

Tightening the lid on legal drugs

Tranquility in a capsule—that's what many psychoactive drugs offer. And because tranquility is often hard to find, more and more people are being offered chemical help. Physicians are prescribing psychoactive drugs at an ever-increasing rate. But even legally prescribed drugs have the potential for serious abuse, and regulatory agencies are now taking steps to curb such abuse. The Drug Enforcement Administration and the Department of Health, Education and Welfare have announced regulations that will restrict the sale of two of the most commonly used (and abused) psychoactive drugs on the market—Valium and Librium. The regulations go into effect on July 2.

Valium is the largest selling drug on the commercial market. Nearly three billion tablets were sold last year. Librium ranks fourth, with sales of more than one billion tablets. Both are minor tranquilizers, usually prescribed for the reduction of anxiety and tension. The psychological effects are similar to those of alcohol. Because tolerance can develop, increasing doses are often necessary to maintain the desired effects. Side effects, however, include drowsiness, ataxia (loss of muscular coordination), lethargy, skin rashes, nausea, diminished sex interest, menstrual and ovulatory irregularities and blood abnormalities. Excessive quantities of the drugs can cause disorientation, confusion, memory impairment, trances, double vision and personality alterations. High doses can depress respiratory functioning and can lead to unconsciousness, coma and death.

According to Carl D. Chambers and his co-authors in *Chemical Coping* (Halsted Press, April 1975), probably as many as 5 million people in the United States are regular users of minor tranquilizers, and more than 90 percent of them obtain their drugs through legal prescriptions. Only about 70 percent use the drugs exactly as prescribed. But beginning next month, doctor's prescriptions for Valium and Librium (as well as for four other psychoactive drugs: Tranxene, Serax, Dalmane and Clonopin) may not be refilled more than five times and may not be refilled at all after six months. Until now, there has been no limit and no deadline on such prescription refills.

The new regulations will also require that manufacturers, physicians and pharmacists keep records on production and distribution of the drugs and tighten security to protect against theft.

The forthcoming restrictions on tranquilizers are only part of an ongoing reevaluation of the use of psychotherapeutic drugs. In April, the Comptroller General's office reported to Congress on the misuse of psychotherapeutic drugs in Veterans Administration hospitals. The General Accounting Office prepared drug profiles

on 6,171 psychiatric patients in VA hospitals and found that "in many instances psychotherapeutic drugs were not being used as recommended by authoritative medical references."

A major problem on the VA wards was overuse of the drugs. About 10 percent of all patients were receiving more than the recommended daily maximum. On some wards, 40 percent of the patients were receiving excess dosage.

Another problem is polypharmacy, the simultaneous use of more than one psychoactive drug. Studies have shown that polypharmacy increases the risk of adverse reactions and should be avoided when possible. GAO researchers found that about 32 percent of the patients were being given more than one drug; many were taking more than two.

The problems at the VA hospitals, the report says, have to do with lack of uniform guidelines for using psychoactive drugs, understaffing and inadequate training of staff members. Such a situation can lead to the use of drugs as "chemical straitjackets," rather than as therapeutic agents. The GAO suggests that new guidelines and educational programs be designed to disseminate to hospital personnel the results of current research.

According to some psychiatrists and pharmacotherapists, however, there may not even be enough research information to adequately educate staff members on the use of psychoactive drugs. "Pharmacotherapy and Psychotherapy: Paradoxes, Problems and Progress" is the title of a recently released report of the Group for the Advancement of Psychiatry (GAP). The report points out that psychoactive drugs were viewed as panaceas when they deluged the mental health scene about 15 years ago.

In 1967, 178 million prescriptions for psychotropic drugs were written. The figure was 202 million in 1970, and there is every reason to believe that the number continued to escalate. The prescription of psychoactive drugs is not limited to psychiatrists or to mental hospitals. About 70 percent of all such drug prescriptions are written by general practitioners, gynecologists, internists and surgeons.

