course, long before the days of modern technology. But the difference is that men now occupy and utilize all land areas except those that are too cold, too hot, too dry, too wet, too inaccessible, or at too high an altitude for prolonged human habitation.

According to the United Nation's Food and Agricultural Organization (FAO), practically all the best lands are already farmed; future agricultural developments are more likely to result from intensification of management than from expansion into marginal lands. There probably will be some increase in forest utilization; but, otherwise, land use will soon be stabilized. In fact, expansion into new lands has already come to an end in most developed countries and is likely to be completed within a very few decades in the rest of the world. A recent FAO report states the probable final date as 1985.

The U.N. Conference on the Human Environment came therefore at a critical time in man's history. Now that the whole earth has been explored and occupied, the new problem is to manage its resources. Careful management need not mean stagnation. In many places, as already mentioned, the interplay between man and nature results in creative symbiotic relationships that facilitate evolutionary changes. Man continuously tries to derive from nature new satisfactions that go beyond his elementary biological needs—and he thereby gives expression to some of nature's potentialities that would remain unrecognized without his efforts.

Man has now succeeded in humanizing most of the earth's surface but, paradoxically, he is developing simultaneously a cult for wilderness. After having been for so long frightened by the primeval forest, he has come to realize that its eerie light evokes in him a mood of wonder that cannot be experienced in an orchard or a garden. Likewise, he recognizes in the vastness of the ocean and in the endless ebb and flow of its waves a mystic quality not found in humanized environments. His response to the thunderous silence of deep canyons, the solitude of high mountains, the luminosity of the deserts is the expression of an aspect of his fundamental being that is still in resonance with cosmic events.

As was mentioned earlier, nature is not always a good guide for the manipulation of the forces that affect the daily life of man; but undisturbed nature knows best—far better than ordinary human intelligence— how to make men aware of the cosmos and to create an atmosphere of harmony between him and the rest of creation.

Humanizing the earth thus implies much more than transforming the wilderness into agricultural lands, pleasure grounds, and healthy areas suitable for the growth of civilization. It also means preserving the kinds of wilderness where man can experience mysteries transcending his daily life, and also recapture direct awareness of the cosmic forces from which he emerged. It is obvious, however, that man spends his daily life not in the wilderness but in environments that he creates—in a man-made nature. Let me restate in conclusion my belief that by using scientific knowledge and ecological wisdom we can manage the earth so as to create environments which are ecologically stable, economically profitable, esthetically rewarding, and favorable to the continued growth of civilization.

NEWS AND COMMENT

Drug Abuse: Methadone Becomes the Solution and the Problem

New York. In recent months patterns of narcotics addiction and drug abuse have changed drastically in New York and other East Coast cities. In the face of a highly successful federal crackdown on suppliers, the use of heroin has fallen sharply.

At the same time, methadone, the synthetic heroin substitute, has emerged both as the primary mode of treatment for addicts and as a major black-market commodity. Thousands of addicts are now enrolled in methadone maintenance clinics; thousands more buy a daily dose from their local pusher.

Although there are some hazards and disadvantages associated with methadone (see box), the substitution of a methadone addiction for a heroin addiction is, in most cases, clearly an advantage for the drug abuser and for the public at large. Officials here are talking optimistically for the first time in the history of New York's heroin epidemic. "We're overtaking the problem," exclaims Health Services Administrator Gordon Chase, head of the city drug treatment programs, and he points to the following indicators:

► The incidence of the type of crime often attributed to addicts, such as apartment break-ins and street muggings, has fallen sharply.

► Police are arresting fewer addicts.

► There is less demand for drug treatment facilities.

► The numbers of overdose and related narcotics deaths are dropping.

New York, as the home of nearly half of the nation's estimated 300,000 heroin addicts, serves as an obvious indicator of the problem, and the situation here is reflected to varying degrees in changes across the country. The positive trends come at a time when the public is fed up enough with junkies and addict crime to be receptive to Governor Rockefeller's plans to put all drug salesmen—even people convicted of selling as little as a gram of hashish—away for life without parole. Although judges, police officials, and nearly everyone involved in drug treatment have all condemned the plan, the state legislature appears certain to take some sort of stringent action, even if it is not as harsh as what Rockefeller has proposed.

