CAUSES & CURE
OF THE
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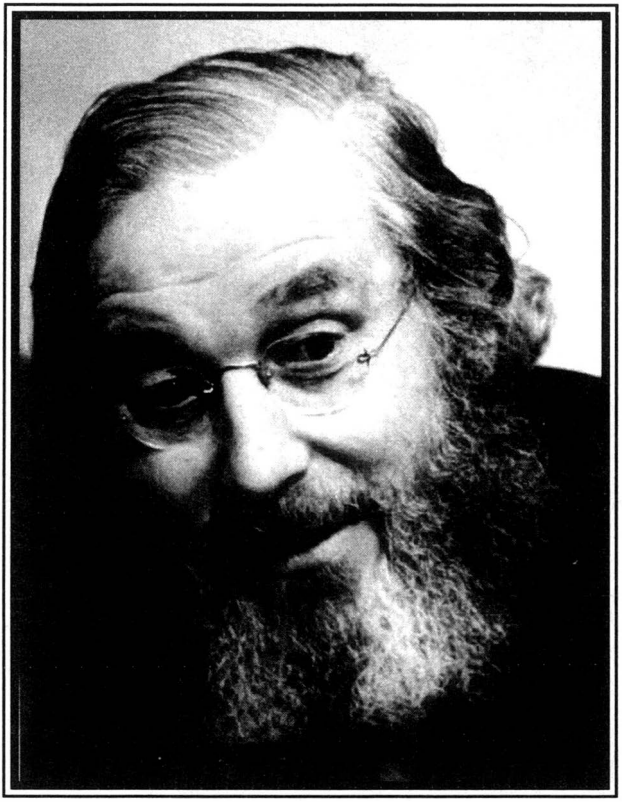

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FOREWORD

It has been the author's lot not only to write a few books and to publish a number of scientific articles, but also to review more of both. One disastrous consequence of the reviewing activity has been a tendency to develop rationalization in it. A fly-by of the first chapter, a swift reconnoiter of a middle page or two, followed by a precocious crib of the summary at the end, have, sad to relate, often been the sum total of real work put into a review article.

There is a deal of truth in the statement that it is not necessary to drink a whole barrel of beer in order to be in a position to judge the quality of it. A drop will do — assuming that the contents of the barrel are really homogeneous.

However, in a complex subject (like that of drug abuse, for example) homogeneity is sometime difficult to arrange for. There are often so many aspects of the problems to be considered that the "one drop" technique of testing (i.e. reading) for quality is likely to give bizarre results. I myself have read some fifteen or twenty reviews in German, French and English on Monod's best seller "Chance and Necessity". One would scarcely guess that some of these reviews were dealing with the same book. In fact, I have a sneaking suspicion, judging from the discontinuity of content of the fifteen or twenty articles on "Chance and Necessity", that some of the illustrious reviewers had not a clue on what the more illustrious author was really talking about. I fear, too, that the "one drop

technique" (here a little and there a little) is at least partly at fault, but the reviewers examined, unfortunately, different drops. This technique can lead to some remarkable discrepancies in dealing with the complex technical literature of today.

The problem of drug abuse is no exception to the above. It is, to say the least, highly complex, and also very widespread in Western culture. It is Problem No. 1 of the NATO forces the world over, to say nothing of the problem of universities and other institutions dealing predominantly with the younger generation. The NATO forces have set up immensely costly programs to deal with drug abuse. Searches of whole military bases for drugs, with the help of specialists and police dogs, are the order of the day in the attempt to control drug abuse. First of all, scare tactics were used by the authorities to frighten people off drugs. Hair-raising stories were retailed by "experts" who often had little first hand information on the subject. But they repeated them so often that in the end they themselves began to believe what they said. However, as the association between lung cancer and cigarette smoking has shown, this tactic does not show much success even though the scares may be well based. The quiet hashish smoker has had no experience of the subject of the scare.

After scare tactics, threats have been used — draconian measures have been threatened and put into effect for possession of small amounts of marijuana. But threats did not work either. People in hundreds, mostly youngsters, have been sent to jail for long periods for little other crime than possession. The law and its threats did not solve the problem. Then amnesties have been used. If a military man turns himself in for help in drug abuse, he is guaranteed freedom from punishment. All the same, it is, of course, impossible to avoid discrimination against him, for he must be removed from certain jobs if he has exposed himself to LSD and similar drugs. Thus his amnesty will often result in his sweeping the floors instead of doing his skilled job.

On top of all this there is the most serious problem of all — the alcohol problem, bringing with it decreased efficiency at

work, increases accident rate, broken families, cirrhotic livers, violence and personality changes. The alcohol drug is legal, though dangerous to some. But other drugs, sometimes more dangerous and sometimes less so, are definitely illegal. The user of the illegal drug feels bitter in the extreme that the establishment colonel can have his particular pet (and potentially dangerous) drug like alcohol or nicotine, whereas he (the user of the proscribed drug) may not. This fact produces, quite naturally, alienation — which is, to say the least, a bad thing in any highly integrated society.

It is clear that we have on our hands a pharmacological problem, but one which is inextricably mixed up with human and psychological complications. The fact is that the whole problem of drug abuse is almost hopelessly complicated. Yet we believe from our own experience that there are, in spite of the complexity, relatively simple, practical solutions. This being the case, one can scarcely expect this particular barrel of beer to be homogeneous. It is highly stratified, to say the least.

May the author then suggest, in all humility, that the particular beer and fare offered in this book cannot be sampled on the one drop basis without grave risk to the value of the whole menu and the reader's digestion. It is intended that the aperitif be taken at the beginning, in chapter one. The red and the white wines are offered towards the middle, and the coffee is served at the end. Cheating the cook by sipping the closing coffee at the beginning, mixed with aperitif, can have unpleasant reactions even (and perhaps especially) on the trained palate! A sequence of menu has to be offered to treat a subject such as that of drug abuse. Destruction of the sequence will destroy the work of even the best cook, who has had the palate and the digestion of his dinners assiduously in view in working out his varied but easily spoiled menu sequence.

CHAPTER I

THE DRUG CULTURE AND ALIENATION IN SOCIETY

We all know that Western society is passing through an unprecedented wave of drug culture. But not everyone seems to be able to give a coherent account of any real, concrete, causative *reasons* that there might be behind society leading towards drugs so suddenly. For drugs of most types, including the psychedelic ones, are almost as old as man. Yet it is only recently that affluent Western society has become a hotbed for the epidemic growth of psychedelic and other drug cultures.

We have not forgotten about the use of cannabis (psychedelic drug) in ancient and modern societies, particularly in the Orient. We certainly have not forgotten that the West's most serious drug problem is still alcohol. Both opium (opiates) and hashish (psychedelics) were popular in ancient Chinese cultures. Cannabis preparations have been as popular in India in the past and today as tea is in England now. We realize too that heroin and cocaine cultures have long existed in the big cities of the West. The mescaline (psychedelic) type of drug is still an integral part of the religious culture of certain American Indian tribes, and is officially allowed by the United States government for this purpose. The natives of the Andes chew cocoa leaf (cocaine) as an anti-fatigue drug, just as the Westerner will drop an amphetamine for the same end. However, *specifically psychedelic drugs* are relative newcom-

ers to *Western culture.* This in particular is the new and striking factor in Western drug abuse.

Psychedelic Drugs

Western culture (in contrast to certain Oriental cultures) has developed to an unprecedented degree of complexity and prosperity until recently without the use of psychedelic drugs being an integral part of its way of life. Again, we realize that alcohol and nicotine have long been a part of Western culture, but neither of them are psychedelic in nature. Western culture developed by and large without the use of psychedelics. Indeed, the West has got on quite well without the use of drugs for its cultural purposes, excepting, as noted, for nicotine and alcohol. Its medicine has used practically everything in the way of active substances for drug purposes, perhaps more than any previous culture. But, in general, Western culture has made almost no use of specifically psychedelic drugs for non-medical ends. And in this point it has differed from many Oriental cultures — and religions.

Generally speaking, the Establishment in the West regards the cultural use of drugs (excepting nicotine and alcohol), to say nothing of their religious use, as rather primitive, disgusting and perhaps decadent as well. Many regard such drug use as a reversion to primitive, oriental native practices, and prophesy doom on the modern Western drug culture as a result. The Western Establishment certainly feels threatened by the new phenomenon. In fact, the threat to its own order is taken so seriously that widespread international policing schemes costing millions of dollars yearly have been worked out and put into practice.

These schemes try to stop the drug sub-culture from functioning by cutting off the supplies of the drugs it needs to survive. And yet about half of all American college students today have had personal experience of at least the mild psychedelic marijuana or hashish. A large number use it on a regular basis, in spite of the serious complications which can arise with the law if they are caught with the drug.[1]

But precisely why does the Establishment feel itself so threatened by this new epidemic psychedelic drug culture when its old alcohol problem is worse? There are many very good reasons, of course, but one is surely that we often fear what we do not understand. the lack of comprehension of the meaning of the (for Western culture) new psychedelic drug epidemic, as evidenced by the widespread use of the relatively new social drug marijuana, certainly plays a part in the generation of the fear and panic at present being manifested by the Establishment, and as evidenced in the draconian measures it has been working out against it and putting into practice.

Again, we are not speaking of the older types of drug culture involving heroin and cocaine, which may produce serious drug dependence or other toxic consequences. This type of drug abuse is, medically and sociologically speaking, certainly grave in its consequences. Nor are we speaking of "speeding" which, as everyone knows, kills. We are speaking of the extraordinary fear of mild psychedelics such as marijuana. Plain fear often leads to unreasonable actions on the part of the fearful. What could better illustrate the consequences of unreasonable fear than the imposing of ten or even twenty years imprisonment for mere possession of a non-habit forming drug which is relatively non-toxic if not used chronically, while at the same time legalizing a quite toxic habit forming drug like tobacco, which produces not only circulatory and pulmonary disturbances but is also associated with cancer of the lung when used chronically? Why legalize a drug like alcohol, which is not only very powerful and may produce in certain people severe personality changes together with liver cirrhosis, but is also habit forming? Both alcohol and tobacco are quite dangerous dependence producing substances, while the relatively new social drug is not. The toxicity of tobacco is now so well established that the Surgeon General of the USA has had to order a reference to that fact to be printed on every packet of cigarettes.

The question we shall have to examine in the following pages is whether fear of the new drug is justified or not.

Without wishing to anticipate the following chapters, it can be fairly stated that almost all social drugs would be better avoided if possible. Let us use drugs to correct pathological conditions that can be corrected by drugs. We have been, however, so anxious to avoid the introduction of yet another toxic factor to our social environment that marijuana is certainly over much feared. As a consequence, propaganda against the drug has been produced to such an extent that the youngsters with practical experience of the drug just laugh at it, and believe it no longer. Of course, toxicity is present, but this fact has not been presented in an unbiased, credible and acceptable way.

Marijuana Effects and the Military

Military commanders whom I have consulted concerning drug abuse are worried about the social use of drugs in their commands. Of the GI's in Europe I have spoken to confidentially on drug abuse, some 70% had psychedelic drug experience. 20% of the men who came to me after demonstrations in Europe had psychedelic drug experience on the same day that they came to me. Yet, in spite of this and its seriousness in affecting certain aspects of the efficiency of military commands (to be discussed later), the colonels and generals have usually informed me that what worried them even more than the social use of hashish was plain alcohol abuse. It was causing violence and personality changes as well as car and other accidents. The general opinion was that while marijuana and hashish amotivated the men, made them passive, at times slovenly (though not always), while sometimes producing the "omnipotence syndrome," alcohol was the most acute problem in causing positive social harm. The fact is, of course, that the Establishment has legalized its own particular drugs, alcohol and tobacco, while forbidding the "new" social drug cannabis. This fact causes resentment and alienation among the younger members of the new psychedelic drug culture, who feel they are being discriminated against. This resentment comes out especially on days when the military commander celebrates some feat of athletics, or some good result of an inspection in which his command has turned out well. In his magnanimity he orders free *beer* for all! Naturally

enough the young marijuana users, who sometimes do not appreciate beer and alcohol, feel hurt that the Establishment's social drug is doled out free as a reward, while they are threatened with dire disciplinary action if they are caught using their own social drug.

The fact is that the Establishment drugs, alcohol and tobacco (both of which are quite toxic as well as dependence producing from a physiological viewpoint, while one, alcohol, causes personality changes as well) are permitted, although society would probably be much better without either of them, while the social drug of the "new" subculture, cannabis (hashish, marijuana) is banned. Furthermore, the Establishment has obviously invented all sorts of scare stories to frighten the new subculture away from its social drug of choice. Of course, those with experience of their drug just laugh in the face of the scare mongers, whose stories do not line up with their own experience. The resulting credibility gap leads to alienation between the cultures. The establishment and the new subculture do not take one another seriously any more, which is, to say the least, a bad thing. For alienation between layers of society disrupts that society. One only needs to note the success of a book like "The Greening of America" by Charles A. Reich,[2] describing this alienation, to understand the process. The book has certainly caught on and its message of alienation is spreading rapidly.

In addition to this threat of pure *alienation* resulting from differing views on drugs and their culture, there comes a second, even more disconcerting threat to the Establishment. It is the threat of a flourishing subculture in its midst which has diametrically opposed ideals and aims in life to its own. The ruling Western culture has always worked on the principle and ideal of merit based on personal competition. Competition between individuals and merit have always been the basis of American and Western industry and society. From its merit and competition based industry, America has supplied the world with goods and become wealthy and prosperous in the process. The new drug culture, however, generally rejects the whole concept of competition, especially that based on per-

sonal competition. Deridingly, it dubs the Establishment a meritocracy. Accordingly, the new culture is interested in banning all competitive examinations at school, college and in industry. A good treatment of the whole subjects is to be found in Charles A. Reich's book mentioned above.

This attack on competitiveness, if it is successful, must have grave consequences for a society whose whole business, political and academic structure is squarely based on competitiveness. The effect on the military will be just as marked, for the system of military promotion is based on just the same principle. Its removal would damage the military power of the Establishment. Thus, a foundation stone of Establishment society which is, in the last analysis, founded on military and police force, is being attacked. No wonder, then. that fearfulness abounds where the new social drug is concerned.

What is to be put in the place of competitiveness in society's hierarchy? The answer is simply that everything is to function on the basis on non-competitiveness. Expressed otherwise, laissez-faire, just let things drift, they will sort themselves out all right in the end. If we consider, in the light of the above, the fact that precisely the social use hashish in Oriental cultures over centuries has accompanied just this same attitude of lethargy, laissez-faire, amotivation, we have cause for serious thought. Hash and cannabis in fact generally produce and reinforce the symptoms of lethargy and non-competitiveness.

The attitude of the new drug culture to science also differs from that of the Establishment. There has been in most Western cultures in recent years a quite massive turning away from science and technology. One can understand this swing when one remembers that it has been science and technology which have been used to fight the two most destructive wars in history, while producing at the same time the "consumer society." It has been science and technology which have given the Establishment the power, at home and abroad, with which to rule over others. the race to the moon highlighted the fruits of scientific and technical superiority. Western technology and Western medicine certainly demonstrated their superiori-

ty over their Communist counterparts in this race. They got men to the moon and back safely many times, whereas the Communists did not succeed even once.

But things are changing today. Science and technology are waning in their reputations. Allegedly they destroy our environment. They are certainly no longer worshipped. Indeed, they are hardly even respected in some circles now. This shift in wide sections of the public in the United States has even cost the country the doubtful advantage of being the first into the market with a supersonic passenger aircraft. Certainly the members of Charles A. Rich's Consciousness III are with this swing away from science and technology as ends in themselves — although the members intend to use science and technology to build up their own paradise on earth.

But the swing away from science and technology even in the Establishment is here. Consciousness III is right in the center of this swing. The older generation knows that its power rests in its own use of science and technology for its own ends, for they consolidate their own power over the culture. If, however, Consciousness III could corner the application of some of the power residing in science and technology, then the Establishment's power would be reduced. The Establishment therefore fears Consciousness III when it calls for science, as a means to Establishment might, to be unceremoniously thrown out.

Research and Psychedelic Drugs

But again, why the swing away from science? Many examples could be cited to illustrate the reasons for this swing, but let us take one that will be of interest to those concerned with the meaning of the drug culture.

Dozens of articles are now appearing in scientific literature describing the pharmacological, physiological and psychological effects of taking tetrahydrocannabinol and other drugs which alter the state of consciousness (ASC drugs). These scientific research projects have usually been very well endowed with Federal, that is, with taxpayers' money. Their authors get promoted in their scientific careers for having been entrusted

with the often lavish grants. The more money received, the greater the degree of promotion that follows and the more important a person the grantee is — whether he wastes the money or not!

When the work carried out comes up for publication, its scientific content can usually be summed up in terms of the measurement of increases in heart rate, reddening of the eyes, increased appetite and (often) difficulty with memory, after smoking marijuana. All this information is tied up in sometimes rather superior scientific jargon, giving involved accounts of responses to I. Q. and other tests to which volunteers were submitted while they were stoned. Usually there are remarks to the effect that no acute or chronic toxicity could be observed, owing to the short term nature of the particular test.

Now the young regular user of marijuana or other ASC drug, who is quite likely to be an intelligent college student, on reading expensive solemn scientific reports of the above nature on the effects of getting stoned, either simply laughs with genuine mirth at them or he sneers at the obviously incredibly low I. Q. of Establishment science manifested in setting about the problem of investigating marijuana. For every line of the jargon on the report betrays to the amused marijuana initiate that the poor Establishment scientist has not the slightest notion of what being stoned is all about.[3] Being stoned has precious little to do with pulse rate, red eyes, appetite or even with memory! Thus science becomes slightly ridiculous in the adept's eyes. It measures blood pressures and pulse rates as a valid measure of being stoned!

For the marijuana initiate, the slight rise in pulse rate with no perceptible change in blood pressure, the increased appetite, the reddening of the eyes and the difficulty with memory under the use of cannabis are the merest of mere irrelevant side effects which have nothing whatsoever to do with the meaning of the psychopharmacology of cannabis and getting stoned with its help! Who but a prepubertal castrate would ever go about investigating or describing the meaning

of orgasm in terms of increased appetite, reddening of the eyes and maybe increased pulse rate? And, says the marijuana initiate, who would ever try to describe the ecstasy, the mystical union, the rapture, the space and time transcendency and trans-personal knowledge experienced by the stoned adept in such terms as blood pressure, increased appetite and conjunctivitis? He concludes, therefore, that the present Establishment culture has "prepubertally castrated" the humanity of the Establishment and its science, thus robbing them for ever of the experience of the rapture mediated by ASC drugs under some conditions. Rapture is not measured in terms of mere blood pressure, though rapture may alter blood pressure!

So the marijuana user is, on reading the scientific investigations on his drug of choice, just confirmed in his view that Establishment society blindly fears him and his culture just because it does not, indeed cannot, understand either. It does not know anything about the beatific vision of the psychedelic peak — just as the prepubertal castrate knows nothing of the hidden world of sex and its heavens or hells! The very fact that the "scientific castrate" is asked to investigate ASC drugs without understanding altered states of consciousness, just confirms the drug initiate in his view that the old forms of society are incorrigible as well as ignorant. By their own standards, he argues, they ought to be at least competitive and not just waste millions of their own taxpayers' money on foolish attempts to elucidate something they know precisely nothing about first hand. Our "prepubertal castrate" could describe sexual intercourse and its joys better than they will ever describe the psychopharmacology of being stoned — that is their view.

This means that the adept has become convinced that nothing much can be done to help a society and its science so incapable of understanding the new ASC drug culture. Thus the alienation gap between him and the society that bore him widens. He begins to despise his rulers and their scientists as his rather ignorant adversaries so much that he will risk huge fines and imprisonment by continued drug use. He feels sure

that the enemy fires will, in the course of time, burn themselves out — as they always have done when new knowledge appeared. The initiate will even risk his personal career to obtain the "in" feeling, the ecstasy, rest, peace and beatific vision of the ASC drug about which his peers and surrounding society know nothing — and want to know nothing. He becomes a member of an esoteric society in "barbarian" enemy territory.

Thus one can begin to understand the alienation which characterizes relationships between the Establishment and the new drug subculture. Communications are progressively deteriorating. In the end the young adept just drops out in desperation or disgust, simply giving up the hopeless job of trying to get the others to see his point — and allow him his drug experience. When he does this, the Establishment promptly does him one further injustice by saying that the whole exercise of dropping out is just one of "escapism". If it is really an escape to transcendence and ecstasy from the rat race, who can blame the young adept?

The Swing to Psychedelic Drugs

The Establishment does not, then, really understand why the younger generation is taking to ASC drugs. It thinks it knows, maybe, why people take to alcohol. For alcohol is an anesthetic (as well as, in very low dosage, a tranquilizer) and, in high dosage, with it a man drowns his troubles in oblivion after he has experienced his initial "high". The same applies to other dependence producing drugs such as the opiates, including heroin, morphine, codeine and the barbiturates. They offer a pleasant way of anesthetizing oneself and reaching a pharmacological "nirvana". The end of the drinker's booze up is unconsciousness under the table. And the end of the heroin addict's spree, after a "high" which he could only really obtain in the early stages of addiction, is "coasting" or "going on the nod", that is, anesthesia, analgesia.

But the younger generation does not possess the same tastes in drug experience as the older generation. The younger generation wants really to experience more, not less — not anes-

thesia, such as the older generation wanted. It does not want oblivion, but more and new consciousness. In fact, the younger generation wants not only increased consciousness but changed, altered, increased and transcendent consciousness — that is, a better and altered state of consciousness, not the unconsciousness of the older generation.

The Establishment today knows little even about the changed consciousness state which occurs by means of religion and religious exercises without drug use. It rarely, if ever, fasts and prays, perhaps, as little as it decently can. It therefore does not know even the "natural" changed consciousness state of transcendent experience such as is regularly enjoyed in and after Christian conversion, and about which a good minority in any Western society knew and had experienced practically and personally in generations gone by. There was always a reservoir of individuals, particularly in England and the United States, who knew first hand about "all things becoming new for him who is in Christ."[4] They knew from personal experience that the words of the hymn were expressing true experience when a man saw the "sky as never so blue and the earth as never so green" after the mystical union with Christ in conversion and full surrender.

Natural Altered States of Consciousness

Thanks to the superficial, mass preaching of the "gospel" in Western countries, which often consists of more soul "massage" than of real repentance followed by real mystical union with Christ, this reservoir of "natural", religious ecstatic "high" experience has largely disappeared in our culture — at least in Continental Europe this is the case. Very few individuals today know much about the mystical experiences described by the prophets of old, including the Biblical prophets. If they do, they are too often classified as "sectarians" lacking in sobriety. There are two most important consequences of this state of affairs which we must now examine.

In the first place the general public has gradually come to regard any "natural" mystical experience and altered state of consciousness as a sure sign of approaching insanity. It knows

nothing of such states itself, and therefore rejects them with disgust in others. It forgets, of course, that day dreaming as well as ordinary night dreaming both belong to the category of the altered consciousness experience which it reflects. Nevertheless the reaction is only to be expected, for most people have a tendency to reject what they do not understand and have not personally experienced.

The second matter is more important. From experiments on dreaming coupled with rapid eye movement (REM), we know that the altered state of consciousness known as dreaming at night is helpful in maintaining normal sanity. Steal a man his dreams (ASC) by waking him every time he betrays that he is dreaming (that is, in an altered state of consciousness) by showing REM, and after a few days, or at most weeks, he will become abnormal, restless and slip into an anxiety state.[5] That is, the ASC state known as dreaming is vital to mental health. It would seem that religious mystical experience, representing (like dreaming) an altered state of consciousness). And the Bible promises to make him *whole* (mentally and physically) in providing him with just these joys now and for evermore at God's right hand.[6]

If, now, a whole society reaches a state of starvation and deprivation with respect to transcendent joy and ecstatic experience, which are essential to it, that society will become sick and therefore attempt to get what it needs in the way of ASC by any available means. Thus, our present materialistic society is a sick society suffering form lack of transcendent (non-materialistic) experience. As such it will try to satisfy this deprivation either by getting natural ASC in religious revivals, such as we see in the Jesus people and other movements, or in unnatural, synthetic opiate or psychedelic drug experience.

Our current European religious leaders do not give much evidence of knowledge or even wisdom concerning ASC. The result is that parents have never been in a position to introduce their children to these matters — for the simple reason that parents themselves have seldom had any such *experience and cannot* therefore pass it on to their offspring. Thus, not only

the older generation, but the younger one too, is desperately deprived in this area. The more adventurous of them go off to the ASC drug culture (usually not the opiate, barbiturate or alcohol culture) to find out about the sources of experience of this nature for themselves. It would be ridiculous to suppose that youngsters do not exchange notes on their ASC experiences under psychedelic drugs. If one talks about beef steak to a starving man, his desire for that form of nourishment is going to get ravenous. As soon as the starved, deprived young man or girl of the rat-race hears of transcendent experiences, a bell is rung in his or her psyche and both know that this is for them.

Aldous Huxley, in his famous book entitled, "The Doors of Perception", brought to the notice of a wider public how he, following the example of some orientals, had obtained his transcendent ASC ecstatic experience by means of psychedelic drugs. Such experiences are just what the younger generation has long been looking for — as indeed Huxley himself admits — starved as they have been of transcendent joy by having known little but the rat-race run by their fathers and mothers before them. Their purely materialistic upbringing in homes, schools and universities had taken good care of this for generations. They discovered, therefore, just what they needed when they sensed what Huxley's experiences undoubtedly helped to touch off; the psychedelic drug epidemic in the West, for the circumstances — scientific materialism for a century — were just ripe. A transcendentally deprived generation was, quite unconsciously, just ready for the psychedelic drug to give him the "religious" experience of which he and two or three generations before him had been starved. Thus, the ASC conflagration is great. The hay was dry and the spark, the drug (LSD, Mescaline, Hashish, Psilocybin), was handy.

Summary

In summary we conclude that some of the alienation existing between the generations arises at least partially from the fact that the older generation needs the joy and ecstasy of ASC but has not found out how to get it in the normal healthy

channels of religion or culture. For this deprivation the religious and cultural leaders are doubtless at least partly guilty. The result has been that a joy-deprived generation has arisen which genuinely is at a loss to know how to supply what both it and its children desperately need — real joy. A vastly materially wealthy older generation is desperately poor in *quality* of life — poor but not in gadgets, telephones, radios, TV, music, food or clothing, but in quality of experiential living. It is literally stuffed full of goods but starved of meaningful transcendent joyous experience of life. The consequences are the malaise and alienation which afflict all aspects of life in well-to-do, affluent society.

The younger generation, being the heir of the older generation, is of course, deprived too. Its science has robbed it of any belief in the transcendent or Divine at all — Darwinism and Neo–Darwinism have long since taken care of that. In the East, the official state religion is, in fact, atheism, based entirely on the Neo–Darwinism developed in the West. But even though our generation thinks it cannot believe in God, it is nostalgic after transcendency, eternity, meaning and beauty. This nostalgia has made it sick, as it were, unto death. Parents and teachers cannot supply the medicine of eternity it needs, so the young people turn to drugs to help them out. The older generation seeks a solution in drowning consciousness and nostalgia in alcohol, opiates, nicotine and barbiturates, while the younger generation guesses better what is wrong with it from simple deduction. It has tried the remedy offered — synthetic ASC — and finds that it works and meets its needs, even though there may be some undesirable side effects.

However, due to the current alienation between the two cultures — for that is what it amounts to today, a culture alienation — the older generation thinks that the youngsters are going to the dogs because it equates ASC drugs with opiates like heroin or with amphetamines or barbiturates. It has no means of understanding the youngster who experiences an ASC by the use of psychedelic drugs, because it has never experienced for itself a natural, genuine altered state of consciousness of any kind — except that of dreaming or day

dreaming, perhaps. The problem is the same as we have already mentioned. A prepubertal castrate cannot appreciate the joys of sexual intercourse for the simple reason that he is by castration a deprived person and cannot have that experience. No amount of explanation is going to really help him to understand the joy of sex either. Similarly, our culture is almost exclusively materialistic, and as such has therefore and thereby "castrated" man of the very idea of the transcendent and its ASC.

