson and from his own experience with patients who had sex with previous therapists, Seagull explains that these patients show feelings of low self-esteem, hatred for the therapist and distrust of other therapists. "I think it is clear from this data, limited though it is," he told the APA, "that the sexual experience was a negative one, and uncondusive to more positive feelings and behaviors."

## Brain damage and crime

Brain damage due to complications during pregnancy or birth has been linked to schizophrenia by some researchers. Sheldon M. Litt of the Psychological Institute in Copenhagen, Denmark, hypothesized that such brain damage may also result in impulsivity that could be a factor in certain types of crime. He checked Copenhagen hospital records from 1936 to 1938 for individuals who had suffered birth complications. The criminal register was then checked for 1,976 such individuals. He found only small support for the supposed link between impulsive criminality and birth complications, he told the APA. Litt did find, however, that those infants who were discharged from the maternity ward without their mothers and who were then institutionalized had a consistently higher rate of criminality.

## New concept in navigational satellites

There are currently five operational navigation satellites in earth orbit. Called Transits, the satellites are used for all-weather global navigation. Commercial as well as military ships can locate precisely where they are (down to one-tenth mile or better) by use of the Doppler shift—the change in the frequency of the signal as the distance between the spacecraft and the ship changes. By measuring how much the frequency has changed, the ship can calculate where it is in relation to the satellite.

The problem has been that the satellite's orbital position itself decays because of aerodynamic drag and solar radiation pressures. Its position has to be updated every 12 to 16 hours.

Now, the Navy has orbited a new Transit that may pave the way for eliminating orbital decay in satellites. Developed by the Applied Physics Laboratory of Johns Hopkins University, the new Transit carries a unit called DISCOS (disturbance compensation system) which forces the satellite to fly a highly predictable orbit. The satellite uses freon gas jets to provide a thrust force equal and opposite to the external forces. If the experiment succeeds, the orbit of an artificial satellite could become as predictable as the moon's. Ben O. Lange of Stanford University, originator of the concept, and Daniel B. DeBra, also of Stanford, worked with APL in developing the system.

## Molecular O<sub>2</sub> in Martian atmosphere

E. S. Barker of the University of Texas McDonald Observatory reports in the Aug. 25 NATURE the first positive identification of molecular oxygen in the Martian atmosphere. He observed the characteristic spectral line of molecular oxygen at 7,620 angstroms using the Condé echelle spectrum scanner with a resolution of approximately 30 milliångstroms. His average observed oxygen abundance is  $9.5 \pm 0.6$  centimeter atmosphere. This is somewhat smaller than earlier calculations of 15 and 26 cm atmosphere for the upper limits of oxygen. He made the measurements on six days between December 1971 and February 1972. (By January the dust storm had begun to subside considerably.)

From the observed amounts of carbon monoxide, Barker had expected to see only about 8 cm atmosphere of oxygen. "Therefore this larger abundance probably means we have another source for molecular oxygen in addition to carbon dioxide," says Barker. He thinks the best bet is from the photodissociation of Martian water vapor.

## U.S.-U.S.S.R. joint mission

Rocco A. Petrone, the Apollo program director at NASA headquarters, has been assigned to be the program director of the U.S. portion of the U.S.-U.S.S.R. joint manned space flight scheduled tentatively for July 1975 (SN: 6/3/72, p. 356).

The mission profile has been changed. Earlier planning called for an Apollo craft to be launched first. Now a Soyuz craft will be launched by the Soviet Union first. About seven and one-half hours later an Apollo spacecraft will be launched on a Saturn 1-B rocket. The Apollo will then rendezvous and dock with the Soyuz.