

## Smoking cocaine: A dangerous switch

"Snorting" cocaine —breathing crystals into the nostrils—has become an increasingly popular form of recreational drug use among those who can afford it. And now some "head" shops have begun to stock kits to convert the crystals into a form convenient for smoking. But if recent studies in South America offer any indication, such a switch in method of administration could be dangerous indeed.

Craig Van Dyke, a psychiatrist at the University of California at San Francisco, told a group of science writers recently that smoking cocaine "almost always leads to severe abuse." In work he conducted with F. R. Jeri and the University of San Marcos in Lima, Peru, cocaine smokers were found to suffer a far higher incidence of toxic effects than those who ingest the drug by snorting or by swallowing gelatin capsules containing it.

Apparently the "bad trips" result from the speed with which cocaine is absorbed into the blood when smoked. Snorting coke can be self-limiting, since the drug is a potent vasoconstrictor that slows down absorption in the nose even as it is being

ingested. Maximum blood levels of the active ingredients thus reach a peak only after 20 minutes to one hour following snorting or swallowing. When smoked, cocaine reaches maximum blood levels in two to five minutes.

Following this "rush," the user quickly starts to "crash." Within 10 to 15 minutes he or she may begin to become depressed and require another "hit" to maintain equilibrium. Compulsive smoking may follow to the point of severe toxicity if enough of the drug is available. Toxic effects include depression, paranoia, extreme agitation and dramatic increases in heart rate and blood pressure. Some users have suffered psychotic episodes that persist and require psychiatric hospitalization.

Van Dyke calls this experience "as clear-cut an example as one can find in pharmacology" of the different effects that can be obtained just by changing the route of administration of similar doses of the same drug. He calls smoking "the most dangerous route of all" for taking cocaine.

The smoking of coca paste already represents "a serious health hazard" in South America, where it has become an "epidemic" in some urban centers, Van Dyke says. And he adds that unless nipped in the bud, it could become a serious problem in the United States as well. □

## Melatonin: A puberty switch

Medical scientists have long been baffled by one of the most universal of human changes — why boys and girls suddenly blossom into sexually mature men and women. Now a mechanism that helps set human puberty into motion may have been found. There is an abrupt drop in the concentration of melatonin, a pineal gland hormone also known to be involved in skin pigmentation, reports a team of London scientists — R. E. Silman, R. M. Leone and R. J. L. Hooper of St. Bartholomew's Hospital Medical College and M. A. Preece of the Institute of Child Health.

In 1899 it was reported that tumors of the pineal gland in young boys were associated with precocious puberty, suggesting that the human pineal gland might produce some hormone that retards sexual maturation. Similar findings were reported in 1954, and during the 1960s and 1970s researchers noted that two pineal hormones — melatonin and methoxytryptophol — were able, in animals, to suppress the production of gonadotropins (master sex hormones) in the pituitary gland. So Silman and his team decided to see whether melatonin and methoxytryptophol might drop in concentration in healthy adolescents around the time of puberty. If so, the hormones might well play a role in triggering puberty.

Silman and his co-workers assigned 51 healthy boys and girls to one of five maturity stages according to genitalia or breast development. Then they took blood sam-

ples from the children and analyzed the samples for concentrations of melatonin and methoxytryptophol and also for concentrations of various gonadotropins and sex hormones, since an increase in gonadotropins and sex hormones accompanies puberty. As the investigators report in the Nov. 15 NATURE, there was a highly significant fall in melatonin in the blood of boys undergoing stage one to stage two of puberty, but not in the blood of boys in later stages of puberty. This drastic fall also correlated with an increase in two gonadotropins, luteinizing hormone and follicle stimulating hormone, and with an increase in the sex hormone testosterone. In contrast, levels of methoxytryptophol did not fall off in the boys as sexual development occurred. So the researchers conclude that melatonin plays a crucial role in the control of male puberty.

As for the girls in the study, neither melatonin nor methoxytryptophol was observed to fall in their blood with the advance of puberty. So the researchers conclude that melatonin might not play a role in the control of female puberty, or, if it does, that the girls in their study had experienced their drop in melatonin before the study took place.

In the view of Salvatore Raiti, director of the National Pituitary Agency in Baltimore and an international child growth and development authority, this finding "is not the final answer [to puberty] but an interesting development." □

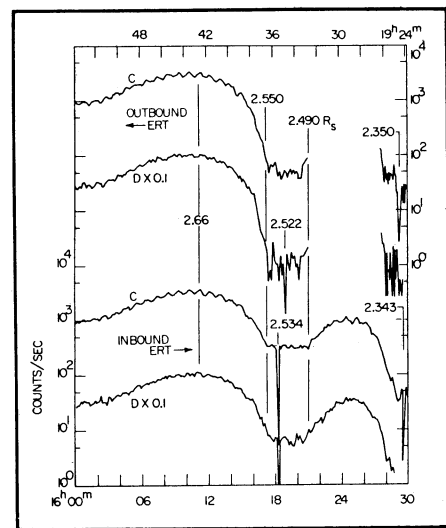
## Sorting Saturn's rings and satellites

Now that scientists have had some time to study the flood of data from the Pioneer 11 spacecraft's early September encounter with Saturn, a coherent picture is beginning to emerge from the confusion about just what previously unknown rings and satellites the probe actually detected. The key information has come not from the vehicle's "camera" (an imaging photopolarimeter, limited in both resolution and sensitivity), but from an array of detectors that monitored charged particles trapped on the lines of the planet's magnetic field. The rings and satellites absorb the particles that strike them, producing wakes or "shadows" that showed up to the detectors as precisely locatable "dips" in the particle counts.

The particle data, according to James A. Van Allen of the University of Iowa, confirm the previously unknown presence of at least one additional ring and two satellites, along with signs that may represent yet more satellites, additional ring material, or both.

The new ring, known as the "F" ring, was first spotted in one of Pioneer 11's pictures (SN: 11/3/79, p. 308), though it seems to be considerably wider than the photo suggested. The outermost of the rings clearly visible from earth extends out to about 77,520 km from Saturn's cloud tops (137,520 km, or 2.292 times Saturn's radius, from the planet's center), after which there is a clearly defined, absorption-free gap — informally dubbed the Pioneer Division — some 2,640 km wide. Then comes the F ring, whose most readily detectable portion spans 2,100 km, ending about 82,260 km from the clouds (2.371  $R_s$ , or Saturn radii, from the center).

Beyond that, reaching to 93,000 km from the clouds (2.550  $R_s$  from the center), lies what the particle scientists first called the G ring, but subsequently, Van Allen says,



Particle-count "dips" mark moons, rings.

J. A. Van Allen et al., Univ. of Iowa