The immediate effectiveness of psychoactive drugs in calming patients helped make the drugs so popular that they were often used without a complete understanding of how they worked, suggests the GAP report. The placebo effect, the fact that some drugs only treat the symptoms of psychiatric behavior or mask such behavior without doing anything to change it, the effects of polypharmacy and the possible long-term side effects are among the aspects that may not be adequately researched. And with continued reliance on these drugs it is difficult to conduct the necessary research. The GAP report says:

"Psychiatric staffs too often view research procedures as unrewarding nuisances. . . . it is easy for them to stereotype the researcher as a snoop who from his ivory tower has never had to confront the practical problems of patient care. . . . They feel they are being asked to play dice with patients' health by accepting 'random' procedures. Similarly, double-blind techniques arouse anxiety in the psychiatric staff, who, while still responsible for the patient's well-being, are being kept ignorant, by the very procedures critical to an objective study, of matters central to his welfare. This lends credence to the argument that patients in research programs are deprived of effective treatment."

One solution to this problem, the GAP researchers suggest, is the creation of combined treatment and research facilities. "The cost," they admit, "would be considerable, but when one recognizes that the community is often paying for the care of these patients, the actual increase is not that great. The research centers would also be training the needed therapists, teachers and behavioral scientists, thus further enhancing their value to the community."

The value of psychoactive drugs is not being questioned seriously in the present reevaluation. What is questioned is their overuse, misuse, and abuse. And while some of the suggestions for changing this situation may not be implemented in the near future, it is becoming apparent that psychiatrists as well as Federal agencies are no longer willing to accept blindly the efficacy of psychoactive drugs. □

October rendezvous with Venus

At least five times, Soviet space probes have reached the surface of Venus (Tass, the Soviet news agency, claims six), although only the latest two—Venera 7 in 1970 and Venera 8 in 1972—were still sending signals when they got down there. On June 8, the newest in the series, Venera 9, was sent on its way toward an October rendezvous with the cloud-shrouded planet.

Not surprisingly, details were scarce. There was no indication of whether it will attempt to land (past experience suggests that it will), and although Tass described the vehicle as "a new type of spacecraft for the exploration of Venus," there were no details initially announced. Venera 8 was a redesigned version of its predecessor, which in turn incorporated several changes from earlier Veneras, largely to give a better chance of surviving the heat and pressure of the Venusian surface.

Besides measuring the atmospheric temperature, pressure, composition and winds, as well as surface composition of Venus, Venera 9 is designed to report on the solar wind, interplanetary magnetic

field and ultraviolet radiation during its flight from earth.

Veneras 4, 5 and 6 were apparently disabled before they reached the surface. Venera 7 lasted 23 minutes on Dec. 15, 1970, during which time it transmitted data that Soviet scientists interpret as indicating a surface temperature of 475 degrees C. and an atmospheric pressure 90 times that of the earth. Venera 8 contributed about 50 more minutes of surface time on July 22, 1972, generally confirmed its predecessor's temperature and pressure readings and added the finding of surface rock containing slightly higher amounts of uranium, thorium and potas-

sium than earthly crustal basalt.

The United States has never tried a Venus landing. Mariners 2, 5 and 10 flew by the planet, with Mariner 10 providing striking ultraviolet imagery of Venusian cloud structure. But not even the exotic Pioneer Venus mission being readied for 1978 is planned to produce a soft landing. Pioneer Venus will include one spacecraft that orbits the planet, while a "carrier" probe will send three smaller craft (plus itself) in through the atmosphere to take measurements all the way down to what the National Aeronautics and Space Administration calls a "nonsurvivable landing." □

Honoring Harlow for dedicated research



Harry Harlow's work is important, fruitful, imaginative, ingenious, valid, original, creative and outstanding. This praise and much more was heaped on Harlow last week, along with the International Kittay Award of \$25,000. The award is presented annually to an "outstanding researcher in the field of mental health whose work represents a major contribution with practical clinical application."

