

# behavioral sciences

## Incentives for an all-volunteer armed force

Public opposition to the draft has almost ensured the establishment of an all-volunteer armed force. The questions now are what kind of force it will be and what incentives will produce it. A Presidential commission has recommended increased pay as a primary incentive, but critics argue this will not attract enough qualified men. Results of a survey by the University of Michigan Institute for Social Research indicate that free higher education might bring in more and better recruits.

As part of a longitudinal study called Youth in Transition, Jerald G. Bachman and Jerome Johnston interviewed 2,213 boys in 87 public high schools across the country. The education incentive was the first choice of 25 percent. Only 15 percent preferred the pay incentive. Of those who choose the pay incentive, 16 percent would fail to pass the Armed Services Qualification Test, the researchers estimate, an additional 28 percent would be in the marginal range. Of those who choose education, only 6 percent would fail with 19 percent in the marginal range. The researchers conclude in the October *PSYCHOLOGY TODAY* that those who elect to serve first and then go to school would ensure a healthy rate of turnover. Those who go to school first would provide skilled and educated manpower.

## Toxic effects of marijuana

In April 1971 Harold Kolansky and William T. Moore of the Philadelphia Association of Psychoanalysis reported in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* that marijuana use had produced a variety of deleterious psychological symptoms in 38 young persons (SN: 4/24/71, p. 277). Their research was attacked for its lack of controls and for being too polemical and one-sided.

In the Oct. 2 *JAMA*, Kolansky and Moore report on 13 adult users of cannabis. All used some form of the drug more than three times a week for more than 16 months. Symptoms similar to those in the previous study were noted: tiredness, apathy, mental confusion, reclusiveness, loss of recent recall. These symptoms developed with the onset of smoking marijuana and, the researchers say, abated after cessation. This and the stereotyped nature of the symptoms regardless of psychological predisposition leads the researchers to believe that a common toxic agent is involved. They say biochemical and structural changes in the central nervous system (possibly the cerebral cortex) are indicated.

## Lithium carbonate clinic

Lithium carbonate is effective in the treatment of some cases of manic-depressive psychosis. But studies have shown that three-fourths of all relapses among patients on lithium are due to negligence. To avoid this problem D. R. Bey and R. E. Chapman of the Peoria School of Medicine in Peoria, Ill., and K. L. Tornquist, a registered nurse, have set up a lithium clinic. They report in the October *AMERICAN JOURNAL OF PSYCHIATRY* that patients report to the clinic at monthly intervals to have the lithium in their blood monitored and to discuss the treatment with a nurse or psychiatrist. This supervised follow-up protects the patient and provides group support through interaction with other patients at the lithium clinic.

# physical sciences

## Fruitless search for tenth planet

Studies of the motion of Halley's comet by Joseph L. Brady and Edna Carpenter of the Lawrence Livermore Laboratory led earlier this year to the prediction of the existence of a tenth planet in the solar system (SN: 5/6/72, p. 293). Three astronomers at the Royal Greenwich Observatory, A. P. O. Foss, J. S. Shave-Taylor and D. P. D. Whitworth, report in the Sept. 29 *NATURE* that they have been unable to find it.

The Greenwich observers looked at an area of sky that covered at least 3.5 degrees in every direction from the location of the planet predicted by Brady and Carpenter and found no moving object. The sensitivity of the photographic plates goes to magnitude 15.5 or 16. The Greenwich astronomers conclude that if a trans-Plutonian planet exists it is either less massive and therefore less bright than Brady and Carpenter predict, or it is not near their predicted position.

## Search for hydrogen in elliptical galaxies

Radio astronomers can detect atomic hydrogen by the 21-centimeter radio waves it gives off. Clouds of it pervade our galaxy but apparently not some others.

Our galaxy is a spiral. When radio astronomers turned their attention to elliptical galaxies they found they could not detect any 21-cm radiation from them. The latest search, of four different galaxies, is reported in the September *ASTRONOMICAL JOURNAL* by John S. Gallagher III of the University of Wisconsin-Madison. No signal from any of the four galaxies was recorded, which means that if they do have atomic hydrogen, they have less than 100 million times the mass of the sun.

The result is surprising because stars as they evolve should inject large amounts of hydrogen into the space of the galaxy. There must be some mechanism to remove the hydrogen. Some astronomers suggest the existence of a galactic wind to blow the hydrogen away, but the best suggestion, in Gallagher's view, is formation of new stars. This would mean that elliptical galaxies are not a kind of cosmological fossil containing only relatively old stars, as had been thought, but places where stellar formation continues.

## Gamma-ray sources in Cassiopeia and Cygnus

As astronomers have extended their observations beyond the limits of visible light, they have discovered new and strange objects that radiate in other parts of the spectrum. Now it is the turn of high-energy gamma rays (more than  $10^{12}$  electron-volts energy).

The Crimean Astrophysical Observatory in the U.S.S.R. has an ongoing program of searching for celestial sources of gamma rays by using mirrors that record bursts of Cerenkov light that appear when the gamma rays strike the earth's upper atmosphere. A. A. Stepanian, B. M. Vladimirovsky and V. P. Fomin report in the Sept. 18 *NATURE PHYSICAL SCIENCES* that they have found a point source in the constellation Cassiopeia. They also report that when they went back to look for a source previously seen in the constellation Cygnus, they could not find it. This leads them to believe that the Cygnus source may be variable, and on this basis they make a general statement that "It seems probable that high-energy gamma-ray sources are variable, but further confirmation of this suggestion is necessary."