The current heroin epidemic certainly did not break out because of softness in the penalties for possession or sale of narcotics, however. And the encouraging trends now being noted stem, not from a reduction in the addict population, but from a massive switch to methadone.

During the past 2 years, local and federal officials have dropped their opposition to the methadone maintenance therapy developed by Vincent Dole and Marie Nyswander at Rockefeller University in the early 1960's and have accepted it as the main form of treatment

for addicts. More than 30,000 people in New York and 80,000 across the country now get methadone from treatment facilities along with medical and rehabilitative services. In New York another 8000 are enrolled in drug-free therapy programs.

With 38,000 addicts under treatment there will obviously be fewer addicts out stealing to support their habits. But there was no sharp change in the drug situation until last summer when a concerted federal effort, aimed primarily at middle-level pushers, began to pay off and the supply of heroin virtually dried up.

Heroin, except in very dilute form, still remains unavailable in most neighborhoods, according to both junkies and law enforcement officials. The current heroin shortage—the longest and most severe in memory—has not, however, led to an increase in crime such as occurred during "heroin panics" in the past. Instead of stealing more to buy scarce and expensive heroin, addicts have been able to purchase methadone instead. Methadone pills—virtually all are the 40-milligram discettes manufactured by Eli Lilly and Co.—are available on the streets in what can only be described as wholesale quantities. Ask around any New York neighborhood with a high addict population, and, no matter what your appearance, you'll probably be able to buy a few methadone pills or "biscuits" as they are called in the streets.

The street price for methadone biscuits has stabilized at $5 apiece and addicts generally take one or one-and-a-half pills per day. Thus, for less than $10 per day the addict is able to support a habit that cost him upward of $30 when he was on heroin. For this reason the widespread use of illicit methadone is thought to be a major factor in the recent fall-off of addict-related crimes. And, because methadone (as usually taken here) does not produce a euphoric high, it seldom leads to addiction by persons not previously on drugs. It is used primarily by heroin addicts to stave off the agonies of withdrawal.

The massive diversion of methadone to the street market is the latest problem in the arduous history of methadone therapy. "It's curious that just when it looks like we're making real progress more people than ever are criticizing methadone," said Vincent Dole.

For Dole, the development of methadone maintenance has been a long and often bitter struggle. At first he faced continuing harassment from federal narcotics officers who had moral objections to treating addicts with a substitute narcotic. And in the early years of the Lindsay administration, the city actively opposed methadone treatment, relying instead on psychologically oriented therapeutic communities.

The city even built its own therapeutic community (TC), Phoenix House, the largest in the country. But Phoenix, like other TC's, quickly proved to be far less than a solution to the drug problem. A combination of the evangelical abstinence of Alcoholics Anonymous with the latest modes of pop psychology—encounter groups, support groups, and marathon sessions—the TC's are live-in facilities that try to attack what is seen as the basic psychological defect that leads to addiction. The TC's impose a group ethic on their residents, reinforcing what is seen as positive behavior and punishing the negative.

Brutal Confrontations

Among them, the TC's show interesting similarities. Visit any of the facilities and you are greeted by a bunch of overwhelmingly sincere youngsters who talk about the need "to get in touch with their feelings" and to "stop acting out their negative emotions." Residents of TC's face an endless series of meetings where they brutually confront one another over virtually every aspect of their past and present lives.

For some addicts the TC's were useful, but for many others the confrontations and the enforced conformity proved to be too much. The first doubts that the TC's could dent the drug problem came with the enormous numbers of "splitees"—people who simply walked away. Few reliable figures are available for a "cure rate" for addicts in TC's. But the Ford Foundation's recent study *Dealing with Drug Abuse** said, "it would be surprising if careful evaluation showed that more than five percent of those who come in contact with [therapeutic communities] are enabled to lead a reasonable drug-free socially productive life."

