

excreted in urine, is studying its metabolic patterns. "THC," he finds, "is metabolized in the liver. It is possible that the active agent is really a metabolite (or breakdown product) of THC rather than THC itself." Preliminary work at Worcester, to be published shortly, and other studies by Swedish researchers, point to the possibility that this is the case.

**Other evidence**, some of it produced by Dr. Louis S. Harris, working under a \$48,000 NIMH grant at the University of North Carolina in Chapel Hill, shows that THC inhibits microsomal (liver) enzymes that play a role in the metabolism of a number of drugs. This phenomenon could lead to potentially lethal situations. If, for example, a marijuana user also took barbiturates, he might be unable to metabolize those drugs. An accumulation in the blood could be fatal.

"The real point to our work," says Dr. Harris, who with his colleagues is studying THC in animals from rats to dogs and monkeys, "is the belief that it might be therapeutic." He is hoping to build, from basic pharmacological and toxicological experiments, enough information to permit human trials of THC in a year or two. "We just do not know very much about this drug in spite of the fact that it has been in use for centuries," he observes. "We need to know a lot before we can proceed to man with impunity."

Among other problems is the fact that there are few suitable tests for evaluating THC. "It exhibits a mix of both stimulatory and depressant activity on the central nervous system," he

finds, and is "unlike any other class of compounds. Classic tests are not always helpful." Nevertheless, Dr. Harris speculates on the basis of what studies have been done that THC might be valuable in at least three areas. First, it could be an antidepressant. Second, it has potential as an analgesic or pain-killer and might find a place in the arsenal of preoperative medications. And third, "more speculative than the others," it might become an antihypertensive agent. "It definitely lowers blood pressure," he states.

**The possibility** that marijuana is teratogenic, causing damage to unborn children, is a specter that as yet cannot be put down. One investigator who is beginning to explore this problem is Dr. Henry Pace of the University of Mississippi. "It may cause chromosome breaks with true (unrepairable) damage," he hypothesizes. Dr. Pace has \$52,000 from NIMH, with another \$67,000 slated for 1970, to test THC in a variety of species including rats, hamsters and rabbits. The rats and hamsters will be given THC in various doses at various times, some before gestation, some during, some both times, and their offspring followed through four generations. Similar regimens will apply to rabbits that will smoke pot.

Referring to other, unpublished work, Dr. Pace says there is already some information indicating that THC readily crosses the placenta and enters the fetus. He expects his own work to begin in a couple months. "We're breeding the first animals for initial tests right now." ◇

## QUASARS AND PULSARS

### Two of a kind

Two of the more startling radio astronomical discoveries of the last decade are quasars and pulsars. The quasars are powerful, concentrated sources of radio waves that in some cases coincide with objects of star-like size. The pulsars are powerful sources of pulsed radio waves. One of the sources has been identified with a pulsing star in the Crab nebula.

Distance estimates proposed by many astronomers put the quasars far out of our galaxy, while the pulsars seem to be in it or near it. Astrophysical theory has come up with a widely accepted model of a pulsar as the remnant of a supernova explosion, but it has been less successful in explaining quasars.

**Now a physicist** at the Massachusetts Institute of Technology, Dr. Philip Morrison, suggests that quasars and pulsars may be analogous objects, similar in their basic structure but with a tremendous difference in scale that makes them differ widely in details.

"A quasar is to a pulsar as a battleship is to a toy boat," says Dr. Morrison. Or, putting it somewhat differently, "a quasar is to a galaxy as a pulsar is to a star."

A pulsar in current theory is the core of a star that has exploded into a supernova. It is condensed, magnetic, and spins rapidly. It is surrounded by a plasma of charged particles which gives off the optical and radio waves and also serves as a drag to slow the rotation.

A quasar, says Dr. Morrison, is also a condensed, magnetic, spinning object. As evidence of magnetism he notes that intense emissions from quasars are polarized, vibrating in only one plane. Only a magnetic body could produce such polarization, he says. As evidence of condensation and spin, he gives the optical pulsations observed in the quasar 3C345. These come at intervals of about 320 days and last for 10 days. Their regularity argues for a spinning body, says Dr. Morrison; their short duration for a condensed one.

**A quasar**, Dr. Morrison concludes, is the condensed "relic of a galactic explosion." It has to be a galactic explosion because the power in the quasar pulses is several hundred billion times that of the sun, and only a galactic amount of matter could produce such power. A quasar is also surrounded by a cloud of diffuse matter that slows its rotation, he says.

As an example of the scale difference, Dr. Morrison compares characteristics of 3C345 and the pulsar NP 0532: The pulsar's rotation period

## DRAFT

### Changes and grad students

At 19 years of age men are more trainable and in better physical shape than they are at 25. This, says a White House spokesman, is why the President wants to start drafting 19-year-olds instead of the oldest available men, as is now done (SN: 5/24, p. 502).

**The White House** denies that any idea of equity, easing pressure from campuses or the plight of graduate students is involved. But the President's new draft program will help graduate students nevertheless. "Anything that dilutes the pool from which these men are called is going to help," says Mrs. Betty Vetter of the Scientific Manpower Commission.

Under the present oldest-men-first system, graduate students form a disproportionately large part of the available pool since they are no longer eligible for student deferments and they tend to be the oldest men available.

The President's plan is to make the 19-year-olds the prime draftable category and add to them the men whose student deferments expire. Both groups would then be eligible during one year only; individuals who survived the year uncalled would be safe thereafter.

The President would like to draft the 19-year-olds by a lottery that would draw dates of the year. Those whose birthdays were drawn would be drafted. The present law forbids such a lottery, and to establish it the President has to get Congress to remove from the law the sentence prohibiting it.

**If Congress** does not act—and House Majority Leader Carl Albert (D-Okla.) thinks it will not—the President will establish his prime pool of 19-year-olds anyway. They will then be drafted in order of their birthdays so as to take the oldest first and comply with the letter of current law.