Harlow, recently retired director of the primate research center at the University of Wisconsin, was honored for his 40 years of research on the learning and emotional responses of primates. He is probably best known for his studies of mother-child interactions. By raising infant monkeys with wire and terrycloth surrogate mothers, Harlow established mother love as a behavior based on the tactile or physical comfort of the offspring, rather than on feeding. Harlow's isolation studies demonstrated the necessity of maternal sensory stimulation of infants and the importance of play as part of the normal process of psychosocial growth. Isolation and lack of stimulation can lead to depression. Without play, infants do not learn sex roles and do not learn to control aggression.

Harlow's work, says Theodore Lidz of Yale University Medical School, is "of extreme significance for understanding those aspects of human behavior related to depression, aggression or sexual dysfunction, which originated in the forma-

tive years of mother-infant interaction." George Serban, medical director of the Kittay Foundation, says Harlow's work "freed clinical psychiatrists from existent speculative concepts and unverified assumptions concerning the mother-infant bond and the development of depression."

"We are, in effect," said Sol Kittay, "honoring Harlow for a lifetime of brilliant work and dedicated research." □

NRC backs most emission standards

The National Research Council, responding to a request for a quick summary of present scientific knowledge bearing on automobile emission standards, has issued a report supporting all but the standard for nitrogen oxides. The study is expected to weigh in upcoming Congressional discussions of revising the Clean Air Act.

The report concludes that emission standards for hydrocarbons and carbon monoxide for 1978 are "feasible and worthwhile" and should be "maintained at the current statutory levels" of 0.41 grams per mile and 3.4 grams per mile, respectively. The NRC also found "no evidence to justify relaxing the existing ambient air quality standards" for regulated pollutants, and recommended that some new standards, involving short-term concentrations of NO_x and ambient levels of sulfuric acid and acidic aerosols, could be added.

The report does state, however, that the current statutory NO_x emission standard (0.4 grams per mile by 1978) might discourage the development of alternative technologies, such as stratified charge engines. Members of the panel could not agree on what course should be taken, but agreed that if NO_x emission standards were relaxed, a two-tier system should be used to replace it, in which congested urban areas would have stricter standards. They also recommended establishment of a sulfuric acid emission standard. □

Coronal model for Cygnus X-1

More and more astrophysicists are beginning to agree that the X-ray source in the binary star system designated Cygnus X-1 is a disk of hot material surrounding a black hole. If it is that, it is the first astrophysical black hole to come under observation, and it is probably a paradigm for a whole class of objects.

The disk is supposed to be composed of hot matter drawn from the normal star that is the black hole's companion. It is pulled by the black hole's gravitation and is in the process of falling down the black hole. On the way it gives off a complex fluctuating spectrum of X-rays. Moreover, this spectrum has experienced two sharp major changes in appearance, and these sharp discontinuities are the sticking points for models of its structure.

An early model, the so-called Lightman-Eardley model, proposes that the disk is divided into two sections, an inner optically thin region near the black hole that is highly radiant and an outer optically thick region that is less radiant. It explains the first sudden discontinuity in the spectrum by proposing that the inner region suddenly expanded at the expense of the outer.

But now Cygnus X-1 has switched back to more or less what it was before. The Lightman-Eardley model cannot explain the switchback so well, says Edison P. Liang of the University of Utah, and he and colleague Richard Price have reached into solar physics to propose a coronal model that they think works better. Liang described it at the recent Symposium on Theoretical Principles in Astrophysics and Relativity held at the University of Chicago.

Liang and Price divide the disk like an Oreo cookie. The middle (which can be called the photodisk by analogy with the sun's photosphere) is dense and fairly cool (about one million to ten million degrees K.). The top and bottom layers are the corona, hot (a billion degrees K.) and tenuous and each ten times as deep as the photodisk. Energy to heat the corona is carried by acoustic waves. Liang and Price can figure it out plausibly, with only one open question: how turbulence in the disk relates to the acoustic waves.

The coronal model, Liang argues, can explain better the two most salient aspects of the spectrum: that X-rays seem to come from two regions of quite different temperature and the sudden sharp changes in over-all shape. The sharp changes depend on appearance and disappearance of the corona, and so the model takes care of reversals quite naturally. A corona can be a transient phenomenon, Liang insists. The sun was without a corona from 1645 to 1715 "so it is not just a fairy tale that it can be on or off." □