The TC's were expensive and paid off with limited and fuzzy results at best. Methadone, on the other hand, offered good results at a relatively small price. Studies have consistently shown that at least 80 percent of the addicts who begin methadone maintenance stay in treatment for a year, and far fewer drop out in succeeding years. For politicians faced with demands for immediate action the choice was obvious. Not only did the city begin supporting the hospital-based methadone programs such as the huge Bernstein Institute at Beth Israel Medical Center, which became the base of the Dole-Nyswander experiment, but the city set up its own program, which now treats nearly 10,000 patients.

Critics of methadone treatment often charge that it is nothing more than "legalized addiction." Dole and Nyswander have themselves assumed that an addict's body undergoes permanent metabolic changes that make it virtually impossible for him to live the rest of his life without some kind of narcotic. (This remains one of the most hotly disputed points in addiction research.) And addicts do not suddenly change by virtue of switching their habit from heroin to methadone. A person accustomed to living by stealing, for example, might not stop just because the methadone removes the need for him to steal $30 or more each day. Statistics for methadone patients show that the number of arrests does not drop immediately among those enrolled in a treatment program. Rather, the arrest figures decline slowly over the first year.

Methadone's most obvious advantage is that it reduces the danger of drug overdose, the constant hustle, the need for criminality, hepatitis-causing needles, and other horrors of the heroin addict's life. The methadone patient, though still suffering drug addiction, has a chance to lead something more nearly approaching a normal life. Methadone programs usually concentrate on practical types of counseling services—helping the patient find a place to live, get on welfare, or look for a job—with psychological intervention only for those who obviously need it. To date, the approach seems to be working. A recent study of patients enrolled for 4 years or more in the Beth Israel program and at Bronx State Hospital by Frances Rowe Gearing of Columbia University's School of Social Work revealed 82 percent to be "socially productive," that is, employed, in school, or taking care of the home. When this group of people entered treatment, only 36 percent of them were socially productive. The patients in this particular study, however, were the pioneers of methadone treatment, carefully selected and given close attention. Success in

* Praeger, New York, 1972.

rehabilitating the large numbers of patients now in treatment is expected to be somewhat more modest.

Methadone maintenance treatment is not without problems. The most serious of these is that the patients, relieved of their need for heroin, sometimes turn to other drugs. They may take barbiturates, alcohol, or, if they can afford it, cocaine, on top of their daily methadone dose. For the proponents of therapeutic communities, this represents the primary failure of methadone. In their view, an addict is rehabilitated only when he is off all drugs.

"If you say success is having people abusing no drugs at all, then methadone probably has a 2 percent success rate," concedes Robert Newman, head of the New York City methadone program.

According to Bernard Bihari, former director of the drug addiction service at Beth Israel's Bernstein Institute, "Twenty percent of the patients in the best-run methadone programs become alcoholics and half of these people drink life-threatening quantities of alcohol." Bihari said "comparable numbers" of addicts abuse other drugs (mostly barbiturates), and often patients take pills and drink wine at the same time.

For Newman and other proponents of methadone treatment, much of the concern over abuse of other drugs is a misdirected moral question. "Some of our patients," says Newman, "are upstanding citizens. Others are child-molesters. And there is every type of person in between. Certainly we have alcoholics on methadone. Certainly we have barbiturate abusers." But he maintains: "Our only goal is to give the patient the ability to function however he or she wants to—to help them stop spending their lives chasing after heroin—to give them control over their own destinies."

The specter of large numbers of addicts, most of them young, black, or Puerto Rican, coming to clinics every day for a narcotics fix is an aspect of methadone treatment which troubles many people. Some critics say that methadone allows the government to gloss over the conditions in the ghetto which perpetuate addiction. They charge an entire generation of youth is thus abandoned to drugs and encouraged to live out their lives in passivity and stupor.