The Reaction of Society

The reaction of society to the ASC drug culture is predictable. It does not understand. It cannot understand. It has been "castrated" from having been deprived of natural ASC for too long. Since it cannot understand because it has no personal experience, it therefore fears the secrets of others. It warns about the 'killer drugs" and tries to scare the youngsters off their ASC drugs, which it confuses with opiates and barbiturates.

Of course, it is absolutely useless for society to adopt this attitude. For society itself knows that scaring rarely is effective. Every pack of cigarettes smoked by society in the USA and UK today is marked with "Cigarette smoking may be hazardous to your health." Yet people risk cancer of the lip and lung by smoking. Scaring does not work. In fact, manufacturers use the government toxicity warning as an advertisement today to prove their tobacco's potency!

Let us face it, the tranquilization produced by tobacco is, in their own view, worth the risk of a terrible, agonizing, choking to death by drowning in one's own blood as a result of lung cancer. I myself have seen relatives visit patients dying a shocking death from lung cancer, and immediately after leaving the bed of agony, disgusting agony, light up a cigarette themselves. Why try, then, anything as ineffectual and fatuous as scaring, to combat the drug culture? To resort to scaring shows that the scarer believes the persons he wants to scare are often more rational than the scarer himself is! For scarers of ASC drugs are often smokers themselves, and only a quite

small minority do allow themselves to be scared out of cigarette smoking. How can we expect the marijuana smoker to react differently or more rationally than the cigarette smoker?

It is, then, quite useless for the Establishment to warn and scare about "blowing one's mind" by using ASC drugs. The adepts know more intimately about this than the Establishment. Yet they are still willing to risk it for the sake of the transcendent experience and "El Kif" (the great peace) which they do not know how to get except by their drugs. They are, in fact, experimental idealists, taking the calculated risk of psychosis by ASC drugs in much the same way that the ordinary person takes the risk of air travel, tobacco smoking or alcohol drinking. The air traveler does what he can, insures himself and so on. So does the ASC drug user. He often carries thorazine in his pocket to abort a "bummer" if necessary. But the fact that some people do get psychotic, irreversibly psychotic, influences the adept about as much as the fact that people do get killed, horribly killed too, in airplane accidents. When the ordinary traveler wants to go some place in hours instead of weeks, he will take upon himself all the risk of air travel for the sake of convenient and rapid transit. Nobody labels him as mad for taking such risks. The psychedelic drug user takes the same kind of risk in order to get the "travel" (trip) he so desperately wants but cannot get in today's religion and culture — the trip into the transcendent.

We must remember, however, that the ASC adept does regard the Establishment as totally mad for being willing to carry on in the deadly boring rat-race ("castrating" with respect to transcendency) year after year with no prospects of reward in the shape of transcendent joy and ecstasy. Thus, when each side regards the other as mad or hopeless, the chances of productive communication are very slim indeed. One can see this clearly in the attitude of chief executives who receive expert medical reports on the relative harmlessness of the cannabis type of drug, recommending legalization in the same way as for tobacco, alcohol and other drugs. The answer on the part of executives has been to date more or less that of "over my dead body" before cannabis is legalized. Reason can

play no role as long as both sides suffer from a real breakdown of communications which is largely due to fear and ignorance on both sides. And so the alienation and communications breakdown continues.

Drug Availability and Turkish Opium & Hashish

A further exacerbation of the alienation between the cultures in our society is being caused by the Establishment policy on drug availability. The Establishment theory is, and always has been, that if drugs are not available, then people will not be able to take them. A quite masterly and compelling piece of simple logical theorizing. The United States government is totally committed to this example of supreme logic and has accordingly offered to pay the Turkish government, to judge by radio reports, some $35 million per annum to subsidize the Turkish peasant not to produce the poppy for opium any more[7], and so to make heroin and morphine not available. there was a crisis at the time in Turkish government circles over just this problem. The Turkish peasant is, however, simply unwilling to give up the growing of the poppy because it is, firstly, lucrative, and secondly it is in his eyes medically highly useful. He knows full well that morphine is easily converted into heroin which is then abused. But he also knows that few synthetic morphines can approach morphine in general medical usefulness, especially in the last stages of cancer. The peasant usually does not himself abuse the opium he produces and does not see why more advanced cultures than his should either. He certainly does not see why he should stop producing opium just because some Americans in far away America abuse heroin, while few Turks do.

One Turkish laboratory assistant of mine once said to me, albeit with a twinkle in his eye, that he was seriously thinking of writing to Detroit to request the motor manufacturers there to stop producing their annual crop of new high powered cars. These cars were dangerous and were being mortally abused by the simple Turks who just could not manage them. He was willing to pay the people at Detroit three billion Turkish pounds annually to halt the production of these powerful cars which were causing thousands of Turks, young and old, to die

in car accidents related to the abuse of Detroit–made cars. The use of these cars was, additionally, "addictive," people just could not leave them alone! If the cars were not available in turkey, the people could not abuse them there! This was his simple but entirely compelling logic!

An American professor, who happened to be in my office at the time, protested and said that the answer lay not in stopping the production of high powered Detroit-made cars but in the teaching of the Turks how to use them properly and how to stop abusing such useful products! Whereupon the Turks just roared with laughter, and between gasps of merriment at having been so subtle as to exceed the faculty for humor of the American (who was not amused but very puzzled) they explained that their point had been that his American countrymen ought to be taught how to use and not abuse high powered Turkish opium — and, for good measure, hashish too! Both Fords and *papaver somniferum* are useful products but both need people who can use them properly for the maximum advantage of society! Perhaps Western culture need not so much forbid useful drug production, but rather learn how not to abuse it!

The fact is, of course, that the apparently simple piece of logic: "make a drug not available and it will not be abused" is not so simple. Anyone who has studied the history of Prohibition should know that. The whole idea behind that noble effort to cure the alcohol problem was based on just that simple piece of transparent logic. Make alcohol non-available and it will not be abused!

The difficulty is that this simple logic does not work out in practice. The reason is the following: Once a "needed" drug and its "useful" effects (the effects of alcohol or nicotine for example) are widely known, having been experienced by many, there will be a strong demand for that drug. If, now, the authorities decide that the drug is harmful and therefore, in order to protect their people from themselves (which all authorities must do), make it not available, then that drug becomes automatically an even more desirable product and its

price rises. If the price rises, then the distribution of the forbidden drug becomes more profitable. The stricter the regulations become against traffic in the drug, the higher the drug price and the greater the incentive to push it. The drug becomes more and more interesting and costly. Man, in his present state of mind, will usually be quite unable to suppress his desire for quick and high profits. So Prohibition had the direct effect of increasing the price of alcohol as well as decreasing its purity and therefore safety. It certainly did not make alcohol unavailable.

Thereupon the authorities increased the police force in an effort to enforce the non-availability of alcohol. This merely increased the organization of the rum runners in their efforts to circumvent the work of the police. In the end the nation became (with slight exaggeration) a nation of cops fighting a nation of rum runners. This battle absorbed far too much energy in society, so that the nation began to suffer under the shocking consequences of the transparent piece of logic: "make a drug non-available if one wants to stop its abuse." It was on the profits of rum-running that the crime syndicates and the gangsters based their nefarious activities — and succeeded in corrupting the police too!

Cannabis sativa (hashish, marijuana) has become widely known and used as a social drug, replacing to some extent alcohol and tobacco. The toxicity of all three drugs are different. Both alcohol and tobacco are productive of addiction (dependence both physical and psychological) whereas cannabis sativa is allegedly not. Alcohol will produce a cirrhotic liver and delirium tremens, tobacco will produce circulatory disturbances besides cancer of the lip, gum and lung. Cannabis sativa may produce flashbacks (especially with LSD), psychosis, synaesthesia and conjunctivitis. All three drugs are, in my personal view as a pharmacologist, better done without, for there are other ways of getting the desirable drug effects of all three drugs by non-drug means. but to try to control any of the three drugs mentioned, all of which are well known and their pharmacological effect considered by many as desirable, by making them simply non-available, will

produce the identical effect of non-availability seen with respect to alcohol during Prohibition.

In fact, one sees this already in the case of marijuana. In spite of superhuman efforts on the part of the police to make it non-available, half of all college students in the USA have smoked it, and a good percentage do so on a regular basis. The horrendous penalties for being caught in possession have done little to stop either availability or smoking. Perhaps the penalties have actually increased abuse. For the younger generation likes a thrill — and enjoys baiting the man (tyrant?) who relies on force to rule instead of intelligence and reason. Besides this, non-availability of one drug leads to abuse of another. Drug users habitually swap one drug for another according to availability.

If non-availability does not work in controlling drug abuse, what method can be tried? It is fairly clear that, to date, practically no methods of control for ASC drugs are known or applied except the non-availability and punitive ones. There is no known social or pharmacological method of curing a man or woman of marijuana abuse. One is not physically dependent upon it, and many believe that there is little psychological dependence either. There are no withdrawal symptoms upon stopping smoking hashish, and certainly none on withdrawing LSD. Perhaps a majority try marijuana and then drop it altogether. Others smoke it for longer periods and then "mature out". But there is, as far as I am aware, no means of "treating" or "curing" a person who gets his *pleasure* from cannabis or other type of psychedelic drug. For he is not addicted or dependent. What can or should one treat medically? The cannabis user may get amotivated[8], lethargic and even drop out. But that would seem to be a social problem as well as a drug one. Thus, if drug availability reduction, together with punitive measures do not stop the ASC drug epidemic, what will?

From these observations it is pretty sure that "stopping" drug availability and increasing punishment will probably merely exacerbate the problem. So what have we left on hand

with which to treat the problem? The answer is that since the problem is primarily neither medical nor pharmacological, we have only the individual and his personal problems as such, that we can treat. What about treating him as a person deprived of joy and real purpose in life? What about treating his affluence and materialism? For psychedelic drug epidemics are usually associated with both affluence and materialism. About this we shall have more to say later.

Non-availability and punitive measures are being applied to control the opiate and barbiturate epidemic too. The fact that the method is not doing very well is proved by the figures on opiate and barbiturate addiction published regularly in most Western countries. The same applies to abuse of the amphetamine type of drug.

This being the case, we may well ask what can be done? The following chapter will deal among other subjects with some pharmacological and other possibilities.

Footnotes

1 States of Consciousness and State-Specific Sciences, Charles T. Tart, Science, June 16th. 1972,*176*.1203.

2 Charles A. Reich, The Greening of America, Bantam Books, New York, 1971, pp. 433

3 More on Marijuana, The New Scientist, 6th April 1972, p. 3.

4 2Cor.5:17.

5 Some experts today are inclined to attribute the anxiety states observed in these experiments to the violence of the waking up process rather than to the mere loss of dreaming (ASC) time. Some mammals can be killed by sleep deprivations.

6 Psalm 16:11; Nehemiah 8:10 etc.

7 In July 1974 The Turkish government rescinded the prohibition on poppy culture in some provinces.

8 Charles A. Reich, The Greening of America, Bantam Books, New York, 1971, pp. 433

Chapter II
Pharmacological Considerations Operating in Drug Abuse

Current Drug Abuse

The current drug epidemic is merely one symptom of the general malaise afflicting Western society. The phenomenon is widespread and complex. Simple answers should, accordingly, not be entertained. Like most disorders of an organic type, drug abuse is in some sort of equilibrium with the society on which it nourishes itself. This means that society will influence the drug epidemic and the drug epidemic will in its turn influence society. Again, this means that the type of society in which drug abuse is taking place will modify the type of treatment to be prescribed. For example, treatment of drug abuse in a hierarchical, chain of command type of society such as is found in the military, will be different from that possible in a democratic society where commands cannot just be given in the knowledge that they will be obeyed. A general can have every soldier searched for drugs twice a week. But one cannot do that to free citizens and get away with it in a democratic free society. So social circumstances certainly will modify the type of measures taken to get a society off drugs.

In the West we have to deal with the democratic way of life, so that even the police have to be careful about trespassing against the citizen's liberty too much, even when they are dealing with illegal drugs. Theoretically at least, the people

are sovereign, not the police. This brings with it the fact that, again theoretically, the laws that are made reflect the wishes and will of the people of the society making them. The consequences of these facts are quite grave in so far as drug abuse is concerned, but are commonly overlooked by our rulers. We must look into some of these consequences.

Ideally, a free democratic society decides to make and abide by laws which are good for it and will benefit it. Stealing, lying, murdering and embezzling are damaging to society at large, so that the laws of society will proscribe such practices. Minorities in society will not normally protest against a majority which passes laws against practices as damaging to society as those mentioned.

However, there are other practices which are not so clearly cut as being bad or good for society. For example, the United States before and during World War I developed and acute alcohol problem, so that society there decided to do something about it. The majority opinion concluded that the best way to solve the alcohol problem was the one we have already mentioned, which was quite simple: make the drug (alcohol) simply not available, then people could not abuse it and get drunk. On this simple piece of logic, as we have noted before, Prohibition was founded.

Apart from not solving the real problem in the least (the *psychological need* for alcohol and the removal of the need) the social consequences of that piece of simple logic were disastrous. Prohibition very nearly turned the country into a nation of cops and rum runners, besides reducing the purity of alcohol, thus causing generalized toxic reactions up to and including blindness. At the same time it denied to the majority of citizens a pleasure which was, to them, harmless.

Take the question of abortion as another example of the role public opinion plays in law-making in a democratic society. A generation ago, life in the womb was considered to be sacred; abortion was permitted only under urgent medical indications. Today, as a result of the loosening of sex relationships and the general loss of appreciation of the Christian meaning

of sex, abortion — that is, in some cases, the carving up of the living fetus in its mother's womb — is permitted and generally practiced for no other reason than that the mother and father have said "yes" to sex but "no" to its natural consequences. Thousands of helpless healthy unborn babies are slaughtered this way weekly in London and other cities. This destruction of life would have been unthinkable on a legal public basis a generation ago, for the laws laying down the will of society at that time forbade the taking of helpless life if there were no better reason than that the mother did not wish to bear her child. Incidentally, hospitals practicing abortion today on a mass scale and for *non-medical reasons* are having difficulty in obtaining doctors and nurses to carry out the abortions — they say, quite understandably, that they are unnerved by living babies hopping and jumping around in the womb while they slaughter them. The practice directly contravenes the Hippocratic oath.

The point of these examples is, that if a society has no longer any *absolute* standard on which to build its laws, then that society will, if really democratic, make its laws on the basis of its *wishes* — which of course may, and indeed will, change from generation to generation. In years gone by, the laws of Western society were based on the unchanging Book. Today they are not. They are based on the sovereign will of the people making the laws. And therein lies the snag in so far as laws against drug abuse are concerned.

A generation ago, the taking of psychedelic drugs to attain religious experiences would have been met — at least in Anglo Saxon society — with incredulity. (I know of a leader of a temperance society in Germany who is still in this position today!) Probably it would have been considered to be primitive, incredible and maybe blasphemous into the bargain. The leader mentioned thinks so. The Book, the former foundation rock of Western law and order, formally and specifically forbids the taking of drugs to produce spells and trances. It calls such practices "sorcery by drugs" ("pharmakeia") which was punished in the Old Testament by the death penalty (see also Galatians 5:20). Today, a large per-

centage of our students studying at universities and colleges thinks quite differently about ASC drugs (which produce trances or trips). In fact they regularly use them themselves for these purposes, even though they are still forbidden by law to do so. Their attitude to the old anchor of society's law, the Book, has changed. The consequence is that their attitude to free sex and abortion, as well as to drugs has changed at the same time. They now practice all three, though a generation or two ago all were on the proscribed list. What will be the consequences of these trends and changes of attitude?

The answer is easy to give. Democratic society has learned to make laws which reflect its own standards, and not those of the Book which was formerly the standard (at least in theory). This means that if in the near future, as seems highly likely, the generation today which resorts to psychedelic drugs to get its religious experiences and its pleasures reaches a majority, a voting majority, in our Western society, then that society will legalize its own new religion and its new drug pleasures.

The fact is that even though authorities are agreed that alcohol (and tobacco) is today a serious medical problem, causing not only personality changes and cirrhotic livers, but also traffic accidents, violence and poverty, it is a source of *pleasure* to the majority in our society. Since the users of alcohol and tobacco obtain their pleasure form these drugs, even though it is at the expense of their health — as well as at the expense of the governments which have to provide "free" health services to cure them of their drug-induced illnesses — no democratic government is ever going to risk putting these two pleasure giving but dangerous and addictive drugs on the proscribed list. It would be against the will of the people! The government would be thrown out of office immediately if it did not fulfill its mandate — that of doing the sovereign will of the people. Society is going to see that its pleasures, harmless or otherwise, are not taken from it under any circumstances. Even when governments put notices on cigarette packs to the effect that smoking the contents may be injurious to the smoker's health, manufactures use this very toxicity notice to advertise the real pleasure-giving activity of their wares! If

the tobacco is not toxic, it cannot give you pleasure either! The implication is, that if the tobacco destroys you, it will at least first of all give you pleasure. So have your pleasure at any cost, even if it destroys you! The tobacco companies' advertisements demonstrate in a very practical way that society is prepared to risk destroying itself for pleasure.

We come then to the conclusion that if the majority in a democratic society finds its pleasure in any drug, it will not suffer that pleasure to be taken from it by any democratic government, even though that pleasure may involve self-destruction. This can only mean that, if in our Western society we do reach the state in which a majority decides to obtain its pleasure in ASC drugs (rather than in culture and transcendent religion as we have known them up till now), then no democratic power on earth can stop them from securing the legal right to obtain their pleasure, no matter how detrimental that pleasure may be to themselves or to themselves or to society. If a head of state were to say the people would get ASC drugs legally "over his dead body", then, of course, democracy has been forsaken and dictatorship, maybe of the patriarchal type, has in practice taken over the reins of government. Under such circumstances, democracy would be really only a hollow hypocritical form.

If the majority happens to have been wrong in its wants and therefore in its resultant laws, then, in the long run, that society will damage or destroy itself by its own laws and practices. Precisely this process has happened to civilizations which flourished before our own. It certainly looks as if history will repeat itself in our Western society if present trends continue. Police force and non-availability programs are quite powerless against these destructive processes because democratic society may make legal the very forces of destruction.

Once a democratic society has become a lover of its pleasures at any cost, that society is irrevocably doomed to decay. The built-in democratic mechanism which allows just what the majority likes and what gives it pleasure, regardless of

whether or not it is destructive, takes care of the irresistible trend to decadence.

Once a democratic society decides it wants to use its democracy to obtain its pleasures even though they may damage it — it is not important whether the consequences of those pleasures are cancer, psychoses, arteriosclerosis, cardiac arrest, venereal disease, dissolution, or even the fatalism associated with certain Eastern religions and some psychedelic drugs (cannabis) — no power in a *democratic* society can stop the damage or the trend to decadence. One way of stopping the process is to rob that society of the right to make its laws to suit its pleasures which lead to its own destruction. But this means the loss of democratic freedom in order to save society. We seem very near indeed to this point in the history of Western culture right now. Another way of stopping the trend to decadence is that of a spiritual revival which cures a society of wanting to use its freedom to make legal that which must destroy it. This has happened in Western history before now – and it works precisely as it did in John and Charles Wesley's England

Before a democratic society reaches a state of total decadence, a vigorous program of education may help to warn of the danger and avert it. But a spiritual revival to give a new sense of values is an essential part of the process. Thus, law making will be put back on to the basis of contriving laws not just so that the majority can obtain all its pleasures in free sex, drugs and affluence regardless of the real welfare of society, but rather that society begins to see its meaning, not in pleasure alone, but in some transcendent as well as temporal purpose behind life which in itself brings overwhelming pleasure.

That is, the only bulwark against the built-in trend to decay in a democratic society is that of a spiritual quickening and reevaluation of life. As we shall see later, the present psychedelic drug epidemic is an indication that society could take the road of renewal, if only it were given the correct leading from renewed men and women who discern the real state of present affairs in Western society. For our younger generation

does not, apparently, really wish for ASC drugs as such but does crave, urgently, the meaning of transcendency — that is, of genuine spiritual experience. ASC drugs are doing something in this direction in that they show the needs of men, although they themselves offer, in our opinion, only a pseudo solution.

Before we can go into this aspect of the meaning of the psychedelic drug epidemic, it will be necessary to spend a little time with some purely pharmacological aspects of the ASC drug.

Various Drug Types

The principal drugs involved in the current drug epidemic are so called psycho–active (ASC) drugs. There are (1) the anesthetics and tranquilizers, including nicotine and alcohol (2) the amphetamines or CNS (= central nervous system) stimulating drugs, (3) the barbiturates (= CNS depressant drugs, anesthetics), (4) the opiates or analgesics which also depress the CNS and the sense of pain and (5) the so-called psychedelic drugs which reputedly expand the mind, produce ASC and induce a state of "instant mysticism".

Thus the psycho–active type of drug includes at least five distinct types of agents which should not be confused with one another, even though they are all psycho–active or consciousness state altering substances. Of course, the boundaries between the various classification are not always clearly defined. Indeed, in some cases, a drug which is generally classified as not psycho–active may turn out to be psycho–active, as for example in the case of some local anesthetics. Lidocaine will produce hypnosis or sleep, besides local anesthesia. Normally these latter are not, as ordinarily used (for local anesthesia), psycho–active. But several local anesthetics can act as CNS depressants (that is, as psycho–active drugs) under certain special circumstances.

Of the psycho–active drugs, the so-called psychedelic agents are used to induce trance-like state or "trips" involving hallucinations, psychedelic peaks and awareness of transcendency, often accompanied by a loss of time and space sense.

They may produce a kind of mystical trance-like state referred to as "instant mysticism", with some of the accompanying experiences belonging to mysticism. Of course, they can produce, too, plain psychotic disturbances according to the dose, the individual taking the drug and his set and setting at the time in ingestion. For a description of the precise effects of the psychedelic drugs, see my book "The Drug Users: the Psychopharmacology of Turning On.[1]"

Amphetamines also produce, besides plain CNS stimulation, hallucinations and psychosis in some cases. But there is little true psychedelic effect. Opiates produce a euphoria, besides the depressant effects on the CNS and digestive system. But the euphoria is followed by depression and "coasting". There is no developed psychedelic effect.

The above summary of the types of drug lumped together under the classification "psycho–active" gives a slight idea of the complexity of the drug epidemic, at the bottom of which are all the various types of psycho–active drug mentioned. Over and above this diversity of drugs is the fact that the person who is today dependent on heroin will probably have tried barbiturates and other psycho–active drugs first. If he cannot obtain his fix of heroin, he may make do with a barbiturate or other drug. The acme of addictions usually considered to have been reached when an abuser takes cocaine, which is a stimulant and at the same time an anesthetic substance, together with a depressant (with euphoric properties) such as heroin. Degeneration of character is often rapid under such a regime. It is important to recognize this overlapping of both drug types and drug users, for it seriously complicates the whole problem of the drug epidemic.

The users of psychedelic drugs, such as cannabis and LSD or mescaline, usually consider the use of opiates such as morphine or heroin to attain their ASC as "bad style" or "bad technique". For, as we have pointed out already, the real "instant mystics" desire *more and varied consciousness*, not "nirvana" or oblivion (*less consciousness*) such as is obtainable with the anesthesia or analgesia of opiates or barbitu-

rates. Thus it is a fact that the use of cannabis or LSD does not necessarily lead to heroin and all its undesirable consequences for the individual and the society in which he lives. Many psychedelic drug users would never consider using opiates. Opiates do not give the kind of trips they want. The use of LSD or cannabis does not then lead inevitably on to opiate and heroin addiction; this is a myth which has been carefully cultivated in the interests of the "scare technique". Of course, if a person starts to experiment "blindly" with any one drug he may well go on to experiment with any others. If his first drug is cannabis he may well move on to amphetamine or to heroin. But psychedelics do not inevitably lead to heroin — the hundreds of thousands of cannabis user who, after years of experience do not use heroin, prove this point.

The present day drug culture includes, then, the use of all types of psycho–active drugs — opiates, amphetamines., barbiturates, tranquilizers, as well as psychedelic drugs. But it is important to recognize the cardinal fact that the drugs which induce mystic experiences and psychedelic peaks are quite different from practically all other psycho–active drugs: they do not produce dependence or, to use the old terminology, addiction. Amphetamines, opiates, barbiturates and to some extent tranquilizers may produce dependent states. But the least dangerous drugs in this respect are certainly the psycho–active drugs which are psychedelic and producers of "instant mysticism". To be quite specific, LSD, cannabis, mescaline, psilocybin — and even adenochrome — are not dangerous as dependence producing agents. Their danger lies elsewhere in the area of psychoses associated with "bummers". It is important to keep this distinction in mind because officialdom sometimes classifies some psychedelic drugs as "narcotics" and talks as if there were a danger of "getting hooked" on them. The drug adept, of course, just laughs at such clumsy efforts to scare and muddy the pharmacological waters.

Drugs of the LSD type cannot be used very often owing to the rapid development of tolerance (*not* dependence). An

interval of about a week between doses is required to reactivate the LSD effect.

In the following we intend to examine the options there are at present on hand of treating the ASC drug epidemic by means other than that of non-availability. Since, however, some psycho–active drugs (the opiates plus cocaine, barbiturates, amphetamines, alcohol, tobacco and to a small extent the tranquilizers) produce habituation and dependence, whereas the second class (the psychedelics) does not, we will treat the options we have open to us on each class separately.

Cocaine

This substance has recently become one of the most common of abused drugs. It is also a most lethal drug. It is rather in a class by itself, pharmacologically speaking. It is a strong local anesthetic and therefore a *depressant*, but at the same time a short acting *mood elevant* producing a euphoria, decrease in hunger, indifference to fatigue and to pain. It is reputedly the most potent anti–fatigue agent known, producing a feeling of great muscular and mental strength so that the user overestimates his powers. It produces its euphoria, just as amphetamine does, in otherwise quite normal persons with no personality disturbances. The natives in the Andes chew the cocoa leaf, which contains a bound form of cocaine, to overcome fatigue. Because of its short duration of action, many doses have to be administered over a few hours to maintain the euphoria. On overdosing, anxiety and hallucinations like those produced by amphetamines supervene. Death may occur from seizure and respiratory failure. Death by cardiac failure is relatively common in cocaine users.

The picture of the depraved drug fiend, often inappropriately used of opiate users, is more fitting to the cocaine user. Some individuals can use it for long periods, however, without the toxic symptoms developing, whole others suffer from them after one single spree. But, as cocaine is now widely used in Western culture, we need give further details here. As previously noted it is widely used in the Andes as an anti–fatigue agent.

It is proposed to investigate the options open to us for treating alcohol abuse first (as being most prevalent) and then proceed onwards to our options on the treatment of abuse of opiates, amphetamines, tranquilizers, barbiturates, and finally of the psychedelic group of drugs.

Pharmacological Options on Treating the Drug Abuse Epidemic

A) Withdrawal of Alcohol

If the simple procedure of making an addictive or other drug non-available on the market does not in practice stop its use. What other options are open to us to stem drug abuse? Obviously one can make the drug, when ingested into the body, non-available to the body by pharmacological means. That is, the drug user is allowed to physically take the drug, but by giving other drugs one can "neutralize" the harmful drug in the body so that the taker does not "profit" from swallowing or injecting his drug. This is the basis of a number of attempts to "block" drugs such as the barbiturates which have been worked on with the same end in view. Results are less convincing. We must look into these methods since they represent a very considerable area of endeavor by pharmacologists today.

Pharmacology and therapeutics have introduced the idea of treating addiction to, or dependence on, opiates and other drugs by administering secondary drugs to block the action of the first. Thus antabuse has been used for treating alcoholism. It works by inducing undesirable side effects such as nausea and vomiting if the patient on antabuse takes a drink of his favorite drug alcohol. The idea was popular for a time, but seems to be falling out of favor today. We must examine it, however, a little further for the light it sheds on the blocking action of secondary drugs.

