

## Cerebral atrophy in marijuana smokers

Marijuana may cause permanent brain damage, report four British doctors. In the Dec. 4 LANCET, they say the symptoms of mental illness seen in many chronic pot smokers may be due to organic rather than psychological reasons. Ten patients displaying these symptoms—headaches, loss of recent memory, poor concentration, depression, inefficiency, paranoid psychosis, hallucinations and superficiality—were tested and found to be suffering cerebral atrophy or irreversible brain deterioration.

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used air encephalography to show that the lateral and third ventricles, or brain cavities, of the marijuana users were significantly larger than those in 13 controls of similar age.

This type of atrophy can be the result of a head injury, severe infection, congenital disease or old age. The average age of the patients was 22 years and their case histories showed no previous indication of brain damage. Therefore, the doctors conclude that marijuana use, the only thing the patients had in common, is the probable cause of the brain changes. Other drug use (usually amphetamines or LSD) was reported but not in any significant quantity.

“What is not certain is whether these changes are caused by the use

of cannabis,” says a LANCET editorial. Comparison with normal controls is not enough and LANCET suggests that controls showing the same mental symptoms without marijuana use would have been more appropriate. Alcoholism is also known to cause this type of damage but it is argued that the alcoholism is the effect rather than the cause. It may be the same in the case of marijuana. LANCET also points out that in another study 97 out of 100 patients showed the same ventricular enlargement and mental illness, but 71 of them used no drugs at all. LANCET therefore advises that it would be wise to avoid the conclusion implicit in this study until other possibilities have been examined.

brightnesses at different periods does not correspond well to the total luminosity given by the model, but the authors are not dismayed. The measurements were made at one wavelength, 2,500 angstroms, and how the brightnesses at this one wavelength relate to the total spectrum brightnesses given by the model have not been figured out yet.

There is also new observational evidence supporting earlier reports (SN: 5/29/71, p. 367) of apparent physical links between some quasars and some galaxies. E. M. Burbidge, G. R. Burbidge, P. M. Solomon and P. A. Strittmatter of the University of California at San Diego present statistical arguments to show that four quasars, 3C 268.4, 3C 275.1, 3C 309.1 and PHL 1226, are too near to four bright galaxies for the association to be chance. The circumstance raises the possibility that all quasars are associated with galaxies that are either their parents or their daughters (in the terms of Burbidge and collaborators) but have moved so far from them that the relation is no longer apparent.

This association of quasars and galaxies also raises the question of the quasar distance estimates and in so doing may raise some difficulties for the model presented by Morrison and collaborators. Traditionally the distances to quasars have been measured from the redshift of their light. Astronomers assumed that the redshift was due entirely to apparent velocity. The hypothesis of the expanding universe tells us that the fastest are the farthest. But in some of these cases the known distance of the associated galaxy does not correspond to the redshift of the quasar. It would indicate that at least some quasar redshifts are due to causes other than velocity and that the distance estimates have to be treated with caution.

Finally, attempts to elucidate the in-

ternal structure of quasars are going forward using the radio interferometer called Goldstack (that is, the Goldstone telescope in California and the Haystack telescope in Massachusetts). Among other things M. H. Cohen of the California Institute of Technology and six others report that the observations confirm earlier reports (SN: 4/24/71, p. 278) that the quasars 3C 279 and 3C 273 appear to consist of two objects that are separating from each other at speeds apparently greater than light. There are ways to explain this superlight velocity as an illusion, but they require so many constraints on the geometry and physics of the situation as to look artificial. The phenomenon could also be produced without motion by properly timed flashes along the body of an extended object in a manner similar to the running lights on a theater marquee. Beyond this, the present authors do not speculate. □

## Contract teaching fails

Contract teaching was expected to solve many problems in the education field because the teaching companies would be paid only for results. Giving the incentive to the teacher instead of to the student apparently is not working. A Rand Corp. study for HEW to be published this month finds that public school programs run by private business firms have produced no overall gains. Five school districts were studied in detail. Gains in the five projects averaged about seven months growth for nine months instruction. This is about the usual unsatisfactory rate for children in poverty-area schools. Only one program—Gary, Ind. (SN: 10/9/71, p. 246)—posted gains above the normal rate. Rand did point out that contract teaching has helped to introduce new teaching methods. □

## The bombing of SLAC: A question of why?

Repairs were proceeding satisfactorily this week at the bomb-damaged Stanford Linear Accelerator Center. On Dec. 7 two bombs exploded in the klystron gallery of the accelerator. Damage was relatively minor: None of the klystrons, which supply the accelerator with the radiofrequency waves that power it, was damaged, and there was no injury to the accelerator itself, which stands in a tunnel below the klystron gallery. The financial loss was about \$45,000.

The accelerator was shut down at the time of the explosions. The director of the laboratory, Wolfgang Panofsky, sees no difficulty in achieving the originally scheduled turn-on date of Jan. 3. The FBI is investigating the incident. As of this week there was no word on possible suspects or motives.

The irony of the incident is that SLAC is a completely open laboratory. None of its work is classified; what it does is on the far boundaries of particle physics, a science without military applications.

The SLAC management has actively sought public understanding. It has invited the public and especially the students of Stanford University to come for tours and explanations of the laboratory. It has hired students as tour guides, hoping that first-hand experience would dispel any myths.

As a result of the explosions security is being tightened temporarily. There are more guards, especially a roving patrol along a two-mile length of the facility, and persons who enter the grounds at night are required to identify themselves. Whether these measures will become permanent remains to be seen. “It was such a nice atmosphere,” mourns a staff member. □