The people who run the methadone maintenance programs reply that methadone is by far the best treatment now available and that, as soon as a safe nonaddictive, nonnarcotic drug comes along they will use it. (Although highly touted from time to time by Nixon Administration specialists on drug abuse, antagonists—such as naloxone—have to date proved of little value.) "I have complete sympathy for those who fear that society will misperceive metha-

Relief from Heroin Craving without a Euphoric High

Despite its ever-widening use, much controversy and confusion remains about what methadone is and what it can do. Critics charge that the drug is nothing but a substitute addiction while some politicians see it as a panacea cure for heroin addiction.

Methadone was first synthesized in 1944 by German scientists to meet wartime shortages of morphine and other opiate pain-killers. In most of its effects methadone is similar to heroin, and the two drugs can be taken interchangeably to satisfy an addiction. Methadone, however, works when taken orally, and its effects last up to 36 hours—as compared to 6 to 8 hours for heroin.

Methadone has two uses in the treatment of heroin addiction. It is often given in decreasing doses over a period of several days to "detoxify" or wean an addict from heroin without the agonies of "cold turkey" withdrawal. Methadone maintenance treatment—regular daily doses of the drug—was developed on the supposition that most addicts quickly return to heroin after they are detoxified.

In sufficient doses methadone generates a "high" similar to that of heroin, but, taken orally, it does not produce the initial euphoric "rush" obtained from the injection of heroin. In the tablet form that is manufactured by drug companies, methadone is very difficult to dissolve for injection. As with opiates, the body quickly becomes tolerant to the drug, and increasing doses are necessary to achieve the high. The patients in methadone maintenance programs receive increasing doses of the drug during their first weeks in treatment until they are taking what is termed a "blocking dose"—80 to 120 milligrams per day in the Dole-Nyswander regime. Once stabilized on a daily blocking dose, the addict feels little effect from the drug. (The same result could be obtained with heroin, but it would have to be injected two or three times per day.) If a methadone patient tries to shoot up heroin in the usual quantity, he experiences no high. He also is free from any craving for narcotics. Methadone does not block the effect of any nonnarcotic drugs. Most addicts who buy street methadone take only the amount to which they are tolerant, and thus they do not feel high from the drug.

A certain percentage of patients on methadone maintenance feel a variety of side effects. But the extent of the side effects is often difficult to assess because the patients were taking heroin before they began taking methadone, and often the side effects of the two drugs are the same. Constipation and perspiration are the most common complaints. A few patients gain weight excessively, and some have continuing nightmares or are unable to sleep except for short periods. Methadone also seems to limit the sex drive and performance of some patients, particularly men. No long-term effects of the drug have been demonstrated.

A number of experiments are under way to determine if methadone maintenance patients can be taken off the drug altogether. Some drug treatment officials say that eventual abstinence should be possible. Dole and Nyswander say that, as a patient's life becomes stabilized, his daily dosage can be lowered to 10 milligrams, but that, if the dose falls below that level, he will again begin to crave heroin.

No methadone-overdose deaths have been recorded of patients in formal programs. However, for someone who is not tolerant of narcotics, methadone is potentially fatal. Close to 100 methadone-overdose deaths occurred in New York City last year and probably a 100 more occurred across the country.—R.J.B.

done as a cure-all for a serious social, psychological, and political problem," said Newman. "But at the same time you can't turn down what is a highly successful form of treatment for some people."

Such arguments have persuaded most officials here that methadone is worth a huge expenditure, and barring a major new breakthrough, this drug is likely to remain the main form of treatment for American heroin addicts.

If legal methadone treatment is offered so readily why then is there a black market and where does the street methadone come from? For one thing, expansion of the facilities has not yet matched the demand. Waiting time for an addict to be enrolled in a publicly supported clinic in New York is now between 2 and 6 weeks (compared to 6 months a year ago). Moreover, many addicts simply have no use for the inevitable red tape and inconvenience involved in attending a clinic—they would rather pay $5 per day and take care of themselves. Others are hoping that reasonably pure heroin will again be available soon, and they're just marking time.