Antabuse or Tetraethylthiuram disulfide (Disulfiram, Aversan, Abstiny, Refusal, TETD)

It was noted during the late nineteen thirties by Williams[2] that individuals exposed to tetramethylthiuram disulfide developed a hypersensitivity to ethanol. His advice that the

substance be tried for controlling alcoholism was neglected at first, but acted upon later, when the tetraethyl derivative rather than the tetramethyl compound was investigated. The tetraethylthiuram disulfide was available commercially since it is used in the rubber industry as an antioxidant. Its effectiveness in producing a hypersensitivity to alcohol was noted by two Danish physicians who had taken the disulfide in some tests to evaluate its potential as an antihelmintic. They both became ill at a cocktail party and recognized that the TETD was the cause of the illness after drinking alcohol. Other substances, such as cyanamide, produce a similar altered response to alcohol. Ingestion of animal charcoal produces a parallel effect.

TETD is a relatively non-toxic substance when taken alone. However, if alcohol is ingested after TETD, the intermediary metabolism of the former is changed, with the result that the blood acetaldehyde concentration is raised between five and ten times the normal amount. This produces the acetaldehyde syndrome. Within a few minutes the face feels hot and rapidly becomes flushed or scarlet. Vasodilation occurs with intense throbbing and pain in the head and neck. This is followed by vomiting, sweating, headache, hypotension, faintness and syncope. Blurred vision and mental confusion are also prominent.

All these symptoms are thought to be due to increased acetaldehyde in the blood, which is caused by the fact that the oxidation chain leading from alcohol via acetaldehyde to acetic acid and carbon dioxide is interrupted at the acetaldehyde stage. The oxidation of alcohol to acetaldehyde is catalyzed by alcohol dehydrogenase. The second stage involving the oxidation of acetaldehyde is catalyzed by the enzyme aldehyde dehydrogenase and becomes blocked due to competition. Thus the concentration of acetaldehyde rises in the blood and causes at least some of the symptoms described above. Indeed, injection of acetaldehyde into the blood stream of normal person produces some of the effects of taking TETD followed by alcohol ingestion. There are some differences, however, between injecting acetaldehyde and taking

TETD and alcohol. Acetaldehyde alone produces hypertension, for example, whereas TETD and alcohol produce hypotension. Thus TETD produces effects which are not entirely due to the accumulation of acetaldehyde in the blood.

TETD is not exactly innocuous for it may produce skin eruptions, allergic dermatitis, urticaria, reduced sexual potency, headache and dizziness. It also produces an unpleasant garlic like taste in the mouth, and some complain of a metallic taste after its use. But the effects of taking TETD followed by alcohol are sometimes so alarming that its use has been called in question by some. Respiratory depression, cardiovascular collapse and cardiac arrhythmias restrict its use. Careful medical and nursing attention is necessary before attempting to apply the drug in chronic alcoholism. TETD should be administered only by a physician and usually in a hospital.

TETD is not a cure for alcoholism, but is intended for use as a therapeutic crutch by volunteers, by means of which the desire to stop drinking is fortified. Owing to the dangerous toxic symptoms, TETD is not used today so much as formerly.

Summary

The TETD-method can be summed up as one depending upon making the drug of addiction unpleasantly toxic and therefore undesirable to the individual dependent on the drug. There are other methods, however, of controlling, or rather attempting to control, a drug which is dependence producing by giving a second drug. One of the applications of this latter method has recently come much to the fore in the attempted treatment of heroin dependence by administration of a second drug. It is known as the methadone method and must be briefly described since it is at the moment so popular, and has enjoyed so much publicity — and public moneys. it will, in the future, almost certainly fall into disfavor again for reasons we will attempt to set out below.

B) WITHDRAWAL OF OPIATES — METHADONE SUBSTITUTION

Methadone is a synthetic opiate showing similar analgesic properties to those of morphine and heroin. It is addictive but less so than heroin. It is also active by mouth, giving it an advantage over morphine and heroin which may be introduced parenterally or intravenously. Withdrawal symptoms to methadone appear rather later than those appearing after withdrawal of heroin or morphine from a dependent individual. Patients primarily addicted to methadone may show no withdrawal symptoms until 48–72 hours after the last dose. For other opiates, withdrawal symptoms usually appear within 36 hours of the last dose if significant dependence has developed.

The morphine withdrawal symptoms — also known as "cold turkey" to addicts — are very much feared among opiates users, who will do almost anything to get a "fix" or a new dose of the required opiate to prevent the withdrawal symptoms from appearing or to remove them. This craving for a repeat dose helps to drive the addict to crime and violence in attempts to obtain the euphoria he so much appreciated in the early days of his opiate experience.

It has been the finding of many dealing with opiate dependence that the withdrawal symptoms arising by withholding heroin from a heroin addict can be suppressed by methadone. The same applies to morphine and opium addiction among the natural opiates (heroin is the acetyl derivative of morphine and is therefore a semisynthetic opiate) as well as to meperidine, and other synthetic opiate dependence. The withdrawal of morphine or heroin from individuals dependent on them is, in contrast to barbiturate withdrawal, seldom fatal. But it is exceedingly uncomfortable and the patient suffers agony in the process. Thus, it was found that by replacing the heroin or morphine by methadone, the withdrawal symptoms, which are so undesirable, could be suppressed.

One further point was noted during work with methadone withdrawal. The heroin addict on methadone treatment allegedly becomes incapable of getting "high" on heroin or

morphine[3]. Indeed, it has been stated[4] that heroin produces euphoria but methadone does not. On the face of things it looked, in early work at least, as if methadone was a drug which would block heroin, morphine and other opiate euphoria without producing the undesirable side effects of natural opiates. But is this the case? Today there is a rapidly growing conviction among experts that methadone is merely a legal form of the heroin type of drug which is, however, orally active and slower acting. It has less weight for weight activity than heroin or morphine.

The following facts are emerging which are seriously undermining the confidence of experts in the usefulness of methadone in "blocking" heroin and morphine addiction. Firstly, the belief that heroin produces euphoria, whereas methadone does not, will have to be modified. The truth is that heroin and methadone are very similar drugs pharmacologically speaking. When either is taken into the body by the oral route, absorption is slower than when injected into the vein. The result is that the body can deal with both drugs more easily when they are given orally, because in both cases the blood concentrations rise slowly. Thus, neither heroin nor methadone produce a "rush" of euphoria when given orally, but *both* produce euphoria fairly quickly if given intravenously. It is true that methadone, being the weaker drug, is less effective, but effective it is.

The second point is that, over the course of time, the use of both drugs produces a tolerance. The body "learns" how to metabolize both of them so that more and more of each drug is required to produce a given euphoric effect. Once tolerance to either has been established, it is difficult to produce euphoria at all, except very fleetingly by very quick injection of large doses. This means that the claim that methadone produces no euphoria may be due to the fact that neither heroin nor methadone will easily produce euphoria in the already tolerant individual. Most people given methadone treatment for heroin are, of course, already tolerant — and therefore toler-

ant to both methadone and heroin — if one is tolerant to one drug, one is also tolerant to the other.

Thirdly, the "blockade" effect, by which it is alleged that under methadone treatment no "high" can be obtained by giving heroin, is easily explicable. The dose of methadone recommended for treating the heroin dependent person is very high — much higher than the dose formerly recommended for the methadone treatment of pain in cancer patients. When the body is swamped with this huge amount of methadone it does not respond to smaller amounts of heroin and is thus "blocked" to heroin and to any other opiate. But if a person had been given a relatively high dose of heroin in the first place and was still under its influence, neither would he respond much to an additional extra dose of heroin given on top of the first dose. Heroin and methadone are very similar opiate drugs, so that a large dose of heroin followed by a small dose of heroin acts like a large dose of heroin followed by a large dose of methadone. The effect of the second dose of any opiate is "blocked" by the first. That this is the case is shown by the heroin fact that a really massive overdose of heroin after methadone will produce euphoric effects experimentally — just like massive doses of methadone will.

These considerations are borne out by a recent publication[5] on methadone, where it was found that patients on that drug did use other drugs to reinforce their methadone maintenance dose. Thus non-opiates such as barbiturates, amphetamines and alcohol, were all used with this end in view. For it must be remembered that there is no cross tolerance between opiates and barbiturates, amphetamines or alcohol. Heroin users (not only methadone users) employ the same non-opiates to increase the effect of heroin when tolerance to the latter is setting in. Chambers and Taylor found that of 40 patients on methadone maintenance, 77% of the total group had used heroin concurrently with methadone and 25% used amphetamines while on methadone,

It is being currently claimed that methadone maintains the heroin addict in much the same way as insulin maintains the

diabetic. That this is an entirely false analogy is shown by the fact that many insulin patients can be controlled by dieting alone, which fact could scarcely be maintained in the case of the heroin addict! Further, it is a fact that methadone does produce the somnolence of opiates, so that the patient on methadone maintenance can scarcely be said to be maintained in a normal state by the drug — as is the case with insulin. In fact, many of the typical heroin/morphine side effects turn up on methadone maintenance. Thus the patient becomes constipated, he perspires, sexual impotence may occur (especially in older men) and his reflex reactions become abnormal. On withdrawal from methadone, severe muscle cramps are common, and hospitalization sometimes becomes necessary. Because methadone is longer acting than heroin, withdrawal sets in more slowly and lasts longer. Many patients on oral methadone "maintenance" therapy now inject ("mainline") it and obtain a "high" similar to that of heroin.

We can summarize by pointing out that methadone may reduce the heroin hunger of the heroin dependent person. But it does that by supplying him with an orally active type of heroin — methadone. The later affects the patient's respiration (morphine and heroin both depress respiration just as does methadone), his digestion and his sexual behavior. Furthermore, methadone influences a patient socially and psychologically just as all opiates do. It dampens feeling and response and "narrows the range of human experience."[6] This means that the whole family of the methadone maintenance patient, including his children, are exposed to the user of a potent narcotic day and night – and that legally.

The large scale use of methadone, legally promoted by some states in the USA, means that there is going to be, in effect, the influence in society of large scale legal use of heroin. Does society want the large scale legal use of heroin. The only real difference will be that the methadone is obtainable at the clinic whereas the heroin is not except in the UK.

What this approximates to is the so-called "British System", under which the registered addict can obtain his maintenance

dose of the opiate on which he is dependent for a nominal charge. If this is the case, then there is no case for methadone at all, pharmacologically it is a form of heroin or morphine. Replace it by the British System and give the opiate dependent person the heroin or morphine he needs, and give the heroin addict his morphine or heroin legally, and keep him comfortable and quiet! This method admits the heroin problem, but does nothing to solve it — its makes it legal and chronic.

One thing should be clear by this time. It is that the methadone "maintenance" method should under no circumstances be paraded as a "cure" for opiate dependence. It does not "block" opiates like heroin. It is really an admission that one will have to give the opiate dependent person his opiate drug to keep him comfortable and that there is, pharmacologically speaking, no cure available to date.

Heroin History

In 1898, morphine was successfully acetylated to produce acetyl morphine, otherwise known as heroin. The early clinical trials showed that heroin "cured" both morphine and opium addiction![7] There was such enthusiasm developed for the new drug that it was named from "hero"— it "cured" the opium and morphine scourge! The methadone maintenance method amounts pharmacologically to precisely the same thing. It treats opiate addiction by giving more opiate — with all the consequences.

The continued use of the method will only undermine law and order since it is, in effect, legalizing an opiate type of drug while forbidding the similar opiate heroin. In that case, why should heroin be a "bad" opiate and methadone a "good" one? The drug abusers (and some pharmacologists too) are coming to the conclusion that the drug legalizers or banners work on arbitrary principles – or that they are just ignorant of the facts of the case by not doing their pharmacological and historical homework.

Crime

One final point must be made on the methadone attempt to "cure" the opiate problem. A good deal of the crime associated with opiate use is caused by the financial necessity of obtaining the drug which, on the black market, is expensive. But not all the crime is financial in origin. This is apparent from the fact that in crimes of violence due to alcohol, finance is not the primary trigger. Either the pharmacology of the drug itself is the trigger, or the personality of the criminal under drug influence is the cause. Or both factors may play their part in the crime. It has, however, been noted that a good percentage of addicts arrested for criminal acts had been previously arrested — before they became drug addicts. That is, a real cause of the criminal attitude lay in the personality. The criminality was there before the criminal took to drugs, and was decisive probably in at least some cases in causing the addiction.

One comes to the conclusion once more that the drug problem is primarily a human problem — and not primarily a problem of drugs alone. In fact, in England, some 34% of addicts arrested for crime had been able to obtain their drugs legally and without difficulty. But they had turned to criminal activities none the less. Thus, the making of opiate drugs easily available (either methadone or morphine) to avoid the black market will not solve the drug/crime problem. Of course, if the black market is made unnecessary by making opiates legally available, drug purity becomes controllable, which is of great therapeutic advantage. For if a patient has taken an impure drug with unknown constituents, how can a physician know how to treat him in an emergency?

Note on Drug Treatment of Heroin Addiction

The newspaper Berner Tagblatt dated 29th May 1972, page 2, carried a note to the effect that a certain plant was being cultivated in Persia (Iran) which is reputedly active in helping withdrawal in opiate addicts. The German word used for "addict" is "Rauschigiftsüchtige" which can mean people addicted to any type of psychoactive drug. The plant named is "papaver brakte atom" to quote the newspaper. It is stated def-

initely that the plant "heals" addicts dependent specifically on morphine, heroin and opium without producing any new addiction. The Iranians are, according to the report, carrying out cultivation experiments preparatory to exporting the plant on a grand scale to countries plagued with heroin addiction. No chemical substance is named as being a product of the poppy species cited.

The author has seen to date (Summer 1993) no further developments in this field.

Footnotes

1 A. E. Wilder Smith, The Drug Users, Harold Shaw Publishers, Wheaton, 60187, USA, 1970, pp. 1—75.

2 E. E. Williams. Effects of Alcohol on Workers with Carbon Disulphide. J. Amer. med. Assoc. 1937,*109*. 1472—1473

3 V. P. Dole and M. E. Nyswander Arch. int. Med. *120*. 19,1967

4 Newsweek, 5th July 1971, p. 31.

5 C. D. Chambers and W. R. Taylor, paper presented at the Eastern Psychiatric Research Association meeting, New York, N. Y., 7th November 1970.

6 H. L. Lennard, Leon L. Epstein and Mitchell S. Rosenthal, Science, *176*, 26th May, 1972, p. 881.

7 S. Cohen, The Drug Dilemma, McGraw-Hill, New York, 1969, p. 71.

Chapter III
Drug Dependence and Withdrawal

Withdrawal of Amphetamines (and Cocaine)

Amphetamines and sympathomimetic amines in general are used medically to aid dieting. They all reduce appetite as well as decrease the sense of fatigue. At the same time they increase mental alertness and induce a sense of general well being. Under certain circumstances, such as overdosing, they may produce anxiety and jitteriness. This latter may be reduced by giving barbiturates concurrently which, as we shall see, is a potentially highly dangerous practice. It is commonly believed that the barbiturate increases amphetamine euphoria.

Actually, the increased amphetamine euphoria in the presence of barbiturates is probably due to the fact that the barbiturate neutralizes the central nervous stimulation (CNS stimulation) due to the amphetamine euphoria. Amphetamine addicts describe their euphoria in terms almost identical to those used by cocaine users. This is not surprising in view of the fact that both amphetamines and cocaine are CNS stimulants. As would be expected from its CNS stimulating properties, cocaine also produces a marked decrease in hunger and loss of the sense of fatigue. Thus amphetamines and cocaine have much in common in their properties. They both induce an exaggerated feeling of muscular strength and of mental capacity. Neither amphetamine nor cocaine need a disturbed

personality in which to show their properties; perfectly normal individuals experience the same effects of both drugs. Of course, cocaine possesses strong local anesthetic properties not shown by amphetamines.

The standard textbooks[1] state that addiction to amphetamine is not rampant — in fact, that it is relatively uncommon. While this has undoubtedly been the case in England and the United States, Scandinavia, particularly Sweden, experienced recently serious Preludin (Phenmetrazine) abuse. In the nineties the abuse of cocaine has exploded in Europe and the USA.

Preludin is an appetite controlling drug which is a chemically disguised type of amphetamine. Its stimulative properties are said to be less than those of ordinary amphetamine, but the appetite controlling effect greater. However, Phenmetrazine certainly possesses many of the properties of dextroamphetamine.

Medically the amphetamine type of drug is used for treating obesity, keeping the user mentally awake during long spells of duty, treating narcolepsy (uncontrollable, paroxysmal sleep) and sometimes for nocturnal bedwetting (nocturnal enuresis) in children. The amphetamines are often abused by gangs of youngsters who want to keep going a whole weekend without the necessity of having to hire a hotel bedroom or of going to sleep. Used socially in this way — as opposed to medically — amphetamines produce psychic malleability or the follow my leader type of mentality. This state is perhaps best described, and its dangers illustrated, by the following type of experiment, which may conveniently be used before large or small audiences in drug abuse lectures and demonstrations.

Demonstration of Amphetamine Effects in Mice

It is not always appreciated that amphetamines are much less toxic on a weight for weight basis if taken individually than when taken in groups socially. The social abuse of amphetamines is accompanied by enhanced dangers of lethality which are not present when the drug is used strictly medically and individually. This fact may easily be demonstrated

as follows. The LD_{50} (dose of amphetamine required to kill 50% of the experimental animals used) is determined in mice by intraperitoneal injection of graded doses of amphetamine in the standard manner. Litter mates of between 25 and 30 gms. each are used, and each treated animal is kept after injection in a separate cage. The dose required to kill 50% of the mice is then verified, the treated animals all being kept in separate cages until the end of the experiment — about 3-4 hours. Normally about 120 mg, amphetamine/Kg. body weight i.p. according to the concentration of the solution used, the technique, the strain of mice and their weight, is required to kill about 50% of the animals when kept in separate cages, with one mouse per cage.

Having demonstrated this fact while lecturing, a second batch of about 50 mice of the same strain and individual weight is taken and treated in exactly the same way, with the same dose ranges of amphetamine i.p. Only one difference is observed. Forty of the treated mice are placed in a small overcrowded cage, while the remaining ten are put again in separate cages as in the first toxicity determination. It is found after one to two hours that most of the mice in the crowded cage, which had been treated with 10 mg./Kg. body weight amphetamine die in convulsions, while few or none of the mice treated with the same dose but put in separate cages succumb, or show even much excitement. The mice in the crowded cage exhibit spectacular acrobatic jumping activity.

The reason for this state of affairs is that in the overcrowded cages the mice are so close together that they continually stimulate one another — they bite, push, attack and generally irritate one another until convulsions, exhaustion and death follow. The drug increases the inter-mouse interaction, that is, it induces psychic malleability in the mouse. The drug itself in the dose given seldom kills an isolated mouse, but the mutual stimulation under the influence of the amphetamine in the crowded cage wears the animals out. They literally run, bite, attack and irritate one another to death. The experiment illustrates clearly how much the influence of a drug is dependent on the "set" and "setting" of the organism taking it.

Taken socially, and taken individually, amphetamines act almost as two distinct drugs. Socially, "Speed" (amphetamine) is a "killer", while when used medically and individually, it is a much less toxic drug.

Amphetamine addiction, as opposed to mere weekend thrill seeking, very often occurs in individuals who show a family history of alcoholism or major psychopathology. Where addiction is concerned, it has been found that the drug users usually did not obtain the drug from a physician for the treatment of some medical condition such as depression or obesity, but that the drug had been procured illegally, strictly for the purpose of a thrill, Amphetamines used to be obtained from nasal inhalers, which are easily bought in some countries outside the United Kingdom and the United States without a prescription. In Turkey, amphetamines can be obtained for the asking over the counter. They are cheap, too, being government subsidized. The usual type of inhaler contains about 500 mgs. amphetamine sulfate, and amphetamine users will consume the contents of several inhalers a day in a bout which often ends up in a psychosis.

Mice having suffered an overdose of amphetamine and submitted to overstimulation in overcrowded cages often assume queer attitudes which are reminiscent of the symptoms one sees in human psychosis. These attitudes and stances are often followed by convulsions and seizures. They offer instructive material for drug abuse demonstrations.

It is quite common for a drug user to consume up to 2 gms. of amphetamine over a two days' spree. The oral route is effective, and the intravenous route is less common.

Withdrawal Symptoms (Amphetamine)

After amphetamine withdrawal there is a high relapse rate, The incidence of suicide and psychosis after withdrawal is much higher than that in the general population, showing that psychosis and suicide are a sequel related to amphetamine withdrawal. A few addicts seem to be able to stabilize themselves on a set maintenance dose. The majority of addicts show deterioration of personality concomitant with their

amphetamine abuse; such patients are usually frequently in hospital for treatment of toxic psychosis.

Tolerance to the stimulatory effect of amphetamines develops. The addict responds to this tolerance by increasing the dose, which may be raised to several hundred mgs. daily or even more. If tolerance develops to one amphetamine there is a cross tolerance to all. However, although tolerance to the stimulatory effects develops, tolerance to the purely CNS toxic effects does not develop. The result of this fact is, that, as tolerance to the stimulation develops and the dose is accordingly increased, the toxic limit is rapidly reached, producing psychosis. This may occur a few weeks or months after commencing abuse.

Amphetamine psychosis is often accompanied by auditory and visual hallucinations. The paranoid symptoms resemble those of schizophrenia. The psychotic symptoms are slower in appearing than those due to cocaine, although, after large doses of amphetamine, they may appear after two to three days. Since large doses of dextroamphetamine (and amphetamines in general) are slowly excreted over the course of about one week, the danger of accumulation is real and may account for the slow appearance of psychosis by slow cumulation. For the same reason (slow excretion), amphetamine psychoses usually disappear slowly if no more drug is ingested.

It used to be thought that amphetamines showed no genuine withdrawal symptoms except for tiredness, craving and depression. If however, EEG patterns after abrupt withdrawal are definitely changed, they are normalized only on giving the required maintenance dose of amphetamine. This is interpreted to mean that the changed EEG is a genuine withdrawal symptom. Although there is tiredness, depression and craving as described above, there is nothing comparable to opiate withdrawal symptoms on abruptly withholding amphetamines. Thus, the best method of withdrawing amphetamines in cases of addiction is total and abrupt withdrawal, under appropriate medical care if large doses have been involved.

The depression following withdrawal should be carefully observed in case of suicidal tendencies.

Energy Relationships and Amphetamine Use

Many users of amphetamines with whom I have talked do not seem to realize that the drug itself supplies no energy or calories to the body. The doses of amphetamines used are milligram-wise much too small to contribute to the body's *fuel* supply. The hyperactivity the amphetamines produce is certainly not fueled by the burning of amphetamine molecules. It is not as though they acted the same way as, say, sugar or fats in the body, both of which are burned in the organism to liberate energy for activities.

Amphetamines act by lowering the threshold at which the organism responds to outside stimuli. Whereas a normal mouse may need a stimulus of, say, x grams before it will react to it, under amphetamine it will react to a minute outside stimulus of, say, x/10 grams. This means that the animal is continually reacting to trivial stimuli, and by so doing wastes its hidden stores of energy. Actually, the mechanisms for the release of energy are overworked under amphetamine.

Every organism contains an invisible reservoir of *available* energy which may be liberated to react to outside stimulation. The animal or man possesses, as it were, an "energy tank" from which the body carefully rations out energy to meet its needs. Under normal circumstances, every organism takes care that it always has sufficient energy on reserve to meet its foreseeable energy requirements — it keeps, as it were, the energy reserve tank fairly full, so that it can react to emergencies. To this end, the animal normally does not waste energy by reacting to every trivial stimulus which comes its way, but reacts only to the major survival— important stimuli. If it did react to every trivial stimulus, it would rapidly empty its energy tank and go into "physiological energy reserve bankruptcy".

Amphetamines lower the threshold at which an animal reacts to a stimulus. Under their influence, the animal begins to over-react to every minor stimulus, so that the organism

rapidly goes into "energy reserve bankruptcy". Amphetamines turn, as it were, the energy "taps" on at the "bottom" of the animal's energy reserve tank, and let out the energy stores in a ceaseless, wasteful, and often pointless activity. The animal will run and jump on the slightest provocation. The human will laugh, giggle, react, move restlessly around and generally fritter away his energy reserves until he becomes exhausted, ending up in energy bankruptcy. He may then go into seizures, hallucinations or convulsions, of which he may finally die.

On dying in this manner, the human or the animal immediately goes into *rigor mortis*, the stiffness of death. The fact that the animal or man goes into *rigor mortis* almost immediately on death shows that it or he was in exhaustion when death occurred. The waste products of metabolism were not washed out of the overworked muscles quickly enough before the circulation stopped. These waste products produced by over activity cause the muscle proteins to coagulate immediately on death, just like egg proteins go hard on putting them into boiling water. If an animal dies under barbiturate poisoning and has lain a long time at rest before its breathing stops, that animal has few products of metabolism in its muscles and takes much longer to go into *rigor mortis* on dying. Thus, the fact that animals dying under the influence of amphetamines go so rapidly into *rigor mortis* is evidence that they died in energy bankruptcy. They were exhausted, and their muscles full of the waste products of over activity resulting from amphetamine overreaction.

During my many demonstrations of this effect ("Speed" kills) before military audiences, I have often been asked questions like the following: If one takes the amphetamine treated mouse which is being overstimulated in the crowded cage out of the crowded cage, will it calm down when it finds itself in a cage alone and therefore not over stimulate itself to death? The answer is partly in the affirmative. If the animal is removed from the overcrowding, and therefore overstimulation, early enough in the experiment, one can often save it. But once convulsions have set in, the animal usually dies,

even though it may be treated with sedative and anticonvulsive agents like barbiturates.

The second type of question put me by military audiences concerns medication designed to save animals from the lethal effects of "Speed". It is: can a sedative like barbiturate neutralize the stimulative effects of the amphetamine, and thus save the animal? The answer is that a barbiturate will often stop convulsions, and certainly quiet an animal in amphetamine seizure But the animal, in my experience, nearly always dies in spite of the treatment, if it has been in severe convulsions beforehand. Barbiturates may decrease or increase the toxicity of amphetamines, according to the physiological state of the animal at the time of barbiturate dosage. After amphetamine stimulation, the rebound or opposite reaction, that is, depression, sets in. If an animal or human is in the rebound depressive stage of amphetamine intoxication and is then given a barbiturate, the latter depresses and thus increases the rebound effect, and so raises the amphetamine toxicity. If a barbiturate is given before the rebound effect has set in, it will often help the animal or human to quiet down, conserve energy supplies, and thus recover from the amphetamine intoxication. But corrective medication in amphetamine intoxication is a very tricky matter indeed, and can easily cause more harm than good.

Another question frequently turns up, especially in military audiences. It is: If the mouse is in energy deficit due to overstimulation from amphetamine, why not give it some sugar as a fuel to make up for the lost energy? It should thus be able to refill its "energy tank" and recover from the amphetamine energy exhaustion syndrome.

This certainly sounds reasonable enough. The only difficulty is that it does not work out in practice. The reasons are the following: If one takes a new car, fills it up with gasoline, takes it to the car park and then lets the engine roar by putting one's foot on the gas pedal while it is not in gear, it will take a number of hours to empty the fuel tank (if the engine does not blow up and put a piston through the cylinder head, or

throw a conrod). When finally, assuming no accidents have happened, the engine coughs to a stop due to lack of fuel, it may be quite easy to get it going again. One fills up again with gasoline and repeats performance. Every time the motor dies of fuel exhaustion it is theoretically possible to correct the exhaustion by putting in more — provided, of course, that the crankshaft or something else as vital stands up to this kind of treatment. The really critical point in an experiment of this type is not the fuel supply, but whether the engine itself will stand the strain of such treatment.

Amphetamines do something to the body comparable to what the above treatment would do to a motor. They let the biological motor, the cell, just rip and roar and burn up its fuel too quickly without real load. The fuel supply is not actually the really critical matter. *It is the strain put on the motor, the cell, when it is asked to burn such enormous quantities of fuel in such a short time.* Its enzyme systems — its metabolic motors — get damaged under the amphetamine treatment just as the new car engine is liable to get ruined if one lets it roar in the car park without load. The enzyme mechanisms of the cells, which are exceedingly delicate, become damaged under the overstimulation produced by amphetamines. Giving the cell more fuel — more sugar or fat — will not help the cell to recover from the effects of the energy bankruptcy produced under amphetamine stimulation. The energy bankruptcy under amphetamines comes really from damage done to the cell motor, so that it has difficulty in burning the fuel left at its disposal to liberate more energy. The best hope of recovery after amphetamine exhaustion is rest and sleep.

Withdrawal of Tranquilizers

Among the so-called major tranquilizers, the phenothiazines belong perhaps to the most important. The oldest phenothiazine is thorazine (chlorpromazine, largactil, etc.). It is still a most useful drug. The phenothiazine type of tranquilizer lacks the euphoriant factor in its pharmacology; as a result, the group is not generally considered to be addictive in nature. This fact stands in contradistinction to other substances, such as alcohol and barbiturates, which both possess mild "tran-

quilizing" properties but are addictive. In spite of the fact that no euphoriant properties are present in the phenothiazine class of tranquilizer, a certain special type of physical dependence on them may occur in certain cases.

Accordingly, abrupt withdrawal of thorazine may cause exacerbation of psychotic conditions for which the drug is being given. Also, muscle pain and insomnia have been reported for a few days after abrupt withdrawal. This occurs even in spite of the fact that thorazine is only slowly eliminated from the body via the kidney, so that blood levels fall only gradually when no more drug is ingested. The conclusion one must reach, therefore, is that, in the human, although the euphoriant factor is lacking in the pharmacology of thorazine and no addiction in the usual sense of the term arises, some physical dependence may occur. This is in contradistinction to alcohol and barbiturates, which both possess very mild "tranquilizing" properties but also a definite euphoriant factor, which is associated with dependence[2] .

In psychiatric patients treated for a long time with thorazine, tolerance to its sedative properties develops. Thus patients may at first feel drowsy on thorazine, but in the course of time they overcome this result of the drug's sedative action.

Besides its use as a tranquillizer, thorazine is sometimes used to control hiccoughs under general anesthesia. Small doses (25 mgs./70 Kg. body weight) may also be used to control vomiting. The ordinary dose of thorazine used in general practice may vary between 100 and 1000 mgs./70 Kg. body weight, with 5000 mg. as a very high dose.

Side reactions to thorazine are parkinsonism, dyskinesia, akathisia (urge to move about), faintness, palpitation, nasal stuffiness, dry mouth, constipation, coldness, drowsiness, orthostatic hypotension sometimes followed by syncope, hypothermia and jaundice (in 2-4 % of patients treated). An important point to be remembered — and one which still seems to be regularly forgotten in prescribing — is that all major tranquilizers increase conditioned reflex reaction times,

and are therefore all potentially dangerous for persons dependent upon conditioned reflex reaction times. Thus, patients driving automobiles or using machinery dependent on learned reflexes should be warned of the interference of the drug with their reaction times. It is believed that many automobile accidents are caused annually by neglecting to give patients this information.

From the point of view of drug abuse it should be noted that thorazine, in common with most other phenothiazine tranquilizers, potentiates the action of alcohol, barbiturates and opiates. The effect of an over–diluted ("cut") dose of heroin can be boosted by this means. In the drug culture today, many deaths have been caused by taking a glass of alcoholic drink after having swallowed a barbiturate. Some time ago, a member of one of the pop groups lost his life by drowning in his swimming pool as a result of the potentiating action of barbiturates on alcohol. Thorazine aggravates this potentiation.

The potentiating action of thorazine on alcohol, barbiturates and opiates is probably due to depression of the rate of metabolism of these in the presence of thorazine due to competition for the metabolic enzymes concerned. It is very often found that chronic drug users are addicted to both alcohol, morphine and barbiturates for the reason that they use any drug they can find to boost the action of their diluted heroin or morphine. As we have already noted, amphetamines and barbiturates are often used together to increase the amphetamine euphoria desired. In a similar manner, thorazine enhances the action of meperidine, particularly its action in depressing the respiratory center.

It should be realized that, although the phenothiazines are often abused today, medically they are of paramount importance. This is especially the case in the treatment of psychotic disease. Prior to 1953, an atmosphere of therapeutic nihilism prevailed in the area of the therapeutic treatment of the severely mentally ill. Physical restraint, isolation and prefrontal lobotomy were the order of the day. ECT and insulin shock were regular methodology. It is fair to state that the

introduction of thorazine revolutionized the therapy of the severely mentally ill, and allowed many patients to be treated at home, or even to go back to useful work. Thorazine opened the locked doors of mental institutions, and released patients from physical restraint.

We are now in a position to allow ourselves to make an estimate of the effect of sudden withdrawal of thorazine in cases of drug abuse. From the foregoing it will be clear that no direct addiction to thorazine occurs as a rule, there being no euphoriant factor in its pharmacology. But the drug is used together with addiction producing drugs, so that withdrawal will usually involve dependence on a number of other drugs (often including thorazine) at the same time. Compulsive use of thorazine alone does not occur, but its use is connected with the compulsive abuse of other drugs. Thus, in withdrawing thorazine, one must take into account the potentiating action of thorazine on the withdrawal symptoms of the second or third drug which has been abused at the same time.

In the second place, thorazine is used to aid patients suffering from the discomfort of withdrawal of addictive drugs. Some years ago, thorazine was given to alcohol and to barbiturate patients in withdrawal, but today many doubt the usefulness of the procedure.

Thirdly, thorazine is widely used in a rather novel withdrawal context. Adepts in the use of psychedelic drugs know that thorazine is useful in aborting a bad trip due to cannabis, LSD, psilocybin and/or to mescaline. In fact, one can often recognize students who regularly use the psychedelic drugs by the fact that they carry on their persons a supply of thorazine. It probably works in this context by general depression of cerebration processes. There will be more to say about this aspect later.

Footnotes

1 Goodman and Gillman, Jerome H. Jaffe, 3rd Edition, 1965, p. 298.

2 See Appendix

Chapter IV
Tranquilizers and Modern Mechanized Society

Tranquilizers and Skills

We have mentioned above that tranquilizers increase the reaction time required for conditioned reflexes. This fact is so important that it warrants an extra section of its own.

The following will illustrate what one needs to know about the common effects of tranquilizers. If a dog is trained to expect a rump steak every time a bell is rung (as Pavlov showed years ago to be possible), when the bell is rung but no steak is given, its mouth will water all the same. A conditioned reflex — salivation on ringing a bell - has been established.

If, now, a dog, which has been conditioned to salivate on hearing the bell rung, is treated with a major tranquilizer (such as reserpine or a phenothiazine type of tranquilizer such as thorazine (chlorpromazine), the dog will salivate but weakly or not at all, on hearing the bell rung. That is, a major tranquilizer extinguishes or weakens an established conditioned reflex. This occurs in animals as well as in man.

Let us do the experiment another way round. If an unconditioned dog (one that has not been taught to salivate on ringing a bell, for example) is treated with a major tranquilizer such as thorazine or reserpine first and then subjected to bell ring-

ing followed by feeding with rump steak, then the dog will become conditioned to associating the ringing of the bell with the feeding of steak much more slowly than in the case of a normal, untreated dog — or he may not learn the conditioned reflex at all, if the dose of tranquilizer is sufficiently high. This means that the learning of conditioned reflexes (that is, of learned skills) is made much more difficult or indeed impossible after therapy with major tranquilizers.

To sum up: major tranquilizers tend to extinguish already established conditioned reflexes (or learned skills) and also to prevent them from being learned. This reduction of the "power" of learned reflexes applies to skills and reflexes we learn and use every day, and includes automobile driving skills as well as other skills necessary in handling machinery. They are all reduced or lost under major tranquilizer therapy.

There is a hidden practical danger in all this. It is that the patient himself does not have the slightest idea that the tranquilizer has blunted his learned skills and reflexes. The car driver may have been a very skilled man indeed — before he took that little white or pink pill containing the tranquilizer. But after he has taken it, you might as well put a man who has scarcely learned to drive at all behind the steering wheel. But the same man notices no difference at all after he has taken the pill. He is not in the least intoxicated, his gait is perfectly steady and normal. He is certainly not "groggy". It is true that he may feel just a little tired and have a tendency to doze off to sleep if he is left quiet for a while. But he is not by any means "drugged"— he can wake up immediately from any little nap he is indulging in. And that is perfectly normal for anyone who has been working hard and has had too little sleep. So he feels that nothing abnormal at all has happened to him. He is absolutely unaware of the fact that his learned driving or other skills have been reduced or even extinguished by the little white or pink tranquilizer pill he has taken.

Let us look at this remarkable phenomenon a little further. A small dose of alcohol — say a large glass or two of beer — producing anywhere between 0.1—0.5 mgs. of alcohol in the

blood of the drinker, does not make anyone drunk or even unsteady in his gait. Such a person is certainly not intoxicated after his drink. His breath is not heavy with alcohol vapor, nor is his speech thick or his tongue "loosened". He may feel just a little "relaxed" and "comfortable" but nothing more. Certainly his ordinary unconditioned (unlearned) reflexes (righting reflexes etc.) are not extinguished or even reduced for that matter. His gait is steady and normal.

However, it has been observed that at the low blood alcohol concentrations mentioned, small doses of alcoholic beverages (concentrations quite insufficient to "intoxicate" or "inebriate") do produce a true tranquilizing effect. That is, these low alcohol concentrations in the blood depress the conditioned reflexes in a similar way to that produced by the major tranquilizers, though, of course, to a lesser degree. The consequence of this fact is that even very low concentrations of alcohol in the blood depress driving or other machine skills and learned reflexes just as all substances possessing tranquilizing properties do. This means that even the lowest concentrations of alcohol in the blood tend to increase *accident proneness* in that they tranquilize and thereby reduce learned skills *without the owner being aware of the fact.* The consequence is that he overestimates his skills, driving or otherwise, and has more accidents as a result.

It is for this reason — the tranquilizing effect of even low concentrations of alcohol in the blood — that the glass of beer before driving home is at the bottom of many driving accidents. *These accidents are not due to the intoxicating effects of alcohol.* The intoxicating effect only begins to show itself after the tranquilizing effects of alcohol have been overtaken. The early effect of low doses of alcohol is that of tranquilization, slowing down the learned skills or reflexes *without the drinker of the alcohol knowing or even suspecting it.* This tranquilizing effect is then swamped later if the blood alcohol concentration rises further, and is replaced by the anesthetizing or intoxicating effect of higher concentrations. This later effect causes the unsteady gait, the slurred speech and the uncoordinated movements. It is very important indeed to

notice the two perfectly distinct pharmacological effects of alcohol, the tranquilizing and the anesthetizing effect producing "drunkenness". They are two distinct effects, though, of course, they run one into the other. The tranquilizing effect tends to extinguish the conditioned or learned reflexes, while the anesthetizing effect ("intoxication") tends to extinguish both the conditioned or learned reflexes as well as the unconditioned or unlearned reflexes (on which gait, speech, eyelid blinking etc. depend). The latter effect produces the thick, slurred speech, the unsteady gait and finally the total physical collapse — the inebriation.

A tranquilizer is, for the above reasons, defined in the text books as a substance which tends to extinguish the conditioned reflexes selectively while leaving the unconditioned reflexes untouched. Anesthetic substances (including alcohol, which is both a tranquilizer, at low dose, and an anesthetic, at high dose) depress both types of reflex, that is, the conditioned as well as the unconditioned reflex.

It is important at this stage to realize that most drug effects, including even the tranquilizer effect, can be produced without the use of a drug if one knows how. This applies to tranquilizers as well as to other drugs.

Most Drug Effects can be produced without the Aid of a Drug — if one knows how.

This fact will perhaps be best illustrated by giving a practical example.

If one tranquilizes a rabbit by giving it 1 mg. per Kg. body weight Reserpine intravenously, it is noticed that, after about half an hour, the rabbit will hyperventilate (pant) even though it is lying quite still and has no outward reason for being out of breath. This panting is due to the liberation of adrenaline (epinephrine) from the adrenals by the Reserpine. The reaction is a sort of pseudo stress reaction.

After a time one can mold the rabbit's limbs into all sorts of uncomfortable shapes and positions without objection being taken by the animal, which is awake all the time. It just does

not seem to be bothered about itself at all. If the animal is left quiet for any length of time it will drop off to sleep. But it can be wakened up immediately without the slightest difficulty — it is not in any sort of "drug stupor" in the commonly accepted meaning of the term. If one drops the animal which has fallen asleep on the experimenter's arm, on to the table, it wakes up immediately and catches itself perfectly on four feet just like an undrugged cat will do when dropped. If one holds the animal upside down in one's hands, allowing its head to hang free, the head will begin to drop backwards slowly, but surely, as the animal, even in this position, falls asleep in spite of its precarious position upside down on the experimenter's arm. If it is allowed to drop on to the table from its upside-down position, the rabbit will give one mighty wriggle and land perfectly on all four legs, showing that its unconditioned righting reflexes are absolutely untouched by the major tranquilizer Reserpine which it has been given. But the animal's learned reflexes (if it has any) would be depressed or extinguished by the tranquilizer. One cannot easily demonstrate this latter effect in the present experiment.

The effect produced by the tranquilizer — that of falling off to sleep at the slightest opportunity, while at the same time being very easily awakened — can be effectively demonstrated even before large audiences. One allows the Reserpine treated rabbit (about one hour after 1 mg./Kg. body weight i.v. into the ear vein) to fall off to sleep while being held upside on its back by the experimenter. Its head falls back and hangs down, a fact which everyone in the audience can easily see. Its eyes close as it naps in this precarious position. If dropped without any warning from this situation, the rabbit will right itself instantly and fall lightly on all four legs. This effect can be demonstrated as often as one wishes.

The rabbit on Reserpine gives the impression of being tired and of napping at every opportunity, just like tired people do, and is a typical symptom of tranquilization. However, exactly the same symptom can be produced without giving any tranquilizer at all if a person or an animal is kept in sleep deficit. Say a person needs 8 hours' sleep a night in order to be fresh

(some people need less sleep and some need more) but gets in actual practice 4 hours. The following day he will nap at any opportunity. His sleep deficit produces in him exactly the same type of symptoms as Reserpine the major tranquilizer does. In fact, if a person is in sleep deficit, he is physiologically tranquilized. Sleep deficit tranquilizes just as tranquilizers do.

This means that sleep deficit depresses the learned reflexes and skills, while not affecting the unconditioned reflexes (such as righting reflexes), just as tranquilizers do. And just as tranquilization by drugs produces accident proneness by extinguishing learned reflexes while not affecting unconditioned ones, so sleep deficit produces the same condition. The man who has had less sleep than he genuinely needs will tend to be accident prone. He will nod off to sleep whenever he can, but one can wake him again just as easily as one can wake a Reserpine tranquilized rabbit. His ordinary unconditioned reflexes are perfectly normal and he has no idea that his skills have been reduced by his tranquilization due to sleep deficit. This makes him a dangerous person in a car or with any other machine requiring skilled learned reflexes.

Only the other day I learned of some military men driving down an autostrada in Italy. The road was perfectly straight and wide and there was little traffic on it in the early morning. They drove at over 90 m. p. h. into the back of a truck moving in the same direction as they were, but at about 40 m.p.h. All were killed. They had driven some 9 hours without stopping, were in sleep deficit and therefore had napped under the tranquilizing influence of that sleep deficit.

Other Tranquilizers (Valium, Librium, Meprobamate etc.)

It has commonly been assumed that tranquilizers are useful as well as safe substances. A high percentage of persons consult their physicians for disturbances connected with anxiety, or psychosomatic illness such as stomach or duodenal ulcers connected with overstress. In these areas the tranquilizers

have proved to be sovereign and are prescribed on a huge scale today.

Besides being used for minor psychosomatic disturbances, tranquilizers have been and are used in more grave mental diseases such as schizophrenia. It is safe to say that it was the tranquilizer which opened the doors to the padded cell and set the prisoner of the mental institution free.

However, beside all these justifiable uses, the tranquilizer is, today, being prescribed in a manner which can only be described as an abuse. Let us look at some examples, for by so doing we shall gain some insight into one of the preconditions for some aspects of the drug epidemic. In recent years the population of the West has been led to believe that there is a pill to cure everything from a headache to schizophrenia.

I was recently talking to some parents of a hyperactive child. He was such a "wriggle breeches" that he did not learn much at school. He was always fiddling with something or another instead of paying attention to what the teacher was saying. His physician had prescribed for the boy a moderately powerful tranquilizer — just to help him learn! Now, the idea was good, but pharmacologically it was the purest of nonsense. The physician hoped to quiet the overactive child by tranquilizing him. This he certainly did, for the child had become so altered in his character (lethargic, lazy) that the parents were disturbed at the change. But at the same time the physician *prevented the child from retaining any learned reflexes or skills, and certainly hindered him from learning anything new at all.*

Patients themselves are partly responsible for overprescribing on the part of their physician. For if the physician tells them to resolve some of their discords in their married or family life rather than expect a pill to cure every headache and generally to do everything for them, then those patients become dissatisfied with their physician. If he gives them a pill — even sometimes a sugar placebo — they are often delighted at such an understanding physician. People want everything done for them by a pill. Why should we wonder

then at the drug epidemic? The psychedelic drug epidemic only goes to prove that youngsters want even their transcendent religious experiences to be pill mediated, instead of resulting from fasting, praying and getting right with God and their neighbor. We shall have more to say about this at an appropriate place later.

The result of this "drug orientated climate" in our society is that today Librium, Valium, Meprobamate, Thorazine, Haloperidol and even some barbiturates with a tranquilizing as well as an anesthetic action are abused by prescription on a huge scale. By definition as tranquilizers they all reduce or extinguish conditioned reflexes and learned skills while leaving unconditioned, unlearned reflexes untouched. Consequently, the patient emerges from the physician's office with the bottle or prescription in his hands which will silently and unobtrusively not only undo his learned skills but will also hinder him from learning any more. This state of affairs applies to the hapless overactive child sitting in school and trying hard to learn some skills in mathematics, history or woodwork, as well as to the harassed mother, nerves all on edge, who is trying to cook a nice dinner for some guests coming in for the evening. She breaks some dishes, burns herself on the hot plate and generally loses her skills as an efficient housewife — thanks to her beautiful tranquilizer.

Some years ago I met an old friend on the Chicago and Northwestern Railway in Chicago. He was bandaged from head to foot. I inquired what he was "on", at which he was annoyed. He was, he said, "on" nothing at all. (He thought I had implied he was on the booze.) It emerged that his wife had left him and his young children. The father was a busy business man. In trying to run both his business and his home he had overdone it and had a serious nervous breakdown. As a result his physician had ordered him some medication, which had quieted him down enough to allow him to carry on. Unfortunately and incidentally, he had smashed up three new cars that same year just to add to his worries. He put everything down to the fact that his marriage had broken up. The car accidents were just the result of anxiety, in his view.

As tactfully as I could I asked him if he would mind showing me his prescription. No, he had no prescription on him, but he pulled out of his pocket a little bottle, well and truly labeled as "thorazine", a major tranquilizer. I then asked him if his physician had warned him to take any precautions. He was taking three quite large doses daily. No, his physician had said he might, in the initial stages of the therapy, feel a little tired, but that would wear off as he became tolerant to the hypnotic action of the drug.

I then broke the news to him. No doubt, his broken marriage had robbed him of sleep and made him accident prone, which would help to account for the three smashed up new cars. But the chief cause of his accidents lay squarely in the major tranquilizer thorazine, which he was daily ingesting in highly effective therapeutic doses. He should not get behind a steering wheel for at least one month after he had taken the last dose, since the substance was notoriously slowly excreted from the body. It therefore remained for a very long time in the blood stream, depressing his learned reflexes, that is, his driving and other skills. I never found out how many people he had injured or even killed as a result of not being warned about the perfectly straightforward pharmacological action of any tranquilizer.

A Research Article on Tranquilizers

A research article appeared recently in the British Medical Journal (4, [1972] p. 580, compare also The New Scientist 14/12/72 p. 622) describing the effects of Librium, Amyl tranquilizers (a hypnotic, sleep-producing drug possessing tranquilizing properties), Trifloperazine (Stelazine), Haloperidol and a placebo (an inactive sugar pill) in human subjects. Each subject was given a pill of one of the active substances or the placebo 36 hours before taking a car driving test.

The results of the tests showed that with the exception of Haloperidol and the placebo, all the tranquilizers mentioned reduced driving skills (conditioned reflexes). The amount of reduction of skill was dependent on the dose taken and the time elapsing before the test was taken. *However, not one dri-*

ver tested in this way had the slightest inkling of the fact that his skills had been reduced by the drug he had ingested. Even when serious reductions of skills had been produced by the tranquilizers, the driver was completely unaware of that fact and often thought he had been given a placebo instead of an active drug. This emphasizes the human subject's total inability to detect his own loss of skills under the influence of a tranquilizing drug. After two or three glasses of wine you will *feel perfectly safe*, but you are nevertheless tranquilized and therefore accident prone.

The conclusion one reaches is that the so-called safe intermediate tranquilizers (as opposed to the so-called minor tranquilizers) are potentially highly dangerous drugs when used in subjects whose lives and safety depend on their ability to use conditioned reflexes.

Recently I was interested in investigating a new method of training and teaching medical students at a new medical school on the North American continent. Naturally, I inquired very carefully about instruction in pharmacology (drug science), particularly as the physician today is armed with the most powerful drugs ever available to mankind. The physician should obviously be thoroughly trained in the use of such powerful weapons, for their power for good is about equally matched by their power for evil, just depending on how they are used. However, in the new medical school there were to be no formal lectures in pharmacology and no public examinations.

This may be a better system than that of imparting knowledge by bad lectures. Since the promotion of a professor in his career does not depend much today on his lecturing ability but rather on his skill in obtaining federal and other research and training grants, it is obvious that lecturing skills have seriously deteriorated in recent years. The consequence is that anything, or any form of instruction, may be better than that given by a professor who does not care in the least about his lecturing ability. However, the same can be said of *any* system in which the professor is not correctly motivated in imparting

knowledge. If his imparting of knowledge, either by lectures or by private tutorials (this was what was to replace the formal lecture), does not decide his professional future, then the likelihood is that neither lectures nor tutorials will help to impart much knowledge to young physicians.

The consequence is that we are getting stronger and stronger pharmacological and pharmaceutical tools put into our physicians' hands with less and less guarantee (judging from personal experience) that physicians have gained adequate skill in using the new pharmacological "atomic weapons". One certainly hopes that, in the future, fewer young men will be let loose on their patients, determined to give an overactive child a tranquilizer "to help it learn its skills a bit more easily."

Withdrawal of Barbiturates (General)

The general pharmacology of barbiturates resembles in many ways that of alcohol, though their potencies, duration of action and other specific factors vary. In an effort to avoid barbiturate abuse, chloral hydrate or its derivatives are still quite widely used, at least in Europe. However, the abuse of barbiturates, glutethimide and other sedatives is probably more extensive in Europe than even the abuse of opiates. As in the case of thorazine and amphetamines, barbiturates are often used in combination with other drugs, particularly opiates and amphetamines, to potentiate and otherwise modify their action. Thus dependence on barbiturates is often accompanied by concomitant dependence on other drugs.

Dependence and Toxicity

Repeated use of barbiturates and/or other general central depressants can produce physiological and psychological dependence. Small doses of phenobarbital can, however, be taken almost indefinitely in some cases with no dependence production. Psychological dependence or habituation results from the individual learning to feel that the effects produced by the drug are necessary to maintain a state of well being. This may lead to compulsive drug use.

Compulsive drug use is often, though not always, associated with tolerance and physical dependence. Increasing doses are required to produce the same (or an even smaller) drug effect. Repeated administration is necessary to prevent the occurrence of the withdrawal or abstinence syndrome which is characteristic for each type of drug involved.

Tolerance to a drug is due partly to the activation of drug metabolizing enzyme systems in the liver by the drug. The presence of the drug causes the destroyers of the drug to become more active in destroying it. Thus, the more often the drug is given, the more quickly the drug is destroyed. This again means that more drug will be required to produce the same drug effect in the body. More and more barbiturate will be required to produce the same sleeping time as the barbiturate user gets more tolerant to the drug.

Consequences of Withdrawal

What is often forgotten is that the corollary to this state of affairs applies too. For, if the drug to which a person has become tolerant is abstained from for a period of time, the liver enzyme systems responsible for destroying the drug "forget" how to destroy it as quickly as they did when the drug was being taken regularly. The consequence is that a dependent person may be able to tolerate, say, 1000 mgs. of a drug after he has been using it for, say, three months. However, after giving the drug up for, say, three months, his liver enzyme systems "forget" how to destroy the drug as quickly as they "knew" how to when they were working at it every day. If now after say, six weeks of abstinence the person takes 1000 mgs. once more, he may die of toxicity effects, since the liver enzyme systems cannot remove the substance as rapidly as they once "knew" how. Toxicity and tolerance do not remain constant but are dependent on usage.

The "forgetting" process does not really involve memory, of course. The presence of the drug causes more enzyme to be synthesized, so that there is more of it to destroy the drug after the drug has been used for a time. And after abstaining from the drug, the amount of enzyme system in the liver decreases,

so that there is less of it when no drug is being taken. This is particularly the case with opiates. Barbiturates and their toxicity's remain more constant, though tolerance is an important factor. The important point is that the degree of toxicity to a drug depends to some extent on the immediate past drug history of the patient.

An individual may in the course of time become tolerant to up to 1.2 gm. phenobarbital per day and show little sign of toxicity on this dose. But, if the dose is raised even only slightly by, say, 100 mgs. daily, toxic signs may ensue.

One other point needs to be mentioned at this juncture. Tolerance to the sedative and intoxicating effects of barbiturates easily arises. But, in spite of the more rapid rate of destruction of the barbiturate in the livers of barbiturate users, the toxic dose level does not always rise correspondingly. Thus, as the dose for effectiveness rises with tolerance emergence, the toxic dose level does not keep pace, and toxicity overtakes effectiveness. The toxicity slope is steeper than the tolerance slope.

Withdrawal Symptoms

Withdrawal or abstinence symptoms are similar in all general depressants of the barbiturate and related drug types. In early mild cases, the only signs are those related to paroxysmal EEG abnormalities. Later on, where greater dependence is present, tremor, anxiety, weakness and insomnia result. In severe cases, grand mal seizures and delirium may result.

On withdrawal of short acting barbiturates, the withdrawal symptoms—abdominal cramps, nausea, vomiting, fainting due to orthostatic hypotension, weakness etc., — usually occur within one to three days. During this period convulsions may occur. Where longer acting substances are concerned — such as phenobarbital and chlordiazepoxide (Librium) — the withdrawal symptoms set in more slowly. Once delirium occurs it may not be easily reversed by giving even large doses of the habituating drug.

If the phenobarbital type of drug is to be withdrawn, this process must never be carried out abruptly. If withdrawal is

effected abruptly, seizures or even status epilepticus may follow. If morphine or any other opiate has been taken together with a barbiturate — many morphine addicts take barbiturates, or indeed any other drug available, when they find they cannot obtain their "fix" of opiate — then both drugs are necessary to prevent the occurrence of withdrawal symptoms. Similarly, alcohol and barbiturates are often used together. Indeed, some alcoholics may even give up their alcohol simply because they get to like barbiturate better than alcohol. If addiction to both alcohol and barbiturate has occurred, then both drugs may be required to prevent withdrawal symptoms in some cases.