One source of street methadone is the addicts themselves who enroll in a program and then sell all or part of their daily dose. A number of profit-making methadone clinics are known to require only minimal identification, and thus an addict may be able to enroll in more than one and sell his excess supply. (Regulations recently published by the U.S. Food and Drug Administration for the use of methadone are designed to cut down this type of diversion.) The massive quantities available on the black market have led many people to speculate that there must be some diversion from the manufacturer or through the distribution system. Spokesmen for Eli Lilly and Co. insist that the drug is sold only to federally licensed clinics. Addicts maintaining themselves on illegal methadone generally take one-half to one-third the dose given in programs.

The fact that methadone has reduced drug-related crime and has not led to the addiction of many persons with no history of heroin abuse is not lost on law enforcement officers. They seem to be ignoring the methadone black market. In New York, sale of methadone is a crime with a maximum penalty of 15 years in prison. Yet methadone sales are carried out with few of the precautions that usually accompany heroin transactions, and police records show few arrests for methadone sales.

At the federal level, there also seems to be a policy of "benign neglect" of the methadone diversion. Myles J. Ambrose, President Nixon's special adviser on drug law enforcement and Deputy Assistant U.S. Attorney General, was asked in a recent interview if the government was not cracking down much harder on heroin than on methadone.

He replied: "I wouldn't want to be quoted as saying anything like that. We're certainly not in favor of illegal methadone. But we have to keep a balanced approach. We want to be sure there is treatment available for all addicts before we come down hard on the illegal methadone.—ROBERT J. BAZELL

Bazell, formerly a reporter for Science, *now writes for the New York* Post, *reporting on drugs and other health topics.*

Drug Regulation: FDA Replies to Charges by Economists and Industry

Milton Friedman, the Chicago economist whose conservative philosophy dominated much of President Nixon's first term, stepped out last month to deliver a swingeing attack on the Food and Drug Administration (FDA). In terms of human suffering, he stated in an article in *Newsweek*, the public forfeit caused by the agency's delay in approving beneficial new drugs more than offsets the gain of being protected from dangerous drugs. The legal basis on which the FDA requires drugs to be proved both safe and effective, the Kefauver amendments of 1962, should be abolished, Friedman said, and maybe the FDA along with them.

The risk-benefit question raised by Friedman touches a crucial factor in the regulation of drugs. The FDA often ignores its many critics, but this was one it could not let pass. Hearings held this month before Senator Gaylord Nelson's (D–Wis.) monopoly subcommittee provided an arena in which the FDA came out fighting from its corner. In a 133-page statement, the director of the FDA's Bureau of Drugs, Henry E. Simmons, produced a detailed and sometimes eloquent defense of the FDA's performance.

Friedman's critique cited a "brilliant paper" by Sam Peltzman, an economist at UCLA, on the effects of the 1962 amendments. Peltzman assigned dollar values to the benefit from suppressing harmful drugs and to the harm from delaying the introduction of successful ones. He estimated the cost of a delay at 10 to 100 times the value of avoiding a thalidomide type mistake. For instance, to have postponed by 2 years introduction of the drugs that cure tuberculosis would have caused about 45,000 additional deaths and 90,000 extra cases of the disease. According to the Peltzman thesis, the 1962 laws requiring drugs to be safe and effective have cost consumers of drugs, over and above any benefits, $250 to $500 million per year at the very least, equivalent to a 5 to 10 percent tax on drug sales. The 1962 laws, Friedman concluded, "should be repealed. They are doing vastly more harm than good. To comply with them, FDA officials must condemn innocent people to death."

The FDA does not see its role this way. If anyone has massacred the innocent, it is the drug companies, Simmons' testimony suggested. After the 1962 laws were passed, the FDA had the National Academy of Sciences review the effectiveness of the 4300 drugs put on the market in the previous 24 years. For only two drugs out of every five could substantial evidence of effectiveness be found. Of 16,000 therapeutic claims made by manufacturers, there was evidence to support only one in five. To waive the requirement for proven effectiveness, as some critics want, would be to return to the errors of the past. And the eliminations of ineffective drugs is perhaps as important