In the psychoneurotic patient, the addiction to barbiturates usually originates in a physician's prescription. The patient continues to take the drug to counteract his insomnia or anxiety. On the other hand, the morphine addict only rarely makes his acquaintance with opiates through a physician's prescription — in the case of medical or para-medical personnel, contact with the opiate often comes in the execution of their duties. The constitutional psychopath is usually introduced to barbiturates by his friends. He does not seek relief from tension so much as an acute intoxication. Therefore he often takes very large doses within the first few weeks of starting his drug experiences. It is this type of person who learns to neutralize his large doses of depressive barbiturates with stimulative amphetamines. If he takes too much amphetamine he may, conversely, neutralize it with barbiturate. This practice results in a serious pharmacological situation similar to that precipitated by using opiates (depressants) in the presence of cocaine (a stimulant drug). Grave addiction is often the result.[1]

From the above it will be realized that withdrawal from general depressants such as barbiturates is not without danger. It is certainly more dangerous than withdrawal from opiates. Relapse in both kinds of withdrawal is very common.

Mental Changes under Barbiturates

Under the influence of general depressants such as barbiturates, changes occur which include mental and physical sluggishness, slow speech and understanding of sentences, poor memory, reduction of attention, exaggeration of personality traits, emotional lability, irritability, slovenliness, paranoid ideas with tendency to suicide. Immaturity and infantility may reach such a stage that the addict becomes unable to look after himself. Toxic psychoses sometimes develop which may end in visual hallucinations. Disturbances of vision and difficulty with visual accommodation are common. Fainting due to orthostatic hypotension has been mentioned.[2]

As previously pointed out, abrupt withdrawal of general depressants such as barbiturates is dangerous in cases of severe addiction. In less severe cases, only anxiety and weakness may be experienced. During the first day or so, according to whether short acting or long acting drugs have been used, improvement is seen. This improvement may be followed by anxiety, weakness and tremor, followed by insomnia, abdominal cramps, nausea, vomiting and rapid loss of weight. Usually the patient feels so weak that he stays in bed and begs for relief and his barbiturate. Uncontrollable shaking of the limbs may occur and may precede grand mal seizures which sometimes follow between two and seven days after withdrawing the drug.

Particularly elderly or exhausted patients are the ones that risk death most during withdrawal. But normally, withdrawal may be completed in several weeks. Hallucinations after withdrawal may continue for as long as two months after completion.

Withdrawal and Treatment

It is generally recognized that there are two cardinal points which must be respected during withdrawal from central depressive agents like barbiturates:

(1) Never abruptly withdraw the central depressant.

(2) Hospitalize the patient during treatment and withdrawal.

To commence treatment and withdrawal, a minimal maintenance dose of a short acting barbiturate is determined which

will just maintain the patient in a state of mild intoxication, free of irritability, insomnia, tremor or anxiety. The patient being thus stabilized is then treated daily with 0.1 gm. less of the barbiturate, until half the original stabilizing dose has been reached. This half dose is then kept unchanged for two to three days, after which the dose is again reduced gradually by 0.1 gm. daily until one quarter of the original stabilizing dose has been reached. A rest is then introduced once more and the dose kept constant at one quarter of the original for two or three days, or until all withdrawal symptoms have disappeared. If any severe withdrawal symptoms do appear, a single extra dose of 0.2 gm. barbiturate usually removes them. Total withdrawal is attained after two to four weeks.

Hospital care with sympathetic nursing are essentials in treatment of this kind. Care in preventing any smuggling of drugs is, of course, mandatory, as addicts will lie and deceive to any degree to get their drug. Any taking of extra drug doses during withdrawal renders the whole procedure pointless. After withdrawal is complete, psychiatric therapy is essential. Without it relapse is to be expected. Even with good psychiatric therapy, relapse is the order of the day in spite of most careful physical withdrawal. The same remarks about relapse apply to alcohol and opiate withdrawal, though, of course, in the latter cases many favor abrupt and total withdrawal of all drug. With alcohol and opiates, withdrawal is accompanied by less real danger.

The disturbances accompanying addiction of the kind discussed above lie at a deep level in the psyche of the patient, who needs a thorough and complete remotivation if physical withdrawal of the drug is not to be followed by relapse. This aspect of the treatment of drug abuse will be discussed in a following chapter.

Footnotes

1 See Appendix

2 For an excellent full description of this subject see Goodman and Gillman, 2nd Edition, 1954, p. 151.

Chapter V
Some Basic Factors Controlling Drug Action and States of Consciousness

General Considerations

There are at least six basic factors to be considered which control the action of any drug in any organism. According to the aspect from which one regards drug action, there are, of course, more. But for our present purposes the following six will suffice:

a) The nature of the drug in question. Its chemistry and its physical properties are all of first class importance — whether it contains double bonds (carbon to carbon), benzene rings, long aliphatic side chains, amide groups, certain heterocyclic rings, nitrogen, phosphorus atoms etc., and the purely chemical stability. All these factors play a role. To these factors must be added those of stereochemistry — the shape of the molecule, whether it is right handed or left handed (optically active) — and whether or not the molecule is easily ionized in contact with biological fluids. Further, the stability of the molecule in the presence of body enzymes must be considered. The mere size of the drug molecule also is important. Physical properties such as solubility, vapor pressure and surface tension must be added to the above list to complete it.

b) The genetic make-up of the organism taking the drug. It is important to realize that many drugs "combine" chemical-

ly with the organism in which they produce an effect. If hydrogen combines with oxygen, a new compound with properties differing from those of uncombined hydrogen and oxygen is formed, namely water. If hydrogen combines with sulfur instead of oxygen, water is not formed but hydrogen sulfide — an entirely different compound with different properties. Similarly, if morphine "combines" with a mouse, the mouse will be stimulated by the "morphine-mouse" combination, But if the morphine "combines" with a rabbit, the "morphine-rabbit" compound depresses the rabbit. The genetic make-up of the mouse is different from that of the rabbit. The "compound" morphine-rabbit differs from the "compound" morphine-mouse. Some women react to morphine or similar opiates by being quieted and relieved of their pain. Other women may react with stimulation and may show "sham rage". The "morphine-woman-A compound" is different from the "morphine-woman-B compound".

c) The Setting. The circumstances surrounding an organism or person when under the influence of the drug. This factor is sometimes called "the setting", and is particularly important where psychoactive and psychedelic drugs are concerned. If, for example, a person takes LSD or even a cannabis drug such as a mere marijuana joint in pleasant architectural and social surroundings with congenial people, his chances of a "bummer" (a bad trip) are less than if his "setting" is unpleasant and he himself is plagued with anxiety. If a person is suffering from violent toothache, his reaction to barbiturate is different from what it would be if he had no toothache. Barbiturates given in the presence of pain will often cause hallucination and stimulation in the human, instead of depression followed by sleep. Morphine given in the presence of pain causes euphoria and contentment. In the absence of pain it may cause dysphoria and vomiting. In fact, the physiological antidote to morphine is pain. Hashish smoked socially in pleasant company without anxiety may produce euphoria. It is almost a different drug when smoked solitarily. Thus marijuana is usually smoked socially, as we all know.

d) The Set. The fourth factor influencing drug action is the attitude of the person taking the drug experience. This is known as the "set" and is, of course, closely related to "setting". Since one's attitude to the drug experience is also related to genetic make-up, liability to depression etc., it will also be related to the factor we have described under b). A fearful and depressed attitude when entering on an LSD trip may be disastrous, even in a person who normally (when cheerful) has experienced little but good trips.

e) Physical Condition. The physical condition in which a person finds himself at the time of the drug experience may considerably modify drug action. Thus, if a person's liver function is depressed and his enzyme systems are not detoxifying drugs normally, by chemically degrading them, less drug will be eliminated from the body per minute than in a person whose liver function is good. That means that the drug will remain longer in the body than usual. The longer a drug remains in the body, the more time it will have to act pharmacologically and toxicologically. All this adds up to the fact that if the body's scavenging and elimination systems (the liver, kidney and the enzyme systems) are not up to par, then a drug will act more strongly in that person and will be at the same time more toxic.

Thus, if a person's enzyme systems in the liver or kidney are depressed by illness, poor nutrition, old age — or extreme youth, as in the new born — then the dose of drug required for pharmacological and toxicological effects is reduced. Smaller doses than normal are tolerated in such organisms.

f) Time. The length of time a drug is allowed to act on the body. This factor is obviously connected to factor e) but does not entirely overlap it. The effect may best be understood by taking an actual example. It may take six to twelve months of regular application of the tar obtained from smoking cigarettes to the shaved back of a mouse before a malignancy (cancer) can be produced. This means that "carcinogenic tobacco tar plus back of mouse plus time equals cancer." The time offered to the drug to react with mouse tissue to produce

a cancer is important. For if too short a time is offered to the drug and to the back of the mouse, no cancer will result.

It may take twenty years of cigarette smoking to produce a pulmonary cancer in man. Shorter periods of cigarette smoking may produce no visible effect at all. All this adds up to the fact that the most dangerous period in the life history of any organism (man or animal) is that period which offers to any toxic drug to which it is exposed the most time for toxic effects to emerge. Obviously, if a boy starts smoking cigarettes at ten years of age and then continues the habit at the rate of a pack a day for thirty years, that boy is more likely to develop the overt signs of tobacco tar malignancy (lung cancer) than if he had started smoking when he was sixty years of age and continued until he was seventy five, when he died of, say, kidney failure.

Thus, any organism is likely to show more drug toxicity the earlier that organism is exposed to it. This means that the most dangerous time in the life history of any organism, the human one included, is the time when the organism can offer the drug the maximal time during which toxicity can be developed. Now, when can any organism offer any drug the maximal time for toxicity to emerge? Surely when it is youngest. And when is one youngest? Surely immediately after conception. Thus it comes about that the first three months after conception are critical, with respect to drug toxicity, in the life history of us all.

The synthetic female sex hormone known as diethylstilboestrol is used by quite a large percentage of physicians on their female patients as a "morning after the night before" contraceptive. If a woman has exposed herself to a man, but has omitted taking contraceptive measures, she may fear a pregnancy and ask for a contraceptive which works retrospectively. On consulting certain physicians, she may be given a large dose of diethylstilboestrol, which is effective in quite a high percentage of cases in preventing pregnancy.

However, in some cases pregnancy does still ensue in spite of the synthetic female sex hormone. If this is the case, and if

the babe is female, it has been shown that a high percentage of female babes born after large doses of diethylstilboestrol had been given after conception, developed vaginal cancer some twenty or twenty five years later. That is, the baby girl who was exposed to diethylstilboestrol while still little more than a fertilized egg in her mother, never "forgets" this chemical "insult." After storing the "insult" for twenty or so years she develops vaginal cancer. This fact illustrates the paramount importance of protecting the young from exposure to drugs and toxic chemicals. When the young are exposed to drugs, they can offer the drug the long time span sometimes needed to produce a toxic effect. This is the case even though the young are never again exposed to drugs after the first exposure.

The same principle applies to women who smoke or take other drugs while pregnant. They expose their unborn babies through their own blood stream to the toxic drugs, to which the child is much more sensitive than the mother. This fact follows, since the unborn babe is much younger than the mother, which means that the drug has longer to work in the babe than in the mother who has less long to live than her child. The same principle applies not only to nicotine but also to a host of other drugs and toxic chemicals to which we may expose ourselves.

Some time ago, one of the leading British medical journals published an article describing an experiment carried out by some London physicians. They divided up several thousands of expectant mothers into two groups, those who had smoked and those who had not smoked. Then the life histories of the babies born by these mothers were followed for a number of years. The babies of the mothers that smoked weighed on the average less and were subject to more general illness than the children born by mothers who abstained totally from smoking. Here the long term toxicity of tobacco smoking emerges in a quite spectacular way.

Factor (f) brings out the need for care that women during child bearing age should exercise in taking any drugs at all.

The Thalidomide (Contergan) catastrophe in England and Germany underlines the necessity for extra special caution at this age. Thalidomide was an apparently non-toxic drug in the adult, and one which proved to be useful in treating the morning sickness of pregnancy which so often occurs in the first trimester. However, no one had tested out the toxicity of Thalidomide (Contergan) in the human fetus (or for that matter in animal fetuses either) in the first three months of intrauterine life. Thalidomide turned out to have a specific affinity for developing limb buds, and prevents or hinders their development. The result of this property was that thousands of children were born showing underdeveloped arms and/or legs.

It is feared in some quarters that the chronic use of certain psychedelic drugs such as LSD might show serious damage to the cell's hereditary mechanisms. "In vitro" tests have shown that in certain cases chromosome breakage may occur under the influence of high concentrations of the drug. There is no evidence that the drug can produce this effect when taken in ordinary "therapeutic" doses "in vivo". As far as is known at present, LSD taken by a pregnant woman does get passed on through the umbilical cord to her fetus, but whether damage occurs in doses ordinarily taken is not known for certain. Chronic users of LSD and hashish maintain that children have been begotten and brought up exposed to both, without damage occurring to the child. Timothy Leary maintains this in his book "The Politics of Ecstasy". Knowing (from experience) the effect of the chronic use of the cannabis type of drug in countries such as Egypt, where it is regularly used in large sections of the population, one cannot help but doubt the statement by Leary. LSD being a much more powerful drug than cannabis, one would expect its effects, especially on the young, to be more serious than those produced by cannabis.

With these six factors in mind we are now in a position to proceed to a consideration of the effects of psychedelic drugs in general.

Effects of Psychedelic Drugs

During the following discussion, we must restrict ourselves strictly to the effects of psychedelic drugs (mind expanding drugs) and omit the actions of other psychoactive drugs. Thus it is proposed here to go into the effects of drugs such as LSD, mescaline, psilocybin, tetrahydrocannabinol and adenochrome, while omitting the effects of psychoactive drugs such as general anesthetics, hypnotics, tranquilizers, opiates (such as morphine, heroin etc.) and central stimulants such as amphetamines, cocaine and similar agents.

Some of the properties of the psychedelic drugs overlap those shown by other categories. For example. alcohol will, under some circumstances, produce hallucinations similar to those shown by amphetamines and the psychedelics. The reverie often exhibited after taking LSD may appear similar to the tranquilization produced by thorazine. Thus, in considering any of these categories of drugs, one must take the complete picture and not any isolated symptoms. Alcohol will, as mentioned, under certain circumstances cause hallucinations (as in delirium tremens) although in general it would not be classed as an hallucinatory agent. In small doses, alcohol does suppress conditioned reflexes, leaving unconditioned reflexes untouched. That is, at these doses, alcohol is acting like a tranquilizer. In larger doses it acts as a perfectly good anesthetic and depresses both conditioned and unconditioned reflexes. Again, by inhibiting inhibitory processes, alcohol may act as a stimulant instead of as a depressant. Dose given, genetic make-up of the organism taking the dose, together with set and setting — all these factors may add up to modify the class in which we place a drug and its pharmacology.

To return now to the psychedelic type of drug. It is reputed to enlarge or stretch the mind, although there are some who object to this description. Under the effect of the psychedelic drug, the mind of the experimenter does experience at least what may be called an altered (if not an enlarged) state of consciousness. Under some circumstances, one may call this ASC an hallucination, so that it is to the mechanism and func-

tion of hallucination and hallucinatory action that we must now turn.

Hallucination

Hallucination can occur as a side effect of many drugs. Indeed, certain physiological states are often accompanied by hallucination without the aid of any drug at all. In fact, the condition known as sensory deprivation, as we shall see later, will produce hallucinatory effects. Amphetamines may provoke hallucination at certain stages. Certain illnesses, particularly fevers, may be accompanied by hallucinations. Stress and/or hunger and thirst may do the same. We shall touch on the mechanism of hallucination of several types in the course of this section.

In health, every normal person experiences hallucination regularly in the guise of dreaming (sometimes day dreaming too). Indeed, if a person is deprived of his normal dreaming activities during the night by waking him every time he dreams, that person will rapidly go into an anxiety state. So, in order to maintain normal mental health, we have hallucinations most nights in our dreams. We become, in effect, "insane" in our dreams so as to remain sane by day![1]

Hallucination may be described as a wandering in mind, or as a subjective experience of something which does not exist in material reality. Or, it may be described as an altered state of consciousness — one in which the image of three dimensional reality becomes distorted in the psychospace.

In order to understand the altered state of consciousness, it is necessary to understand how normal consciousness is experienced first. Then we can go on to show how aberrations of consciousness occur, with and without the presence of drugs.

Mechanism of Consciousness

Let it be stated clearly at the outset that consciousness itself, the nature of consciousness, is not understood. I have gone into some of the most recent research on this subject in my book "The Drug Users",[2] to which reference may be made for further information. On the other hand, the mechanism by which the outside world gets transmitted to our "psycho-

space", by which nerve impulses reach the bottom of the brain, there to be decoded, is somewhat better understood. That is, the nature of consciousness is not clearly understood, though the mechanism by which nerve signals reach the brain and thus consciousness from our nerve endings is better known. It is a knowledge of this latter mechanism which will suffice us in our discussions on ASC and hallucination, even though we still know little or nothing of the actual nature of consciousness itself. We can start off by asking ourselves how we become conscious of, say, light around us. In the retina of the eye there are embedded innumerable photosensitive cells known as rods and cones. When light falls on them they send electrical impulses through the optic nerve back into the decoding center under the brain, where the impulses are decoded in such a way that the brain or consciousness "sees" a flash of light. Many organized flashes of light build up a complete optical picture of reality round about us in the form of a an electronically "simulated reality" of photonically expressed light in the psychospace (or in the "mind"). Somehow or another our consciousness within the brain is then able to "look" at an electronically simulated picture of reality outside of the body, inside its own psychospace.

Every quantum of light (photon) which falls on a retinal light sensitive cell produces the same sort of electrical discharge, which is then interpreted as a flash of light. Thus the light the consciousness "sees" is not the real light which fell on the retina of the eye, but rather an electronic interpretation of the same. This is seen to be the case when a blow on the eye is registered as "seeing stars" or seeing "flashes of light". There were no real flashes of light falling on the eye when one acquired the black eye. The stimulus of the blow (pressure) on the retinal light sensitive cells was registered as light, for the simple reason that any stimulus of the light sensitive cells by either light or pressure (or other means) produces the same electronic response which is then registered as a flash of light in the psychospace.

The same principles apply to not only the sense of sight, but also to the other four main senses by which we experience a

sense of our surroundings (proprioception). There are certain nerve endings which register a sense of "cold". If one stimulates those endings by touching them, they register "cold" and not "touch". The reason is that these cells produce the same sort of electronic response no matter whether stimulated by temperature changes or by touch. So the decoding center under the brain registers *any message* coming from such cells as "cold".

Some taste buds register a sense of "saltiness" on the tongue. If one stimulates such cells by pressure, they will produce a response which is interpreted as "saltiness" in the consciousness. Stimulation of certain cells of the ear register "sound" whether it really was sound that produced the stimulation or not. Some nerve endings when stimulated produce an unpleasant sense of pain. Stimulating such pain endings with warm water (otherwise not in the least painful) will produce a sense of pain.

Thus, the nervous system of the body, which communicates to our consciousness center the happenings round about us in the outside world, does so by converting piecemeal all the impulses that reality round about us makes on us into standard electronic impulses (responses). These are so decoded in the brain that they simulate reality surrounding us in a picture projected into the psychospace. It is as though the body were a camera which looks out on to reality round about it, and projects that view of external reality into the "darkness" of its own interior in the form of an electronic image. Our own interior consciousness then reads off this view, thus transmitting electronically what is happening round about the body so that it can react to reality in an appropriate manner.

There are some consequences of this system of reporting electronically on external reality internally. These we must look at next.

All the Five Senses are in Competition With One Another

The five senses we have been discussing all report to the same decoding center under the brain. This fact brings with it a competition, which is highly important, as we shall now see.

Let us first of all take an example to prove that the competition between the senses exists. If one has a severe abscess under, say, a molar tooth, something needs to be done about the pain while the dentist either does a root treatment or extracts the tooth. Let us assume that the dentist resolves to extract. Usually he will block the pain reporting system from the tooth to the decoding center under the brain by one of two methods He may carry out a nerve trunk block by injecting a local anesthetic into the nerve running from the tooth to the brain, thus stopping the pain impulses from getting past the blocked length of nerve trunk. Thus, although the pain is still present under the tooth, the brain and its consciousness knows nothing about it. Usually the dentist will also anesthetize the tissue surface round the tooth, so that no impulses from them leak through to the consciousness center by way of other routes. Thus pain is there all round the tooth, but the impulses simulating the pain cannot penetrate the blockade of the nerve paths brought about by the local anesthetic.

A similar overall effect can be achieved by giving a general anesthetic, by means of which the impulse routes in the brain itself, which lead to consciousness of the pain impulses, are blocked. In both methods, the pain is still there in absolutely undiminished form and intensity, but the routes of its simulated impulses are either blocked on the way to the brain (local anesthetic) or in the brain itself (general anesthesia).

There is still another way of blocking the pain of an abscess under a tooth. This way does not make use of a blocking agent such as a local or general anesthetic. It depends on the principle we wish to explain, namely that of competition between the various five senses of proprioception. This principle is vital for any understanding of hallucinatory drugs. How does it work?

The pain impulses from the abscessed tooth are so intense that they are taking up most of the available space in the decoding center of the brain — the pain is so intense that one's whole consciousness is filled with nothing but pain. One can appreciate little else and is distracted by it. How can one stop this state of affairs without the use of an anesthetic? The dentist could do the following experiment (I do not advise submitting to it, for local anesthesia is much more comfortable): He places a pair of headphones over the ears and connects them to an amplifier which feeds in white noise or music. He tells his patient that as he begins to extract the tooth (if he has decided on that method of approach to your problem) and the pain mounts, he is to turn up the volume control on the amplifier. The more he hurts, the louder the patient turns up the input to the headphones until by the time he has nearly blown his head off with noise, he does not notice that the tooth has gone. The *noise* anesthetized him. How?

The pain impulses were going up from the tooth abscess to the decoding center under the brain where they were taking up a good deal of the available space. These pain impulses were so strong that one could barely appreciate other sense impulses. They were pushed aside by the pain impulses so that the "line" to the brain was maximally "busy" with pain messages. If, now, one forcibly feeds into the ears so much noise or loud music that the auditory nerve becomes so flooded with the sound produced impulses that they flood the decoding center with their messages, there will be less "space" there for it to deal with the pain impulses. The line becomes so busy with noise impulses from the auditory nerve that it cannot deal with any more business at all — not even with pain from a tooth. Thus the pain messages arrived all right at the decoding center but could not be dealt with by that organ, which was cluttered up with business from the auditory nerve. Thus it had to leave the pain messages undecoded. This is another way of saying that the consciousness was anesthetized to pain by the noise.

The above is actually an everyday experience, even though we often do not recognize it as such. I was once playing in a

Rugby football match, my position being in the scrum. One of my colleagues had set himself the task of getting a try in that match, come what might. He was playing all out, as it were. He, too, was in the scrum. The scrum wheeled in such a way that his ear lobe got caught up in the belt buckle of the boy in front of him and part of the lobe was ripped out. But he was playing with all his might and did not notice the pain — or the blood. His five senses were so busy reporting on the position of his body in the game, the positions of the opposite team members, the flight of the ball, in short they were so busy reporting on the heat of the battle that the boy's decoding center was much too busy with other matters and did not decode the pain impulses. The running, the dodging and the general heat of the "battle" flooded the decoding center so much that it was just unable to cope with the pain impulses which therefore went unregistered. "Battle" anesthetized him to pain. However, as soon as he was taken to the touch line and was *hors de combat*, Rugby footballwise, this flooding of the decoding center stopped abruptly. The decoding center business was vastly diminished with the consequence that the pain impulses, which had been there all the time, could now be handled by the decoding center. The result was that the boy immediately fainted from pain and had to be given an opiate to deal with it.

We all know that a soldier when he is fighting for dear life may suffer serious injury. He may have a toe or a finger blown off. But in the battle he hardly notices it. His decoding center is so busy dealing with the incoming impulses from reality round about him which must be properly decoded if he is to survive, that there is no room on it to deal with the pain from the finger or toe. But take the soldier out of battle and he will need morphine to cope with the pain which gets through the moment the overloading of the decoding center (caused by the battle) stops. The heat of the battle is removed, and with it the millions of impulses coming in from proprioception. This leaves space in the decoding center for dealing with pain, which then becomes intolerable.

We all know of cases such as the one I recently encountered: A lady slipped on a patch of ice in the road and broke her leg. It was a multiple fracture, and she had to have a number of screws put in until the bone had joined. She tells me now that she has no pain at all during the day. The trouble always starts at night. The reason is that the load on her "telephone exchange" under the brain is much reduced at night — she is not hobbling around doing what house work she can. The "exchange" is not busy and has more time for analyzing and recording in detail the messages from her broken leg. "Keeping busy" anesthetized her effectively with respect to the pain. Strong activity will anesthetize even strong pain, and weak activity will anesthetize weak pain impulses. She has pain during the day, but does not register it. She is too busy to do that!

Sometimes we husbands have to hang pictures for our wives, and sometimes we hit our thumbs with the hammer, instead of the tack. When this happens, we do not quietly and simply murmur, "Dear, I have hit my thumb nail. It really looks as if it is going to go blue. How very interesting to watch." No, we jump off the ladder, say all sorts of things we ought never to say, we shake our hands and arms and run frantically around. The rational explanation of this behavior is perfectly simple. The pain impulses (after hitting our thumb) reaching the decoding center are overwhelming, so that one can pay attention to nothing but the fact that one has hit one's thumb nail with a hammer. If now one rushes around and shouts all sorts of unpremeditated poems, shakes one's hand and doubles up one's body, one is by these actions feeding into the decoding center millions of extra impulses from proprioception which will overload the decoding center. If the center is overloaded by non-pain impulses from a writhing body, shaking hand and a vociferous mouth, then the pain impulses will get through to consciousness less well than if they had the decoding center all to themselves, as it were.

Thus, the five senses are all in competition with one another. The equilibrium between them all is dynamic, and messages get through on the basis of business volume and priori-

ties on the decoding center. This competitive principle is vital to the understanding of psychedelic and other drug action.

There is another important point we must consider at this juncture. If the picture of reality outside us is to be faithfully reported in our internal psychospace for our consciousness to read off, every impulse reporting back must be decoded in a standard way. If this is not the case, then a distorted picture of reality will be read off in the psychospace. Such distortion is connected with the phenomenon of hallucination, so we must investigate it a little further.

Distortion of Reality (Hallucination I)

Since our consciousness of the outside world is dependent upon the communications and decoding systems we have briefly discussed above, it is obvious that distortions in them will lead to a distorted view of reality as seen by the consciousness. Thus, if all the systems of the five senses cease to transmit their messages to the decoding center, then no impulses from reality will get through to the consciousness center in the psychospace. That is, consciousness will read off that there is nothing happening in reality round about us — indeed that there is no reality there — if all five senses go dead, that is, get anesthetized.

This happens under deep general anesthesia. This state is, in a sense, a distortion of reality, in that reality no longer penetrates to consciousness. Usually less than total anesthesia in this sense takes place. It is necessary to consider one further vital factor in nervous impulse transmission, before an understanding of certain hallucinatory processes becomes possible. It is this:- The rate of nervous impulses traveling along the nerve fibers of the body both to and from the brain is not the same as the rate of transmission of electricity in a copper or other metal wire. In a wire, the rate of transmission of current is the same as the speed of light. In the biological nerve, the rate of impulse transmission is very much slower and varies from animal to animal. It takes quite a finite interval of time, for example, for an elephant to feel a pinch in the toe of its

hind leg. Some "lower" sea creatures have a very slow rate of nerve transmission.

This slowness of transmission of nervous impulses is due to the fact that nervous impulse transmission depends upon chemical diffusion of ions, particularly alkali metal ions, through membranes. Along the course of nerve fibers there are what may be termed "junction boxes", where the impulses of one nerve are transferred to another. These junction boxes are termed synapses. The impulse or electric current in the nerve fiber is transported across these synapses by ion diffusion, causing depolarization or loss of electrical potential.

Obviously then, the rate of passage of an impulse along a nerve fiber is going to depend not on what might be called purely electrical processes which proceed at the velocity of light, but rather on the rate of chemical diffusion of ions across a biological membrane. This rate is, of course, very much slower than the velocity of light, so that nerve transmission is, compared with ordinary electrical processes, slow.

We are now in a position to understand how distortion of impulses along nerve fibers can take place, so that distortion of the picture of reality, which consciousness receives, occurs. If one can alter in an irregular manner the passage rates of electrical impulses across various synapses, then the message they carry will become correspondingly distorted. This is the cause of some types of hallucination.

Psychoactive drugs such as hashish (tetrahydrocannabinol and certain of its derivatives), LSD, psilocybin, mescaline, adenodrome and others showing the same properties are thought to owe at least some of their hallucinatory properties to the above mechanism. They diffuse into the synapses and immediately depress diffusion of ions across the membranes, with the result that all messages and impulses from reality become depressed. The first effect of ingestion of a dose of about 100—300 micrograms of LSD is the production of a "reverie". The LSD adept goes into withdrawal from reality, sits quietly in some corner and finds reality cut off from him. His afferent messages, impulses, from his five senses con-

necting him with reality get anesthetized by the fact that nerve impulse transmissions become "dampened" by the psychedelic drug.

After some time (minutes or hours according to the dose of active material taken) it is thought that the psychedelic drug begins to diffuse out of the synapses at an irregular rate. This means that some synapses lose their psychedelic drug more rapidly than others, according to their proximity to a supply of blood which washes the drug out of the tissue, or to enzymes which metabolize the drug and so inactivate it. The result is that there is thought to be a variation in concentration of psychedelic drug in various nerve synapses. If this is the case, there will be varying rates of nerve impulse transmission across those synapses which will result in a garbled, distorted picture of reality reaching the decoding center of the brain. This is merely another way of saying that an hallucination (distortion of reality) is taking place.

It should be emphasized here that the above mechanisms have not yet been finally proved. The techniques required to effect proof are very complex, and experimentation in humans is, of course, difficult. In animals, the nature of hallucination is difficult to assess. Although the mechanisms given are speculative, there is some evidence, however, to support them.

This theory may be interesting as an explanation of the mode of action of certain drugs in producing certain types of hallucination. But, we may well ask ourselves, how is it that the "highs" and hallucinations similar to those due to LSD, can be attained without the use of the drug at all when no more drug is in the body? That is, how does such a mechanism account for the so-called "recall syndrome" or the "flash-back"?

The Recall Syndrome or the "Flash Back"

If a person has ingested psychedelic drugs such as LSD or cannabis (preferably both together from the point of view of the Recall Syndrome) he runs the risk of experiencing under certain circumstances further "highs" without ingesting any

more drug. This spontaneous repetition of the drug experience has been known to happen up to three to five years after the last ingestion of drug. Combinations of psychedelic drugs such as LSD and hashish together are more powerful in producing the flash-back than the drugs taken singly. This is due to the potentiating action of one psychedelic drug on the other. In my personal experience of flash-back cases the addition of such drugs as amphetamine ("speed") or reserpine to the LSD and cannabis smoking combination increases further the probability of flash-back occurrence.

I spoke to one young man recently who had dropped "acid" (LSD) and smoked hashish regularly over about six months. When he could not obtain further supplies of LSD, he took to "speed" and hashish with disastrous results. He was experiencing over two hundred flash-backs a day, and was distracted by them to the point of nervous breakdown. The flash-back took all sorts of guises. Sometimes they manifested themselves as little flashes of blue light flashing over the documents he was working on. Sometimes he was experiencing full blown "highs" without having taken any drug at all. All the flash-backs were associated with stress of some kind.

There is no doubt about the fact that these flash-backs are not due to drug in the body, for they occur long after all drug has been metabolized, inactivated and excreted. The flash-back usually occurs when the person is exposed to stress of some kind or another. I personally knew of one case of a person who was experiencing flash-backs under the following circumstances. He had smoked marijuana and dropped LSD for about a year, and then had given it up to get through his examinations. He was in the habit of bathing very hot. One night on getting into his very hot bath he suddenly experienced a flash-back with the result that he lost all account of time — a typical symptom of the psychedelic trip — and had no idea of how long he had been in the bath or whether he was "in the body or out of it". He was seriously disturbed by the experience and consulted me about the matter. Here the hot water was the source of his stress.

Another case of flash-back among students came to my notice. Some students had been regularly smoking marijuana and dropping "acid", but gave it up for some months prior to examinations. One night they were motoring along the highway from Chicago to De Kalb when a convoy of cars met them traveling in the opposite direction. Some of these cars did not dip their headlights, so that the driver of our students' car (which was due at De Kalb for evening lectures) was momentarily blinded by the oncoming bright lights. The stress of the bright lights shining in his eyes was sufficient to set off a flash-back reaction and he had hallucinations, seeing hundreds of oncoming lights everywhere besides the real lights. He stopped the car on the highway (fortunately) and fled. It must be remembered that LSD hallucinations and highs are predominantly visual, so that visual stress from the headlights is particularly liable to trigger the visual flash-back reaction. The driver then panicked and left the car parked on the highway. Investigating police thought he was drunk, but the alcohol test was negative. No drugs were to be found on the students or in the car — they were all "clean" and had been for months. There was no legal procedure for arresting the driver for having had a flash-back on drugs he had not touched for months — except for illegally parking his car.

This brings us to the question as to the mechanism of producing a drug effect without drug presence — as in the case of a flash back. Pharmacologists are often very strictly materialistic in their views. They do not relish the idea of a drug effect without a drug — and rightly so. As it turns out, there is no need to be tempted to invoke paranormal events to explain this type of flash-back, as we shall now see.

The Mechanism of the "Flash Back" (Recall Syndrome)

The mechanism which we are going to suggest to explain flash-back has not been proved, but it seems plausible to a number of pharmacologists.

The first clue as to the possible mechanism of flash-back production is that it often occurs under obvious stress. The

stress may be large or small, but stress of some sort is usually present and may be visual, auditory or even temperature stress. When stress is mentioned, the pharmacologist immediately thinks of adrenaline (epinephrine) production from the suprarenal glands above the kidneys. Every time the mammalian body is subject to stress, the suprarenal glands pour out adrenaline from the stored adrenaline precursors into the blood. The adrenaline itself produces vasoconstriction (the blood capillaries become contracted so that passage of blood through them is made more difficult and blood pressure rises). By this contracting of the capillaries, blood is squeezed out of the tissues which accordingly become pale. When shocked, a person often becomes blanched. His heart beats faster, his cheeks pale, his digestion slows down and he is prepared to meet the stress of the shock by this adrenaline release.

But this state of readiness to meet shock must not continue indefinitely. The tissues would suffer damage from lack of blood and oxygen supply if the contraction of the capillaries continued too long. So there is a mechanism by which the high adrenaline concentration in the blood is rapidly reduced by the activity of certain enzymes known as amine oxidases, which break down the stress hormone (adrenaline). When this is done, the color returns to the cheeks, the blood pressure falls and the digestion begins its normal activities again.

Some time ago, it was noticed that substances like the major tranquilizer reserpine (Serpasil) potentiate the action of LSD. Reserpine releases large amounts of adrenaline into the blood — it produces "artificial chemical shock". If one takes a small dose of LSD *at the same time* as a dose of reserpine, the effects of a large dose of LSD are registered. It was therefore concluded that LSD and the adrenaline type of substance work together in the brain to produce the LSD effect. This was confirmed by a very elegant experiment, so elegant that it appears almost paradoxical. It was done as follows.

Reserpine was given in full therapeutic dose (it is used to tranquilize, and lowers the blood pressure if the latter is mod-

erately high) several hours *before* giving the patient his dose of LSD. The result was indeed surprising, for there was little, if any, LSD trip produced under this regime. If one gives LSD and reserpine together, one obtains a much potentiated LSD trip. If, on the other hand, one gives the reserpine several hours before giving the LSD, little or no LSD trip is obtained.

The explanation is thought to be the following. Reserpine liberates into the blood stream the stored adrenaline just as though the patient (or any mammal) were in a state of shock. If one gives a rabbit 1 mg./Kg. body weight of reserpine by the intravenous route, after about half an hour it will begin to pant even though it is lying perfectly still and nothing is bothering it externally. It will do this until it has little more adrenaline left to pour into its blood stream to cause the panting. Then it will lie for hours, exhausted and quiet — completely tranquilized and almost incapable of responding to stimulation. It has far too little adrenaline left in it to enable it to react much more to stress. If this is done to the human, as when we gave our patient first of all his dose of reserpine and, then, much later his LSD, that human has much less adrenaline in store to pour out when stress comes. And that human does not respond normally to LSD.

The conclusion is therefore drawn that LSD action is much strengthened or potentiated by the presence of adrenaline (and perhaps serotonin, too). In fact, LSD action is feeble without adrenaline and very strong with it. Some years ago, the following explanation for these facts was suggested. Adrenaline, when it reaches certain concentrations in the blood, condenses to form adenochrome. Now, adenochrome is a quite strongly hallucinatory substance with properties akin to those of mescaline and therefore to those of LSD itself — their properties, from a psychedelic point of view, are close. If, now, stress produces adrenaline, and adrenaline produces adenochrome which is hallucinatory (like LSD but weaker), then one can understand why a person subjected to stress may have hallucinations, that is, "see things".

There is one final link in the argument. It is thought that once the brain "learns" to "flip over" or to "flip out" with the help of such drugs as LSD or hashish, it can "flip over" later with lower doses of the hallucinatory drug. LSD acts, as it were, like oil on a mechanical system. When oil is present it takes less energy to achieve a mechanical end. The brain that has become "used to LSD" requires less drug to achieve a "high" than the novice does. This rather unusual situation contradicts what we usually expect — the usual effect is that the more one uses a drug the more drug one needs. It is even the case in one sense with LSD, for one cannot trip out with LSD more than once or twice a week. The body needs time to recover before it can respond to a dose of LSD with a trip. However, if one allows the body the time to recover from the last dose of acid (about a week) it does "learn" to "flip out" with less of the drug.

The consequence of all this is that, once a brain has learned to "flip out" with LSD, the threshold dose to produce a reaction to hallucinatory drugs is in general reduced. This means that the brain becomes so sensitive to hallucinatory drugs that it becomes able to react to the low concentrations of adenochrome produced from the body's own adrenaline. Which means that when the body of a person who is adept at taking LSD is subjected to stress, that body will produce adrenaline and therefore adenochrome in sufficient concentration to cause hallucination. One might call this "autohallucination." The effect of stress on a person who was not an LSD adept to the same degree would produce the same amount of hallucinatory adenochrome but this same concentration of adenochrome would produce no autohallucination. For the person had not lowered the threshold concentration at which he responded to hallucinatory drugs in general so that although adenochrome is in his blood the concentration of it is too low to cause a trip for him.

All this means is that once one has learned to produce hallucination under LSD, it happens more easily with any such drug because the threshold of reaction to such drugs is lowered. When the reaction threshold to psychedelic drugs has

been sufficiently reduced by this means, one eventually reaches the position at which one responds to one's own normally produced hallucinatory substances — one produces autohallucination or experiences flash-backs under stress. If one had never taken LSD one would not have lowered this threshold and would consequently not respond to one's own hallucinatory substances (produced in one's own body). That is, one would not have experienced flash-backs. This state of affairs has one important consequence we must glance at before proceeding further.

A Consequence of the Ability to Experience "Flash Backs"

If a person has been smoking hashish and maybe dropping LSD at the same time, or if he has been a heavy user of hashish or LSD and then used concurrently the stimulant type of drug such as amphetamine, my impression is that person is more likely to experience flash-backs under stress than persons who have not practiced this type of polypharmacy, that is than those who have not mixed their drugs in this way. It is, of course, very difficult indeed to arrive at any real firm conclusion on this matter because drugs purchased on the black market are so often "cut" or "laced" with other drugs. Thus Turkish hashish is usually potent and often laced with opium. The lacing process often changes the pharmacological properties of the drugs concerned in quite a fundamental manner. Since the drug adept buying his drugs on the black market does not know what he is taking, one can seldom relate drug effects to any specific drug.

Thus a drug user may swear he has never mixed his drugs. In reality, however, he has perhaps bought his drugs on the black market where, unknown to him, the mixing has been done for him. The results are, of course, the same, whoever does the mixing. Or, it may never occur to the drug user that to drink a glass of alcohol of any sort (beer, wine, whisky, rum or vodka) vastly potentiates the action of the barbiturate he took for insomnia. It may not occur to the drug taker who has dropped LSD that it is highly dangerous to take a tranquilizer such as reserpine immediately on top of the "acid".

The upshot of all this is that *the person taking "acid" or other psychedelic drugs such as hashish, mescaline or psilocybin renders his own character unstable under stress.* Take a practical example to illustrate this point. Say a pilot has been indulging in psychedelic drug abuse and has never experienced anything untoward on his trips. Suppose then that he is preparing to land his aircraft and finds his landing gear is jammed. It is surely superfluous to say that this eventually incurs very considerable stress on all concerned and will certainly liberate a large amount of adrenaline into the blood stream as the pilot struggles with the hand operated gear. The adrenaline in his blood will form small amounts of adenochrome. If now his threshold for hallucination has been much lowered during his chronic psychedelic drug experience, he may produce enough endogenous adenochrome to precipitate a flash-back or even full blown trip without taking any more drugs — his own adenochrome may suffice. Personally I would not like to be in the hands of any pilot who was liable to trip out under stress He might see three landing strips or mishear instructions from the control tower in such a state.

The fact is that for the above reasons the psychedelic experience tends to undo specialist training. For a part of all training, especially military training, is surely to teach a man to be stable, cool, calm and collected under any stress liable to come his way. The man who is calm under stress is better than the man who is not. He is better trained. We can therefore conclude that the psychedelic experience, especially the reinforced psychedelic experience produced by mixing drugs (such as alcohol, amphetamines, reserpine, LSD, hashish and similar drugs) tends to make a man subject to flash-backs under stress (this does not always occur, but the *risk* of a flash back is involved), that is to "trips" when stress arises, without taking psychedelic drugs. This liability to flash-backs under stress may last up to five or more years after taking the last psychedelic drug dose. In short, the psychedelic experience tends to make a man unstable under stress. In normal life, he may notice absolutely nothing after his psychedelic experi-

ence. The change only shows up under pressure, stress. A man may be normal, perfectly normal, after psychedelic experience — until the pressure and stress is turned on. Surely the psychedelic experience is the last experience any man or woman should have who bears responsibility in industry, science or in the military. Every employer looks for stability of character even under severe stress when seeking persons to occupy important stressful positions. Flash-backs under stress nullify training for stress.

Thus, if a person wishes to "get by" in life, assume as little responsibility as he can, then that person may risk the flash-back danger. Others with higher aims will not wish to risk this instability of character under stress.

Footnotes

1 Recently evidence has been produced showing that if a person is not wakened violently while dreaming, anxiety states are less likely to result.

2 The Drug Users, H. Shaw Publishers, Wheaton, 60187, Illinois, USA.

Chapter VI

Trips, Flash Backs and Hallucinations

We are now in a position to draw together some of the loose ends in our thoughts on the mechanisms of action of psychedelic drugs. To do this we must first of all glance at the main types of hallucination to which the human psyche is heir. We have already shortly discussed one type. Then we must take a look at the so-called natural "high" or natural "trip".

Types of Hallucination (Vision, Trance or Trip)

a) Type I Hallucination

There are two main types of hallucination which interest us at this stage of our discussion.

The first type of hallucination (Type I) which we have already mentioned, may be termed an experience of altered consciousness involving the distortion of consciousness of three dimensional *reality*. This experience has nothing to do with the "seer's" or "prophet's" vision of transcendency which is involved in "instant mysticism". It involves, strictly speaking, only distortions of such objects as kitchen cups, light bulbs, people's faces and carpet patterns in the consciousness. Under its influence the limbs of one's body may feel, for example, so light that the subject is sure that he can fly down unaided from the top story of a building and land safely at the bottom.

Here a distortion of normal proprioception by the five senses is at work. The image the subject receives of material real-

ity around him in his consciousness center is simply distorted and out of proportion. Real faces may become diabolic masks, real bodies may become contorted, smiles may be seen as smirks and normal voices heard as weird screeches. Simple water tastes perhaps like nectar — or like poison. In short, the picture of material reality is distorted by the time it reaches our consciousness center.

This first type of hallucination is due to quirks having developed in the "closed circuit television system" of the five senses which reports on three dimensional reality to our consciousness center. The impulses from the five senses reporting on reality round about us get twisted, which leads to the picture of three dimensional reality reported on the psychospace becoming twisted too. Such hallucinations may be conveniently classed as Type I hallucination, which is not transcendent and has little to do with "instant mysticism".

B) TYPE II HALLUCINATION ("INSTANT MYSTICISM")

However, not all hallucinations, natural or drug induced, can be put into the Type I class, for some hallucinations have little in common with material reality round about the subject. There is evidence that this type of hallucination does not necessarily stem from three dimensional reality at all, but represents something more. How then should one interpret and classify hallucinations which apparently have little to do with three dimensional reality? Such hallucinations occur both with and without the use of psychedelic drugs.

Aldous Huxley and others with him believe that the explanation of the Type II class of hallucination lies in the following considerations. The human brain is thought to be not only a generator of thought but also a receiver and filter of thought or consciousness. Behind the order of the living and non-living universe there is believed to be a "universal think tank" or a "universal think bank" in some trans three dimensional sector of reality. This "think tank" is conceived of as pervading all three dimensional reality around us. Matter and life are not considered to be so much generators of thought as the result

of thought. The brain receives some thought at least from the "universal think bank".

Theoretically, it is believed that the human brain could be conscious of everything three dimensional and beyond that is happening in the whole universe. However, if the brain really were to become conscious of this much of universal events and thought, it would be incapable of surviving in our hostile environment. The brain is therefore regarded both as a *receiver* and as a *filter* with respect to universal thought events. It filters out what it does not need to survive in our three dimensional reality. It also filters trans three dimensional thought reality, that is, thought transcendency. It must act this way as a thought filter, or it would be overloaded and thus would not easily be able to survive. This concept reminds one of the Biblical idea that if God burst in on to our consciousness — if we "saw" him — we would perish. Such a tremendous transdimensional thought event would overload and destroy our consciousness instrument.

It is clear that psychedelic drugs have in the first place a reducing effect on the canals of the five senses. They "anaesthetize" them so that the subject goes into a kind of synthetic partial sensory deprivation, a reverie, resulting in deprivation hallucination as we have already noticed. Partial and irregular anesthesia of the five senses by psychedelics results in Type I hallucination, as we have already seen. The *removal* of this type of anesthesia (as the drug is washed out of the nervous tissue) results in an *increase of sensation* (the opposite to anesthesia) which produces the intense perception, the throbbing colors so characteristic of some trips and about which we shall have more to say when we come to deal with the various types of psychedelic trips. These actions stem from an effect purely on the five senses.

Just as a psychedelic drug can "close" and also "open" the canals of the *five senses* (Type I hallucination), resulting in one case (closing) in anesthesia and its concomitant sensory deprivation followed by hallucination, and in the other case (opening) in "hyperaesthesia" in which the five senses expe-

rience an incredible intensity of perception, so also in the case of Type II hallucination involving the *sixth sense*, the nature of which we will deal with in due course.

In sum: psychedelics can both open and close the canals by which the five senses communicate with the consciousness center. This brings anesthesia, partial or otherwise, in this sector, or hyperaesthesia in which the subject experiences material reality as never before. But psychedelics can also close or open the canal or canals to the sixth or mystical sense. When they close the sixth sense canal (as by flooding the decoding center with super messages from three dimensional reality as in hyperaesthesia — the sky is never so blue and the grass never so green) little or nothing will penetrate to the consciousness from transcendency (the sixth or mystical sense). When, however, psychedelics open the canals leading to transcendency, then the Type II class of hallucination ("instant mysticism") will occur. Thus, it is postulated that psychedelics can open up the canals leading from the brain to the universal think tank and make a man more receptive to the mystical and the transcendent, thus closing a man's consciousness to three-dimensional reality and producing a reverie. On the other hand, they can also reduce this ability to enter into contact with the universal think tank both by closing the sixth sensory canals and also by opening up the canals of the five senses to three dimensional reality, thereby flooding the decoding center with traffic from three dimensions and thus reducing the Type II experience.

One can put these postulates in a different way. The biological brain is capable of connection with the "universal think tank" behind nature by means of what we have called a sixth sense (mysticism). The five senses report back to our consciousness on events taking place in three dimensional reality round about us. By their means we see that the rose is red and that the potatoes are growing nicely in the fields. On the other hand, the sixth sense reports back to our consciousness on paranormal (or mystic) events taking place in transcendency. Or it may report back on events taking place in time and space but by means of paranormal media, that is, by means not

explicable in terms of the forces we know to be operating in time and space. There would seem today to be little doubt that the biological brain does have a means of access — albeit often a very tenuous access — to the mystical paranormal and to the transcendent. I have listed some of these paranormal events in my book "The Drug Users".[1]

May we take it for granted, then, for the sake of the present discussion, that a sixth (mystical) sense does exist in the human perceptive systems alongside the normal five senses? If this is, in fact, the case, then we should expect the sixth sense to be in competition with the five senses just as the five senses are in competition with one another. Both the five senses and the sixth must compete for traffic space on the same common decoding center en route for the consciousness center.

Normally speaking, the sixth sense sends in very weak impulses. Most of us find them so weak that we often doubt their very existence. If these sixth sense impulses are weak then they will obviously easily be swamped by competition from the stronger impulses fed into our consciousness center by the five senses. The sixth sense impulses will then have difficulty in competing their way through to the decoding center against the strong five sensory system so as to penetrate to actual consciousness at all. Nevertheless, from the following type of experience many believe the messages from the sixth are just as real as those from the five, even granted that they, the sixth sense impulses, are weak.

The reasons for this belief are as follows. When an astronaut is put into a simulated space capsule he is often first of all rendered weightless by floating him in water at about blood temperature. This simulative trick removes from his proprioceptive system the millions of nerve impulses normally necessary for him to maintain his balance against gravity forces. The reality of these millions of impulses and their decoding is demonstrated by the fact that the moment a man dies in the upright position he falls down into the supine position. The dead man stops decoding and reacting to the millions of

impulses from his five senses with the result that he immediately falls. Floating a man in water removes the necessity for sending these proprioceptive messages up to the brain and reacting to them to maintain balance. The result is that the telephone exchange system or decoding center under the brain is relieved of a very considerable load otherwise needed to maintain mere physical balance. The space on the decoding center occupied to process that load now becomes free while the man is floating in tepid water.

In the simulated capsule the contact of the ears and eyes with three dimensional reality is cut off, so that in the darkness and silence of the capsule there are no impulses being sent from the eyes or ears up to the decoding center. The optic nerve is a very big nerve indeed, and normally carries a heavy load of impulses. In the pitch darkness of the capsule its load is transmitted no longer. The same is the case with the ear. The auditory nerve is normally quite heavily loaded so that the silence of the capsule frees the decoding center of an additional heavy load. This state of light load on the decoding center is known as "sensory deprivation".

A result of this freeing of the decoding center of the loads normally sent from the optic, auditory and other proprioceptive nerves is that the center becomes freer to process the weak messages from the sixth sense. Accordingly, for the first time, as it were, messages from the sixth sense begin to reach the conscious areas of the brain. The astronaut in the simulated capsule goes into five sensory deprivation and experiences as a result a Type II class of hallucination. This has nothing to do with Type I hallucinations, which are concerned with three dimensional reality in a distorted form. In the Type II class of hallucination the astronaut may see "God", the "angels" or the "Devil" in a mystical type of vision. This kind of experience has occurred regularly without the aid of drugs or even as a result of previous drug experience in the flash-back syndrome. It is merely a *sensory deprivation type of hallucination*. The cause is that the decoding center becomes freer, with the result that weak sixth sensory messages can now be processed; this was not the case so long as the decoding cen-

ter was under heavy load. Our astronaut begins to experience the world of the mystical sixth sense, about which he knew nothing in the days when his busy life filled his decoding center with heavy three dimensional five sensory "survival traffic".

The mystical experience is, then, a consequence of the competition we have already noted between the five senses among one another and with the sixth mystical sense. One can demonstrate this point fairly easily: — if one feeds into the astronaut's eyes and ears sights and sounds from, say, radio and/or television, his hallucinations will vanish. Or if one drains off the tepid water in which he is floating, thus causing the feed back of the millions of impulses necessary for him to regain his balance, then his decoding center becomes so busy once more with five sensory traffic that the weak messages from transcendency are swamped out and the hallucinatory experience dries up immediately.

One can demonstrate the role of competition between the five senses and the sixth sense in Type II hallucination, not only in cases of natural sensory deprivation "highs"— as in the case of our astronaut — but often also in the case of some types of LSD and psychedelic drug hallucination. For example, if a person is experiencing a "bummer" after LSD it is sometimes possible to "talk him down". This is done by someone, who understands the situation thoroughly, talking to the sufferer sympathetically but authoritatively. Thus a heavy load of impulses is fed into the ears — and eyes maybe — of the patient, and passed on for decoding under the brain. These impulses compete for decoding space with the hallucinatory impulses in such a way that, if the therapy of "talking down" is successful, the hallucinatory sixth sensory impulses are swamped out. When this competition between the two competitive trains of impulses is complete, and the hallucinatory impulses have been swamped out by the "authoritative talking down", the patient finds himself delivered of his "bummer". Of course, success is by no means always assured by this means.

The logic, at least, of this competitive relation in the brain between the five senses and the mystical sixth sense was well known to the ancients. For example, Jesus Christ advised his disciples as to the best methods to adopt if they wished for an experience with their heavenly Father, that is, if they desired a transcendental prayer experience. As a prerequisite to this experience, they were to subject themselves to a mild form of sensory deprivation! Of course, the Lord Jesus Christ did not use scientific jargon such as this, but he said precisely the same thing, for they were to go into their closets and lock the door behind them and then pray to their Father *who is in secret.*[2] Going into one's closet and locking the door behind one amounts to mild five sensory deprivation, for the eyes see less and the ears hear less under these circumstances. Thus the transcendent mystical interview with the Father is facilitated by this simple method of practicing mild five sensory deprivation.

The ancients knew much more about this simple psychological and physiological wisdom than we moderns do. For they also went up into the mountains to pray alone in the quiet. They withdrew for a time from society to obtain the necessary reduction of impulses from their five senses. Thus God was able to reward them openly[3] — they were often a good deal more balanced psychologically than the psychological wrecks that modern society with its endless bustle and noise (= five sensory flooding, plethora) produces. They knew that shutting the five senses for a time to the impulses of the material world allowed the delights of the sixth sense to make them whole.

One reads today criticism after criticism of the modern Western tendency to turn to Eastern religions and to Yoga. Many of these cults involve meditation, withdrawal and rhythmic exercises in the practice of transcendental meditation. Yet this tendency to Eastern religions, withdrawal and meditation is at least understandable (even though one may not agree with it) in the light of the above propositions. For the *five senses* of modern man have been hopelessly overloaded for many generations now. Let us call to mind the overloading

caused by modern abuse of radio, television and the press. All these impulses crowd in upon the decoding center of the brain by means of the five senses and swamp it, with the result that the sixth mystical sense seldom gets experienced by modern man. His experience of the sixth sense has thus atrophied. An organism with an atrophied sense can be a sick organism.

It is not exactly surprising that sick organisms seek a cure for their sickness — even rats will eat exactly the correct proportions of various pure vitamins to cure their hypovitaminoses. It is thus not surprising if our sick society seeks a means of correcting the atrophy of the sense of the transcendent by any means it can find. Our sick society is suffering from chronic overworking of the five senses aggravated by almost total neglect of the sixth. Psychedelic drugs, as we have now seen, reverse this imbalance by anaesthetizing (for a time) the five senses and opening the canal to the sixth. Although this process is not without danger, yet it does something to correct the situation. A confirmation of this state of affairs is to be found in the recent preliminary research work showing that when a modern drug adept learns transcendental meditation he is often freed of his desire for certain drug abuse — drug abuse became distasteful to those practicing meditation of this type.[4] Surely all this is an indication of the fact that Western culture is being *deprived of sensory deprivation* with the result that it knows little of the transcendent which it needs in order to be whole. It is consequently sick. We have our Monods and other nihilists with us who deny anything but matter around us because they have allowed their communications with the transcendent to dry up and to atrophy. As a consequence they deny the very existence of anything mystical or transcendent.

Even those who are Christians rarely practice what their Master did in respect of sensory deprivation. He went up into the mountains alone to pray.[5] And if it was not the mountain he resorted to, it was the desert.[6] In ancient cultures there was always provision for withdrawal into quietness to think and to meditate in solitude, and so to repair the sense of the presence of transcendency. This need is rarely satisfied in modern

Western culture, which means that the whole important faculty of the sixth mystical sense tends to lie barren in the Western human psyche, with a corresponding impoverishment of quality of Western life. Even the Puritans practiced this kind of sensory deprivation in keeping to their times of prayer and quietness. The Zinsendorf Brethren in Germany did the same. But today one finds in the Establishment little emphasis on this aspect of spiritual life, with the consequence that the younger generation is spontaneously taking to psychedelic drugs and dropping out, in order to obtain what their parents never showed them how to attain by natural means (without drugs).

We shall have to discuss these things in fuller detail in a later chapter. Suffice it to say here that even the practice of closing our eyes during prayer lends us a method of producing mild optical sensory deprivation with its concomitant increase in the sense of reality of the transcendent. For the eye impulses considerably load up the decoding center of the brain with traffic, which is lessend on closing the eyes.

This should in no way be construed to mean that the transcendent mystical so opened up by sensory deprivation is always, as it were, divine. It is the author's conviction that the experiences of transcendency can be either "heavenly", neutral or "hellish" depending on the person concerned. For any readers who take the Bible seriously, it will be obvious that the transcendent can be experienced as either "hell" or "paradise", for war in heaven is described in the Bible, and Satan has had access to the very transcendent Presence of God.

We shall have to say more about these matter in a later section. However, we must develop first of all one more aspect of Type II class of hallucination.

Psychedelics and Type II Class of Hallucination

We have already noticed how psychedelics such as LSD and hashish produce Type I hallucination (distortion of three dimensional reality). We must now look a little more specifically into the production of Type II class of hallucination by psychedelics.

In the first place it is generally believed that LSD and other psychedelics do produce a genuine Type II class of hallucination. The psychedelic peak Type of experience, about which we shall have more to say later, does without much doubt represent a genuine experience of the transcendent in at least some cases. Again, by this, we have not said that such an experience is one of "heaven" or even of "hell", or of both even.

What concerns us here is by what physiological means the psychedelic drug is able to produce a Type II class of hallucination. It is thought that this effect is produced by essentially the same mechanism by which physical sensory deprivation (the "astronaut" deprivation) produces the identical effect. It is believed, in fact, that whether the sensory deprivation required to produce the Type II class of hallucination is purely physical in origin (such as in a space capsule, where physical weightlessness, physical lack of light for the eyes and sound for the ears deprives the five senses of much of their normal business, thus producing sensory deprivation of physical origin or of non-physical drug origin is not an important factor). It is not important whether drugs anaesthetize the five sense neural passages so that nerve impulses are reduced by being blocked internally, or whether the reduction of impulses passing along the neural passages takes place externally because the walls of the space capsule prevent light and sound from reaching the ear and the eye while the tepid water produces weightlessness, thus reducing proprioception. *What is important is sensory deprivation itself, produced by any means, exogenously by space capsule or closet walls or internally by nerve anesthesia.*

It is, then, the five sensory deprivation itself which tends to open up the transcendency, and not necessarily any special or specific drug effect. In general, one can say then that any means of cutting down the traffic volume from the five senses will tend to produce the Type II class of hallucination. There is, however, a slight modification of this thesis which we must notice. It is this:— Some scientists believe that LSD and other psychedelics, in addition to the above effect, also

"enlarge the canal" leading to transcendency so that a person "learns to have hallucinations" more easily after psychedelic experience. We must look at this proposition as soon as we have noted one other matter.

Mechanism of Type II Hallucination

How does the psychedelic drug produce the reduction of five sensory impulses leading to sensory deprivation? When the tripper takes his 300 micrograms or so of LSD he soon lapses into a reverie and seems to lose contact with his surroundings. He is not asleep as he would be under barbiturates. He can walk around, for example. But he is in a kind of a trance, and reality round about him has little impact upon him in a specific way the LSD diffuses into his proprioceptive neural system, modifying and reducing (at first) his reception of impulses from the outside world. He now responds to impulses from that outside world quite differently from the way he did before he dropped the acid.

This state of reverie represents a kind of sensory deprivation, which frees the decoding center under the brain of a good deal of routine traffic from the five senses in much the same way as the space capsule walls and the tepid water did. However, in this case the sensory deprivation is brought about by an internal blocking of the nerves reporting on the findings of the five senses, and not by a deprivation of the nerve endings in the eyes, ears and sense of touch by physical space capsule walls. But the end result of both types of sensory deprivation is about the same — there is less business being transacted in the decoding center under the brain. This means that the weak messages from transcendency can get through to being processed for the consciousness center, whereas beforehand they could not.

It is not strictly true, of course, to say that the drug method of producing sensory deprivation is exactly equivalent to the physical space capsule or closet wall method. Drugs may introduce toxicity, whereas the physical method does not. The drug method toxicity can be permanent or temporary, and can

vary from person to person and from circumstance to circumstance.

There is one other consequence to the opening of transcendency *by drugs* (not by natural sensory deprivation) at which we must glance. After the initial reverie following dropping acid or other psychedelic agent, the drug gradually begins to diffuse out of the nervous tissue and synapses in which it is producing its effects. But the drug does not usually diffuse out of all its positions in the nervous system at a constant rate. It seems to diffuse out of some of the nervous tissue more rapidly than out of other nervous tissue. Maybe LSD diffuses into some thin sheathed nerves more quickly than into thicker sheathed nervous tissue. This means that the thin sheathed nerves will lose their LSD more quickly than the thick sheathed nerves do. If this is the case, then the nerve impulse transmission in the thick and thin sheathed nerves will be irregular and, in fact, distorted. Some nerves will still be blocked if they contain a high concentration of drug, while others at the same instant will be transmitting normally, if and when they have lost their LSD. Intermediate concentrations of LSD in the nerves will give intermediate nerve transmission. The net result of all this will be a garbling of the picture of reality round about the LSD adept. This garbling will occur both as the LSD is *diffusing into* the nervous tissue at an irregular rate and also as the LSD is *diffusing out* of the nervous tissue at an irregular rate. Wherever there is a "patchy" concentration of LSD in the nerve tissue, there one will find also a "patchy picture" of three dimensional reality in the psychedelic adept consciousness.

This means, of course, that while the reverie is coming on and going off, the psychedelic adept will experience Type I class of hallucination — plain distortion of three dimensional reality round about him. But, at the same time, sensory deprivation has taken place, with the result that Type II class of hallucination — the experience of the transcendent — will also occur concurrently. *The LSD adept will therefore most likely experience a mixture of both Type I and Type II hallucination*, with the result that he will be confused himself, and

may confuse other people who are trying to get to the bottom of the meaning of his experiences. Because of this complex mixture of experiences, many classify the psychedelic experience as meaningless. This is a pity, because there surely is meaning behind the apparent confusion. But this meaning will only be extracted from the experience if the mechanism of the experience is correctly understood.

From this it will be understandable why the natural psychedelic experience, attained without the aid of drugs, sometimes does not suffer from the inherent distortion present in the psychedelic drug experience. In the natural "high" (though not necessarily the "stress" high to be discussed later) the irregular diffusion rates of drugs into and out of the nervous tissue play no role, so that distortion of the five sensory image in the psychospace does not occur so readily as in the psychedelic drug experience. This means that the natural "high", (not the "stress" high) produced by sensory deprivation of a purely physical nature (closet or space capsule walls, closing one's eyes in prayer, retiring into quiet places to mediate and pray) is not usually accompanied by the toxic side effects and distortion often seen in the drug aided psychedelic experience. Not only that, the drug aided experience will be most likely interspersed with Type I and Type II hallucination in a confusing medley, whereas the natural experience is less likely to be thus distorted.

We must now turn our attention more specifically to the natural "high" or natural psychedelic experience which may be obtained without the aid of psychedelic drugs.

Types of Natural "High" — Satori

There are, of course, many types of natural "high". They have been extensively reported on and studied by Eastern groups who classify them in terms of levels of consciousness or *satori*. John Lilly, writing in Psychology Today,[7] mentions that satori level 48 is reckoned as the normal neutral rational state of consciousness. Level 24 represents the state of consciousness in a condition of enjoyment at doing some activity without conflict. Satori level 12 is a state of blissful aware-

ness. It cannot normally be reached under ordinary circumstances in the world because one is still in the bodily state with the conflicts associated with that state. Level 12 represents the first level of a good LSD trip. In this state it is often difficult to speak because of the bliss. Sometimes this level is reached in sexual intercourse. Zen speaks of this satori and points out that the body is not experienced.

Level 3 represents the highest level of satori which can be reached and from which people return to a normal state of consciousness. It used to be considered to be a kind of fusion of the individual mind with the universal mind or God. The sense of the own ego is lost almost completely in this state, but some memory of the satori remains after the trip is over.

It is not our purpose here to go into the various teachings on levels of consciousness. They can be read up in any of the standard text books on the subject. "Psychology Today" regularly reports on developments in this field. In the following it is our purpose to glance at two main divisions which are discernible in natural hallucination or ASC. They are:

Natural Sensory Deprivation Hallucination and

Natural Hallucination due to Stress.

Natural Sensory Deprivation Hallucination

As we have already noted, any person who becomes cut off partially or otherwise (without drugs) from his own proprioception (that is, from his own "rapportage" on himself and from his relationship to his surroundings), is liable to experience a natural "high" or hallucination of Type II. He will probably not experience Type I class of hallucination, because his proprioceptive reporting system is not being distorted, it is simply physically cut off from reaction with its natural surroundings — as in a closet with the door closed, or as in a space capsule.

In this natural kind of sensory deprivation, the impulses from the five senses are reduced in an equal and regular manner, which avoids distortion and thus Type I hallucination.

Thus the Type II hallucination which results should be relatively "pure", that is not mixed with distortion of three dimensional reality.

It is thought that the natural sensory deprivation experience is at the root of at least some of the visions of prophets, seers and hermits. They all attained communication with the transcendent in that they took time out to cut themselves off from the bustle of this life to close their eyes and ears and to pray. It is certain, as we have already mentioned, that Jesus Christ actively practiced this method of sensory deprivation during his earthly ministry. The Apostle Paul followed his Master's example when he retired into Arabia[8] for some time (probably three years) early in his ministry.

As a result of this sensory deprivation (accompanied, no doubt, by much prayer and fasting — the latter also being a form of sensory deprivation) the Apostle attained an altered level of consciousness which he found unlawful to describe in writing or in speech. He refers to this mystical, revelatory experience as one of the paradise of God, during which he did not know whether he was in the body or outside of it. Perhaps he experienced a satori 3. We do not know anything for certain, except that: "I knew a man in Christ above fourteen years ago (whether in the body, I cannot tell: or whether out of the body, I cannot tell: God knoweth:) such a one was caught up to the third heaven. And I knew such a man (whether in the body, or out of the body, I cannot tell: God knoweth:) how that he was caught up into paradise, and heard unspeakable words, which it is not lawful for a man to utter. Of such a one will I glory . . . And lest I should be exalted above measure through the abundance of the revelations, there was given to me a thorn in the flesh, the messenger of Satan, to buffet me, lest I should be exalted above measure."[9]

We surely may conclude from this that the principle of self discipline, after the Apostle had received his salvation from Christ as a free gift by faith, followed by sensory deprivation in his retirement in Arabia, certainly led to an "out of the

body" experience accompanied by a bliss which he himself describes as being transported into the paradise of God.

If one reads other literature than that which we have quoted from the Bible, one comes to the conclusion that not only may the acme of paradisiacal bliss be reached in the sanctified Christian by the above means, but that also the acme of abysmal experience may be reached, too, in the rebel and fugitive from Paradise — by the same means. In other words, one and the same physiological means or mechanism may be used for good or for evil, as is so often the case and not only in biological mechanisms.

There is, however, a second type of natural "high" we must glance at. It may be designated as "the Stress High".

"The Stress High" or Hallucination due to Stress

If a person is tortured to death — say he is burned alive at the stake, boiled slowly in oil, slowly mutilated to death or even crucified, as has so often happened in the annals of mankind — a remarkable physiological or psychological phenomenon has been noted as quite often occurring. In the extremity of agony, before his consciousness becomes finally clouded in death, the sufferer may hallucinate under the massive stress to which he is being subjected. Christian martyrs quite regularly experience visions of heaven and of Christ at the right hand of God under just such circumstances. They become more or less oblivious of the "hell" in which they find themselves, and in spirit they become "translated" into the cool and beatific vision of heaven.

Let us take a specific example of this kind of phenomenon, to make matters quite clear. Bishop Cranmer was burned at the stake in Oxford for his faith and for his refusal to retract. He had, however, at an earlier period in his life, signed, under pressure, a document which, in effect, denied what he held most dear. He much regretted this later. After he had made a new stand against the oppressor, he was duly sent to the stake to be burned alive. When at the stake he asked one favor of his executioners. It was to allow his right hand, with which in earlier days he had signed the scandalous document denying his

faith, to be burned first. The request, so the story goes, was granted him, and Cranmer is said to have stretched out his right hand first into the fire as it blazed up. There, unmovable, he allowed the fire to do its work on his right hand before he himself was committed to the flames. As boys at school learning English history, we were told that the martyr's smile played round his lips as the fire consumed his right hand.

The fact is that martyrs in their ultimate agony very often do experience the "opening of heaven" and receive of its bliss, dying, as their consciousness finally clouds over, with an expression of utter joy on their faces. In the midst of "hell", as it were, they experience a transcendent mystical alteration of their state of consciousness. In the ultimate agony of consciousness they experience the ultimate in bliss. We are by no means saying that this is universally the case, but merely that it is on record as having happened in some cases. Stephen's stoning to death was, for example, accompanied by this change of state of consciousness just before he died.[10]

How is it that this type of vision of the splendor of paradise, transcendency or heaven (it does not really much matter about strict nomenclature here, for we are dealing with phenomena which transcend language, time and space) can be so powerful as to eclipse the utter stress of the martyr's suffering? At this point we must return to the stress mechanism we have already discussed, for it can give us light on the subject.

We may recall that under stress adrenaline, the stress hormone, is released from the suprarenal glands into the blood stream to help the body brace itself for stress. Under the extreme stress of martyrdom, massive amounts of adrenaline will be released to regulate the massive stress. The body breaks down the stress hormone, which remains in the blood after it has done its work, by means of enzymes known as amine oxidases. If, however, the adrenaline is released into the blood stream in massive amounts, the amine oxidase systems are unable to cope with breaking down excessive adrenaline concentrations quickly enough. They are, as it were, swamped with the work of clearing away the excess stress

hormone. Under these circumstances, the adrenaline concentration may build up to quite high levels in the blood. One consequence of this build up may be, as we have already seen, that adrenaline becomes converted into adenochrome. Under these extreme conditions, relatively large concentrations of adenochrome may be formed and built up in the blood.

We have already pointed out that adenochrome possesses similarities in structure and properties to the well known psychedelic agent known as mescaline (from the "holy" mushroom Peyote), and works in a parallel way to LSD, although it is less active on a weight for weight basis. The result is that the proprioceptive impulses are cut back, a kind of anesthesia (reverie) is produced as a consequence. One may thus become less sensitive to pain and the surrounding circumstances. In the ensuing sensory deprivation, hallucination of Type II occurs with the consequence that the transcendent is opened to the suffering martyr. He becomes relatively oblivious to his terrible situation, and at the same time conscious of the heavens opening to receive him to transcendency when the torture has done its work.

Death itself produces the final and total sensory deprivation. No more messages from three dimensional reality get through to the decoding center at death with the result that the psyche becomes unencumbered in its perception of the transcendent. On this basis the unveiling of the transcendent at death becomes accountable.

The Edge of Suffering and its Blunting

The above represents the first method or mechanism by which the Creator in His goodness sometimes reduces the horror of man's inhumanity to man. The martyr in his ultimate agony is partly cut off from the reality of the horror by the supervention of a self synthesized hallucinatory agent, which he produces under stress from the stress hormone itself. The ordinary person not under stress does not synthesize enough adenochrome to produce the hallucinatory effect. The "acid head", however, has so "enlarged" the channel leading to the sixth sense and the transcendent by his chronic use of LSD,

that even very slight stress will produce minute concentrations of adenochrome which are sufficient, in his sensitive state, to hallucinate him on the slightest provocation. The same mechanism is at work here as in the martyr under massive stress. But the acid head has become so sensitive to psychedelic drugs that very small quantities of his own adenochrome are sufficient to produce the hallucinatory reaction in him. Here the effect is known as the "flash-back", as we have already seen.

This leads us to the second mechanism by which stress may produce an altered state of consciousness. The use of LSD, particularly in combination with other psychedelics such as hashish, mescaline or psilocybin — or even with non-psychedelics such as amphetamine and/or reserpine, as we have already pointed out — is thought to "widen" the channel to transcendency in the brain. Many psychedelic adepts maintain that they had to "learn" how to hallucinate just as one has to learn how to write or to exercise properly. That is, by practicing hallucination they can achieve better results with the same amount of drug. This means that if a person uses *psychedelics as a way of life* he will, in the end, be able to produce hallucinations more easily. In fact he may produce them without having dropped any drug at all, *particularly if he is subjected to stress*. The smallest concentrations of his own adenochrome will suffice, with practice, to produce an altered state of consciousness in him. In other words, he will experience spontaneous flash-backs on the slightest provocation or stress. As this Type of hallucination originates in self synthesized drug (adenochrome) distortion, hallucination (Type I) will usually accompany hallucination Type II — thus differentiating from the natural high.

The above is merely another way of saying that the *use of psychedelics as a way of life will tend to render the user a less stable character under stress than he would have been without the drugs*. For he will be less able to withstand stress. It may be good for the martyr to see the heaven open in his agony, but it certainly is not good if an aircraft pilot has an hallucination and sees the heaven open when he is subjected

to the stress of a jammed landing gear, and needs all his wits about him to operate the hand winding mechanism before he can land his aircraft.

The Legitimacy of Psychedelic Drug Use

The above considerations will probably account for the fact that the Holy Scriptures, although they recognize the efficacy of psychedelic drugs in producing altered states of consciousness, *strictly forbid their use under any circumstances.*

The Apostle Paul in writing to the Christians in Galatia[11] goes into this matter quite explicitly. He refers to certain practices such as adultery, fornication, uncleanness, lasciviousness, idolatry and witchcraft (among others) saying that those who practice such will not inherit the Kingdom of God. We must note, however, very closely the word translated as "witchcraft" in the ordinary King James English translation. In these modern times, the word is still liable to excite hilarity when mentioned seriously — although in recent times some young ladies are rather proud of calling themselves witches in all seriousness.

Actually, the Greek word translated in the text by "witchcraft" is "pharmakeia" which means "the casting of spells — or inducing of trances, visions or hallucinations by means of drugs". Today we would translate this practice of "pharmakeia" as that of producing a trip (or trance) by a psychedelic drug. The active principles of certain mushrooms for example the Psilocybe genus, known among Mexican Indians as "teonanacatl", which means *god's flesh*. They regard it as the key to communication with their deity, and therefore revere the plant. It contains two active psychedelic constituents known as psilocybin and psilocin. The small cactus known as Lophophora williamsii or peyote "buttons" contains mescaline and is used too for highly disciplined religious purposes by the Indians.

Thus it is a very old and well known fact that certain chemical plant substances can be used to alter one's state of consciousness, that is, to cast "spells" and to produce religious trances. This obviously lent itself to the practice of witchcraft.

The Bible certainly does not give one the impression that it regards the practice of producing trances by chemical means as empty nonsense. The practice is so severely proscribed in Holy Writ that we must ask ourselves just why. There must be something about it which makes it more reprehensible than if it were merely the practice of just experimenting around chemically with psychoactive drugs would lead one to expect. What is it then that makes this practice of producing mystical trances (pharmakeia) by means of psychedelic drugs so dangerous that the Bible classifies it as comparable in wickedness to the worst sins of the flesh?

May the answer to this question lie in the following considerations? In the first place, since the Fall of mankind into sin, which resulted in Adam and Eve, the first human beings, being cast out from paradise, God has guarded the gates of paradisiacal experience and transcendency from common human kind. Genesis 3: 23—24 records that man was barred from the garden, paradise, after the Fall, and that the way to the tree of life in that garden was henceforth blocked by a sword which turned every way, so that man could not in his miserable fallen state return to paradise and thus live for ever by eating of the tree of life which grew there. In his fallen misery that would have made paradise equivalent to perpetuating hell forever in the garden. The point here is that the way back to the experience of the transcendency of the paradise of God was now closed to man on account of sin. Obviously, what God has firmly closed (for our well-being) — the ecstasy of paradise — should not be wrenched open — not even by psychedelic drugs, which can, under certain circumstances, as it were, force open the way back to transcendency. Maybe the fruit of the tree of life in paradise contained just some such a psychedelic substance or substances! The fruit would have been good for the man and translated him certainly to transcendency — if he had not sinned, that would have been the very best thing that could have happened to him! From transcendency he could probably have recognized good and evil better! But in his sinful misery, transcendency, paradise and the tree of life forever, would have been the worst things that

could have possibly happened to him, for they would have perpetuated his lost condition forever — made it eternal, transcendent. So the way to eternal transcendency was barred after the Fall. Before the Fall, it was open—Adam walked with the eternal God in paradise. In fact, Adam could oscillate, as it were, between transcendency in God's eternal presence and the material, temporal, physical Garden at his ease before the Fall. After the Fall, Adam and Eve *became restricted to just one sphere, the material, temporal, physical, here and now*. They became bound to it just as we are now — and had to work in the sweat of their brows to make a living.

It will now be more apparent why the Bible regards the use of psychedelics as utterly forbidden for those who wish to enter the Kingdom of God, the New Paradise. The reason is that these drugs break down the barrier between experience of our fallen world and that of the transcendent, eternal paradise which God erected for the very good reason that if there were no barrier, man's misery in his fallen estate would have been perpetuated for ever. The barrier was, then, erected as a result of the Fall into sin and should not therefore be removed until the cause of the Fall, namely sin, has been removed.

The Martyr's Vision

This brings us quite naturally to the question as to why the Bible should proscribe psychedelics and their experiences of mystical transcendent altered states of consciousness, while allowing the martyr to have an uninhibited enjoyment of that experience by the *same mechanism*, physiologically speaking, as the acid head obtains his psychedelic experience? How can one ban exogenously produced psychedelics (that produced exogenously by taking mescaline, LSD, psilocybin, hashish or even synthetic adenochrome) while allowing endogenously produced psychedelics originating from one's personally and internally synthesized psychedelic drug such as adenochrome? Is this position reasonable?

We think it is, and for the following reasons. We have seen that the occasion for forbidding to the human mind the experience of paradise lay in the fact that the Fall, its sin and its

misery had supervened. That is, sin produced the barrier between us and the transcendent world we were made for (as much as for our material world). *If, now, sin could be taken out of the way, then this barrier would be gone.* Let us remember that. After Christ died and arose from the dead, this barrier has been removed in principle, even though the removal has not become generally effective yet in the human race. That will come later. However, in Christ, the barrier has been removed together with its blocking effect. For Christ, after the resurrection, was able to appear and disappear at will before the eyes of his disciples. That is, in effect, he could oscillate between the temporal material and the eternal transcendent world at will — *just as Adam apparently could before the Fall.* Christ needed to take no barrier between the material and the transcendent seriously after dealing with the cause of the barrier's erection, namely sin, and removing the same.

But why make the difference of allowing the martyr in this age his psychedelics and no one else? The Apostle Peter gives us the short answer to this question when he writes: " he that hath suffered in the flesh hath ceased from sin."[12] Surely the martyr qualifies for this description as being one who has finished with sin? In the first place, Christ dealt with his sin on the cross and put it away for ever. But in addition to this, the martyr is one who by suffering in the flesh has finished with the practice of sin which also barred him the way to transcendency. Thus the martyr alone in this present age qualifies for the privilege of psychedelics under the influence of his own self-synthesized psychedelic agents. In practice, the sin barrier has been removed in suffering and dying in the flesh for Christ's sake. The acid head is, in effect, breaking through a God-erected barrier to transcendency without regulating the sin question first. He grabs, or tries to grab, at the fruits of the tree of paradise by jumping over the hedge around paradise, instead of going in through the Door. Yet the hedge itself has been done away with by Christ — for those who serve Him — in principle. The martyr seals Christ's doing away with sin by his practical suffering for Christ's sake.

Footnotes

1 A. E. Wilder Smith, The Drug Users, The Psychopharmacology of Turning on, Hanssler-Verlag, Neuhausen-Stuttgart D-7303, Western Germany.

2 Matth. 6:6.

3 Matth. 6:6.

4 The author is not recommending transcendental meditation.

5 Matth. 14:23.

6 Matth. 14:13, Mark 1:45.

7 John Lilly, Psychology Today, December 1971, p. 75.

8 Gal. 1:17—18.

9 2 Cor. 12: 2—7.

10 Acts 7: 55—56.

11 Gal. 5: 19—22.

12 I Peter 4:1.

Chapter VII
Causes and Cure of the Drug Epidemic

In this chapter we wish to confine our attention chiefly to the psychedelic drug scene (including hashish, LSD etc.), which is, after the alcohol problem, the most important aspect of the current drug epidemic. This is not to be taken to imply that alcohol, heroin, amphetamines and barbiturates are not important. They are. But once a person has taken to an *addictive* drug such as heroin, he is likely to take any other drug to help him increase his "high" and to reduce his withdrawal syndrome. Thus, barbiturates and alcohol are sometimes interchangeable. Amphetamines are often taken with hashish and LSD. These facts are mentioned to emphasize that, although the psychedelic drug epidemic, including the hashish epidemic, is important, psychedelic drugs are nearly always mixed up with any other drugs available. This is true, in spite of the fact that it cannot be said that hashish always *leads* to heroin.

Our approach to the general drug problem by means of the psychedelic drug problem is also conditioned by the fact that the psychedelic phenomenon is relatively new to Western culture and is therefore less well understood there than, say, alcohol or nicotine abuse. Large scale epidemic experience with marijuana and hashish is, after all, not much more than fifteen years old in the West, hundreds of years old in some Eastern

cultures, whereas alcohol and nicotine abuse has been endemic in the West for centuries.

Since psychedelic drugs are in a particular way concerned with thought and changed states of consciousness (as indeed, is the case with all psychoactive drugs) we will start off this present section with a very generalized analysis of the chemistry of thought. This is not intended to be a detailed study. A mere outline of mechanisms of action which bear thought will suffice us here.

Chemistry of Thought

If they have read as far as this, some readers who incline towards orthodoxy in religious matters may have been shocked at the idea that drugs can be considered to have anything serious to do with man's spirit, his religious thought, or even with the idea of human perception of transcendency.

Recently I saw an article in a German Christian magazine in which the writer was frankly scandalized at the idea that LSD could call up "the other side". The author, a religious leader of quite young years, was outraged at the idea that acid heads claimed to have seen "God" or the "angels". The very idea of a psychedelic peak and its religious implications was preposterous to the author of the article. His thesis was to the effect that psychedelic drugs could not work because they made "God" and the transcendent the subjects of a Punch and Judy show. . . by swallowing a pill one could "call up" or "drag up" "God" with or without his consent. Our religious leader, young though he is, wrote reams on "all that nonsense about God being available at the call of LSD just as a poodle is when it comes rushing up at the whistle of its master at mealtimes".

Our highly respectable but outraged young leader made no bones about the matter. The whole business of psychedelic drugs was blasphemous nonsense in his view. How could God's, or even the Devil's, presence be revealed or experienced exclusively to those who came into possession of the Forbidden Drug? It simply was not right that a few puffs of hashish or marijuana, strengthened maybe by a few hundred

micrograms of LSD or a few milligrams of mescaline, should be able to give the taker a beatific vision — or a malevolent one, as the case may be. The whole idea was to him plainly blasphemous and preposterous.

And indeed so it must be, or seem to be, to those who do not reflect or are not informed either about what the Bible says about our bodies and psyches, or about recent discoveries as to the *mechanism* by which the human brain *thinks*. Once we take the time to find out more about the basis on which our muscles as well as our brains work, we shall have less difficulty in understanding the intricacies of the psychedelic drug and what it does to the human mind.

What precisely do we mean by the above? Simply that to be unable to believe that a few hundred micrograms of LSD or a few puffs of hashish smoke can produce a trance leading to transcendent realms of thought and experience, is merely to prove that one has never taken the trouble to find out what is already known about the chemistry of the human mind. Here I am not speaking of surmise on how the mind works (there is a great deal of surmise in this area) but of simple basic chemical facts, which are easily ascertained, on the chemical functioning of all nerves and their impulses.

Surely it should be obvious, when the Creator says he made us out of clay, that the properties of the clay, the elements of which all nature is made up, serve as a *basis* on which the body of clay works? Clay is a chemical mixture of material elements with physical as well as chemical properties. A knowledge of these chemical and physical properties will help us to understand how the body of clay works. The attitude towards the drug problem, which we have described above, really represents a negative attitude towards the chemical skill and scientific ingenuity which the Creator put into his masterpiece of clay, the human body, and its psyche, which lives in and is influenced by the clay. His skill and ingenuity are reflected in his obviously infinite knowledge of chemistry and physics which he applied in practice in building the human body and mind out of the chemical elements of

clay. If we are frankly not interested in this subject then we should frankly own up to the fact that we are not interested in God's handiwork. The Bible, of course, commands us to reflect on these signs of God's skill (and love for us) so that we may praise and worship Him the more for his handiwork when we learn just a little more about it. (See also Rom. 1).

One can explain the attitude of some orthodox Christians to the psychedelic drug problem really only on the basis that they are not interested in the methods by which the Creator in fact made us. This attitude of lack of interest leads, of course, to further ignorance, which might be less damaging if such gentlemen did not feel called to make public declamations about drugs and their effects which are based on largely ignorance and which, therefore, reveal the same.

Where does all this lead to specifically? The following example will show better than a lot of theory: Every evening when I am at home I tell my four children a bedtime story. Sometimes the story is taken from the Old and sometimes from the New Testament, and sometimes we read a chapter or two from C. S. Lewis' Narnia series of books. After this, we all sing together, then each of the children says his or her prayers. And so to bed. The question is: How, by what chemical mechanisms, do I tell them the story and by what chemical mechanisms do the children say their prayers? By what chemical mechanisms do we all sing together?

Let us take first of all some of the chemical mechanisms by which I express thoughts in retailing the bedtime story. To get first things first, my (and their) basic thoughts in our singing and praying *are borne, that is, carried along in the last analysis, on purely chemical reactions.* One is almost ashamed to waste printer's ink on stating this, for every biological chemist knows this to be a basic, firm, indisputable fact. *My prayers to God (that is my thoughts) are without a trace of doubt borne along on chemical reactions.* Without these chemical reactions, speech as an expression of thought would be impossible too. The thought behind the speech as well as the speech itself is chemistry (the chemistry of "clay") borne.

That is, the thoughts themselves are not chemical reactions, but the thoughts are carried along and transmitted by chemical reactions, like a boat is borne along by the current of a river. The current is not the boat but carries the boat along. The "boat" itself may be thought of as a "ripple" in the current.

Any informed person today knows that the nerve impulses behind thought and thought transmission are borne along the nerves by the diffusion of potassium (K+) ions through membranes in the neural system, thus causing polarization and depolarization, by means of which the nerve impulses behind thought are transmitted. Electrical current does not pass down a nerve at the speed of light as it does in a copper wire. It travels much more slowly — in fact, at the rate of the diffusion of chemical ions through a biological membrane. The basic process behind biological thought is nerve impulse transmission, and this process fundamentally is of chemical and physical nature. I think and pray therefore by the help of the passage of millions of potassium ions diffusing across millions of neural membranes. Take away from my body all the potassium (and other related) ions and I can no longer think to say my prayers to God. That is, in order to pray, I must have my chemical (potassium ions etc.) to do so. If they are removed from my body I can no longer think to conceive of God for prayer purposes.

But, we may object, that is not half the story of the mechanism by which I pray, or think, or talk. Indeed it is not. Energy must be supplied from somewhere to drive those ions against a concentration gradient and establish the polarization. To drive them against this concentration gradient is like forcing water uphill. One needs energy to do it. Calories must be derived from somewhere for this "uphill" operation. The body obtains these required calories by an ingenious chemical mechanism. It burns carbohydrates, fats or proteins by chemical enzymatic processes or oxidation. The energy stored in potatoes, for instance, on account of the plant's ability to use the energy of sunlight, is released in the body and made to push the potassium and other ions across biological mem-

branes to transmit thoughts and nervous impulses — in fact, to enable me to think and to say my prayers.

That is, if I am deprived of potatoes, butter and meat, I shall not have the "push" to get those ions across the membranes (an "uphill" job) so that I can think, conceive of God and say my prayers. So, to pray with my children I need to apply the basic art of complex and specific chemistry. Thus, even my ability to pray depends on potassium ions and chemical "potato energy" to get them "uphill" over an energy and concentration "hill". The potassium comes from fruits like oranges and the energy comes from food like potatoes, butter and meat.

We must take another step forward in the chemical maze. My children and I now sing prior to going to bed. To do this we have to lustily fill our lungs with air and adjust our vocal chords carefully.. we do not allow any sort of bawling matches on such occasions. But how are we going to fill our lungs with air? They are elastic, and left to themselves will expel air. So we have to work "uphill" again against their elasticity and stretch them. This is done by chest and diaphragm muscles, using calories from potatoes, butter and meat to force plates of thin molecules to slide over one another so as to make the muscles longer or shorter as required. This is an "uphill" job again, just like getting potassium ions through a membrane against a concentration gradient was an uphill job. Both the job of filling the lungs and adjusting the vocal chords to sing are dependent on pure and complex chemistry. If one hinders the chemistry of muscle contraction by lack of chemical molecules (potatoes, butter or meat) to supply energy, neither process can happen — with the consequence that we cannot sing praises to God, let alone think about Him (or Old Testament stories or Narnia fairy tales).

Thought Creates Matter

Thus, if I become deprived of my potassium ions, potatoes, butter or meat (not all are necessary all the time — just some) I can neither sing, pray nor even think in my present bodily structure. However, when considering the above, one must

keep one point absolutely firmly in view. It is this: In all the above we have by no means said that thought *is* chemistry or that it is *nothing but chemistry.* There is *less* evidence that matter and chemistry can *create thought* than there is evidence for the proposition that *thought creates matter and chemistry.* What we do know, however, is that matter and its chemical reactions *can carry or bear my thoughts, prayers and songs.* My *thoughts*, borne along on *matter*, can create new aggregates of matter such as new drugs active against old diseases. Matter can be, as it were, the *pipeline* along which thought, creative thought, can flow. But there is little evidence that the pipeline which brings water into my house from the mountains above us can *generate* the water which flows through it. The metal pipes, which act as conduits for the water we use, have a monopoly on our water supplies. But the metal pipes themselves *do not generate* the water.

Many believe that our nervous system in the brain and throughout the body *transmits thought* just as our metal pipes transmit our water. But the thoughts, as well as the water, come themselves from the mountains beyond and above us and the pipes. Destroy the nerves, the pipes, and no water or thought is forthcoming. But that fact *(that no water or thought is forthcoming after destruction of the conduits)* is absolutely no proof that the conduits *generate* the water or thought. Yet many have fallen into the conception of believing that nerves and brain tissue generate thought simply because they both conduct or transmit it and because no known nervous impulses exist without them. (There is evidence of nerve transmission without the help of differentiated nerves in certain unicellular organisms.)

It would seem, then, that thought itself should be distinguished from *thought processes* just as *water conduction* in pipes should be distinguished from *generation of water by rainfall in the mountains by means of solar energy.* Thought itself is an expression of "logos". Thought (logos) can be channeled through matter in nerves but in the last analysis "logos" is the source of even matter, the conduit for "logos". If thought were bound to matter absolutely—as it would be if

matter or nervous tissue were the sole source of thought — then after the decay of matter or its aggregates there could be no thought any more. Physical death would in that case be the end of all *mind.* Anyone interested in psychic phenomena, or indeed anyone who is able to believe in the Biblical view of death and resurrection, will obviously be unwilling and indeed unable to take the view that matter is the *sole generator* of thought. For, if that were the case, there could have been no thought (logos) before matter came into being. The Christian position is that before matter and even biological life, thought or logos existed — and caused the creation of matter which could then conduct thought or logos.

Once again, it is obvious that thought can "ride" on organic biological matter, its chemistry and its potassium ion diffusion systems. Obviously, thought can and does "ride" on the oxidation of potatoes, fats and meat. But, while we keep this fact firmly in mind, let us also remember that biological, organic matter possesses no monopoly today on the *transmission* of thought Organic matter may not be the source of thought nor yet the *sole* transmitter of the same. It must be kept firmly in mind that forms of inorganic matter (as opposed to organic, biological matter) are capable of bearing the "thought" of intelligent machines and computers. Thermionic tubes and transistors are capable of transmitting the impulses which lead to lightning rate computing etc. The electrical impulse transmission in such inorganic matter is much quicker than that occurring in biological matter. For in the former the impulses travel at the speed of light, thus far outstripping biological thought processes in speed. Even magnetic tapes can transmit as well as store thought. Tapes are certainly not biological in nature.

Thus, thought can be transmitted chemically and slowly as in biology. Or it can be transmitted at the speed of light as in inorganic matter in computers. It can be stored in coded form on magnetic tape or in a biological brain. These considerations lead us to the view that thought is an entity in itself. It can "ride" on biological matter at a comfortable "amble" or "trot". Or it can ride on inorganic matter at a breakneck "gal-

lop" at the speed of light. Or it can be stored on nerves or magnetic tape and thus remain "stationary".

With these facts in view, we may now proceed to the last step in our chain of discussion. It is this: Thought (logos) is a non–material or supramaterial entity in itself. It can "ride" on various material media (substrates) we know about, such as organic biological matter and inorganic non-biological matter. If this is the case and thought itself can be regarded as a supra-material entity (logos) why should it not be feasible for thought to "ride" on media (substrates) other than material ones — if there are such media as "supramaterial" ones? *If non-material thought (logos) gave rise to matter, how can thought be restricted for its genesis and transmission to matter?* If there is such a concept as dimensions beyond the three we have experience of (three plus time), then why could non-material thought not "ride" on aspects of these supradimensions as well as on material dimensions?

This may not be so far fetched as some may object. For certain paranormal phenomena do not appear to be governed by the same laws as matter — otherwise they would not be paranormal. Certain supramaterial phenomena, such as telepathy, telekinesis etc. do today appear to have a sound basis and are often linked with *thought* (logos) of some sort.

For those who are fearful of the occult and therefore see it in everything they do not understand (by this I do not wish to minimize the danger of the occult today — I think it very real indeed, personally), let us look at a para-normal phenomenon, which Christians, at least, have no fear of. It is the para-normal phenomenon of the resurrection body of Christ — a type of body he has promised will be given to each believer at His return. The matter is then of very personal interest to every believing Christian.

The resurrection body of Jesus Christ was constructed of at least two "materials". First of all it was constructed of matter as we know it. He could, for example, after his crucifixion, death and resurrection, eat fish, breathe, walk, use his voice and give thanks at table. Presumably his muscles worked as

ours do — that is, on the basis of chemistry and calories. Mary recognized the pitch of his voice when she exclaimed Rabbuni.[1] Presumably Jesus Christ digested the fish and the honey he ate after the resurrection — and digestion is a purely chemical matter designed to extract calories from victuals, so that energy is available for thought transmission and for muscle contraction.

However, this material body functioning on the basis of chemistry and calories was "pervaded" by a supramaterial transcendent resurrection body having properties which were supernumerary to those of his material body. He could, for example, appear or disappear at will. He could pass through locked doors. He heard the unbelieving remarks of Thomas the disciple although He, Jesus, was not physically present when they were spoken. While in the material state in the inn on the road to Emmaus he could resolve his material state into the immaterial and transcendent one before the very eyes of his unbelieving disciples. Here we have a case of the return of humanity in Christ to the original paradisiacal state: just as Adam walked with God in the transcendent and also walked with the creatures of earth in the material Garden, so the resurrected Christ could do the same, because the sin problem which had precipitated Adam out from the Garden in the first place, had been for ever resolved at the Cross.

A Vital Consequence

This brings a very important consequence with it — one which many overlook. The changing of Christ's physical state — from the material to the immaterial — in no wise introduced a hiatus either in his personal identity or in his thinking. He was the *same Jesus* whether he was in the immaterial resurrection body or whether he was in the material human body. His thought and his personality remained the same, regardless of which state he found himself in — whether his thoughts were borne like ours are, on potassium ions and calories, or whether they were borne on immaterial (supramaterial) media. His continuity of being and therefore of thought and psyche remained intact in spite of his change from the material to the transcendent state of bodily structure, just as

my thought is the same whether borne on my biological nerves or transmitted over telephone wires. He is referred to as Jesus, the *same*, yesterday, today and for ever[2], that is, the *same* whether in the human body or out of it. We may thus, surely, conclude that *thought* can be borne on matter *or* upon the dimensions beyond matter, the transcendent. This has nothing specifically to do with the occult, of course.

May we then assume that Christ's thought processes and psyche were not *fundamentally* altered or disturbed, whether he was in the mortal body and therefore dependent on potassium ions and calories for the bearing of his thought processes, or whether he was out of the mortal body — swallowed up in immortality — and therefore not dependent on potassium ions and calories?

We have so far established, or endeavored to establish, the continuity of thought and its identity, whether it is borne on matter (organic or inorganic) or on transcendency. Apparently the same argumentation can apply to others besides Christ in this dispensation, *before* the resurrection body (which is to be like Christ's resurrection body in nature and function) has been given to redeemed mankind. Take, for example, the Apostle Paul. He experienced a state in which he did not know whether he was "in the body" or "outside" it.[3] He says that he was translated into the paradise of God, as we have noted. The important point here is, that in this transcendent state the Apostle Paul's thought processes and his personal identity remained continuous, regardless of whether matter was responsible for the bearing of his personality and thought or whether the transcendency of paradise was responsible. Being "out of the body" or "in the body" made no difference of identity as far as his personality was concerned.

Of course, the "out of the body" paradisiacal experience so widened his experiential thought horizons that the Apostle found himself unable to adequately express himself about them afterwards in the restricted language of man, which was not designed apparently for such experiences. Nevertheless, his "out of the body" experiences certainly enlarged and com-

plemented his "in the body" quality of life and thought. Thus matter itself and its chemistry may not be able fully to bear the depth and strength of transcendental thought and experience flooding into it during and after an experience such as the Apostle attempts to describe. This will only be fully possible when the mortal body is swallowed up in immortality at the first resurrection. *But the important point is that in both states (the material and the transcendent ones) actual identity of personality and thought remains unchanged.*

The same thing happens in a lesser way when a human being implants his intelligence and thought processes on to a computer or a magnetic tape. The thought content remains the same whether it is "riding" on gray matter in the brain, on magnetic tape or on an artificially intelligent computer. True, this thought content may be less subtle and more restricted in scope. But it itself remains unchanged by its change of substrate. Thus restriction of thought scope may occur with change of substrate but not necessarily change of identity.

The Bible confirms these views. For it says that mortal eye has not seen and mortal ear has never heard (both the eye and the ear are parts of the chemical system of proprioception dependent on chemistry and potassium ions for their functioning) what God has prepared for those who love him.[4] Experience and thought in the immortal state will be immeasurably richer and deeper when our proprioception is not dependent on the restrictive potassium ion and calorie mechanisms. But the proprioception itself of both stages will be contiguous. The great change will come, but there will be no hiatus or change of identity where mortality is swallowed up in immortality — merely a fuller, deeper experience of what we know now . . . and are now.

It seems then that our present experience, normal (that is, not paranormal) though it may be, does have something in common with that experience of the transcendent (paranormal). Even though the latter will be immeasurably fuller and deeper, yet the now and the then will have factors in common uniting the two.

This brings us to the point at which we can discuss the psychedelic experience better.

Drugs and Visions

It will by now have become clear that if thought processes in our present material state are based squarely upon chemistry, then alteration of thought transmission should be possible by chemical means. That is, identity of thought is not changed even by changing from material to immaterial substrates, but quality of thought may be changed by changing the quality of chemistry. Further, the main traffic of nervous impulses in the body is undoubtedly that of proprioception, that is, it has to do with the orientation of the body with respect to its purely material surroundings. We would expect, then, that alteration of these proprioceptive chemical processes would produce largely alterations — or distortions — in our perception of material reality round about us. In other words, altering the chemistry of proprioception will produce alteration in the quality of proprioception — what we should call straight forward hallucination Type I. Proprioception will be distorted, resulting in appropriate hallucination. It is easy to understand, then, why the abuse of many psychoactive drugs leads to distortion in our perception of reality round about us. Undoubtedly, hashish, LSD, mescaline and psilocybin do produce a great deal of their effects in the human in this way. The perception of the five senses becomes distorted.

But there is, as already mentioned, good evidence that proprioception by means of the five senses by no means exhausts brain function. What we may perhaps call "extroception" — the perception of events outside the experience of physical reality such as is manifested in paranormal perception — must be taken into consideration. But even "extroception" will have to penetrate into the brain and then, afterwards, be processed by it by means of the normal chemistry of nerve function. The consequence is that even "extroception" will be modified by the chemistry of psychedelic drugs. So that in this area too we may expect distortion and hallucination, even in transcendent mystical perception, to occur.

Psychedelic drugs can certainly "anaesthetize" the nerves of the five senses, thus cutting a person off temporarily from the experience of reality in a reverie. But the same drugs can also, by means of the "rebound" phenomenon exercise the opposite effect to "anaesthetization"— that is, they can produce hyperaesthesia, or supersensitivity to material reality, so that the person injesting the drug experience material reality in an enhanced form. For example, the blue of the sky has never been so blue and the green of the grass has never been so green. The purple of the satin dress lives and pulses: Plain water tastes like nectar. All this regular psychedelic experience (adepts know what I am talking about) is really a distortion of material proprioception (reality) just as the anesthetic effect is really a distortion of reality too.

Thus, it is clear that psychedelics, by acting on the chemistry of proprioception, can produce the psychedelic distortion of material reality. But how do they produce the "psychedelic peak", the "beatific vision"? We are now in a position to understand at least to some extent how they do this too. The anesthetic effect of psychedelics produces, as we have already pointed out, a five sensory deprivation of short duration usually, which allows the atrophied input of thought from the transcendent to get through to being processed by ordinary chemical thought processes in the brain. We should expect, then, two additional main effects to be produced by psychedelic drugs: firstly, a five sensory deprivation effect, leading to its normal consequence — namely that of experiencing transcendence — and secondly, distortion of even this "extroceptive" experience by chemical alteration of impulses from transcendence after reception. Psychedelics will, then, alter and distort both proprioception as well as "extroception".

This brings us to another basic matter in neural processes in general and thought processes in particular: The functioning of the five senses is necessary so that the body can survive. One must hear, see, feel and taste in order to avoid danger and to survive. One must nourish oneself, run, walk, build houses and construct artifacts in general in order to live. All this is

done with the aid of the five senses, which can thus be described as utilitarian or as having survival value. What one often forgets, however, is that there is a second aspect of the five proprioceptive senses. It is this: in the utilization of the five senses from a utilitarian aspect there is an additional but very definite hedonistic aspect. It is not only *useful* to use the five senses to survive. In using them we gain *pleasure* as well. We must now therefore look into both the utilitarian and hedonistic aspects of the five senses and then extrapolate to the sixth sense, which will lead us directly into some of the main causes behind the present drug epidemic.

The Senses are Both Utilitarian and Hedonistic

If we glance at the sense of taste, it becomes clear that it serves an obvious utilitarian purpose and ensures that we eat enough to live and to maintain health. But the utilitarian aspect is strongly coupled to a hedonistic one. It gives us pleasure to eat . It gives me taste pleasure to eat an orange — thereby ensuring, that I get enough potassium ions into my body so that I can, among other things, think. Similarly with a Wiener Schnitzel — it gives me pleasure to obtain my share of protein and maybe fats as well . . . utilitarianism is then closely coupled with hedonism. Bad taste may protect us from toxicity, too.

The situation is similar with sex. Sex and the sense for it are mediated largely by the five senses and hormone chemistry. The senses of sight, touch, sound and smell coupled to sex hormone chemistry serve the utilitarian purpose of ensuring the survival of the race. But the purely utilitarian aspect of sex is surely vastly enhanced by its being coupled with hedonism! The overpopulation of the planet surely bears eloquent testimony to the strength of the hedonism coupled with sex! One doubts whether there would be many babies born at all if sex were merely utilitarian and not highly hedonistic too.

Someone may object to this and maintain that the sense of pain, for example, is never hedonistic, even though it may be highly utilitarian in preventing damage from being inflicted on the body.

The objection is superficial from two points of view. The pain of childbirth does sometimes have a euphoric factor. The pain of martyrdom, which we have already discussed from another angle, does too. But there is a second and deeper reason why the objection is superficial. It is this: The pain and the pleasure nerve endings and sensation are coupled very closely indeed. It has only recently been noted that the nerve endings in the female clitoris are mainly of the type which record pain. A search for a different type of nerve ending to mediate the pleasure sensation transmitted by this organ ended in failure. There were no such pleasure nerve endings in an organ concerned with pleasure, but only endings specialized for recording pain. This seemed at first remarkable, for it means that pleasure may be mediated by pain nerve endings — utilitarianism coupled with hedonism!

However, it is, of course, common experience that pleasure turns almost imperceptibly into pain and vice versa. One experience runs into the other without clear frontiers. These being the facts of the case, we arrive at the conclusion that the highly utilitarian pain experience is inextricably closely coupled with the hedonistic (pleasure) experience. One sees this in childbirth pain too . . . although the pain can be excruciating, yet there is definitely a euphoric factor coupled to it. My wife informs me that the pain of childbirth is "healthy" and therefore bearable One may ask oneself whether the martyr's pain we have already discussed from a different aspect does not have a similar factor in it. We conclude, then, that both the utilitarian and hedonistic factors are present even in the sense of pain.

If one analyses all the five senses one can usually detect both these aspects in each one of them — the utilitarian and the hedonistic aspects. The same division can be detected, too, in matters concerning the sixth mystical sense, though this aspect has not been greatly looked into in spite of the feverish work going on in Russia on the subject. We must now look at these two aspects in the sixth sense.

The Sixth Sense is Utilitarian and Hedonistic

One might maintain that the sixth sense is utilitarian in that it acts as Huxley said it does — it makes human society more functional. Without a sense of the divine and the transcendent, human society tends to lose its sense of awe of the mystery of life — and also of awe and respect for its neighbor. In fact it becomes "godless" in the ordinarily accepted sense of the term. If there are any doubts about this fact, one may reflect on the record of the atheistic materialistic ideologies of the past fifty years as to respect of neighbors and of human rights. If in doubt, meditation for half an hour on one of the platforms which gave visual access to the Berlin Wall some years ago would have settled the doubt.

Few who have experienced Christ would deny that the sense of the mystical Presence is supremely blissful — that is, hedonistic. Up till present, we have used the term "sixth sense" in as general a setting as possible. Under no circumstances have we wished to confine its use to means of communication with the occult. It may, of course, be used in this occult sense, too. We, however, wish to use it in connection with any means of communication with the mystical transcendent, which latter term may include the occult but it may also include, in our view, communication with "the Father of Light". For transcendent communication is certainly not purely "bad" nor "good" in the ordinary meaning- of those terms. As we see man and his meaning in the universe, it seems that he was created for two main purposes. The first was to "walk with God and give both his Creator and himself pleasure." God takes pleasure in the sons of men and they should have pleasure in Him. The second was to rule justly over the physical creation as God's governor. The first purpose involved the transcendent and mans ability to live in that sphere. For this purpose man was made transcendent (as well as material) in the first place. The second purpose involved man's being able to work and converse with God and man in our three physical dimensions and time as we understand them now. The net result of this was that man had to be created as a hybrid between "spirit" and "flesh and blood" to meet this "job description". He

could oscillate between both material and transcendent spheres.

When the "Fall" came and man was turned out of the transcendent, the Garden, Paradise, he lost one of his spheres of action — the transcendent one. This loss meant that his "transcendent proprioceptive system", his ability to sense and "get around" in transcendency became no longer necessary and was therefore little used. If we do not use any one of our five senses which we need for proprioception in three dimensions and time, it atrophies. Fishes that live in the dark lose their sense of sight — moles have done the same. It would be perfectly natural, then, to believe that man, when he was thrown out of transcendency, Paradise, at the Fall, stopped using his sixth sense or senses which was, or were, given him for proprioception in that paradisiacal state. The result was that the sixth sense became weaker and weaker. It began to atrophy, just as one would expect, through not being used.

The many generations of man which have elapsed since the Fall have produced a man with an almost completely atrophied sense of the transcendent. But the sense is still there, albeit in an atrophied form. The Bible itself says that it is still there when it informs us that God has firmly placed *eternity* in man's heart.[5] In the King James Version the word eternity is translated with "world". In the original text (Hebrew) the word used is "olam" which means "indefinite time" or "love of indefinite time". Which all equates to "eternity, or transcendency or Paradise and the love of it." Now, if a sense is not used, the body bearing that sense *suffers*.

When we lived in Chicago, the dirty gray city, the slums, the ugliness, positively afflicted our eyes and our sense of sight. We longed for the mountains again, the green fields, the clean mountain rivers and the cool calm valleys between the mountains This longing for the satisfaction of using our sense of sight in the pure mountain air was so great that we found ourselves looking on Saturday afternoons at colored Swiss mountain calendars! The conclusion is, therefore, that a sense — whether it be the sense of sight, hearing, touch, taste or

smell — is not only there for utilitarian and survival purposes. It is given for pleasure, hedonistic purposes, as well. If one has not eaten a Wiener Schnitzel for some time, we all know how we can long for one! It is something like longing for the Swiss mountains! For the sense of taste is not only utilitarian (serving our nutrition). It is hedonistic in nature. . . given for our pleasure — as well.

If the five senses are not fully and regularly satisfied we feel a malaise. This is difficult to describe, but we all recognize it. A young man may not have experienced sexual intercourse with the woman he loves, but he may long for it as for something he knows not what. .. but must have. The sublimation of just this longing (nostalgia) has given the human race some of the most beautiful art, poetry and music it possesses. This means that the need, indeed the necessity of the satisfaction of the five senses is very strong indeed, and must be fulfilled either directly or by sublimation (as in the writing of poetry, composition of music or painting of pictures) otherwise *malaise* results.

The Main Thesis on the Causes of the Current Psychedelic Drug Epidemic

Man has still the traces of eternity written in his psyche. He still longs for eternity, Paradise, the Garden, and hates the idea of the breaking off of his life in death. This does not by any means lead us to the view that man seeks a holy God. He does not. In general, except for a special work of God's spirit, man flees from the very mention of God and of Christ. Mention the name of Christ or God in an ordinary drawing room company and note the effect — if one needs to verify this fact.

However, in spite of man's fleeing from God and Christ, he cannot escape the tug of eternity, Paradise and transcendency, even though this tug is only describable as a general nostalgia or even malaise, an indefinable yearning for the beauty of "the other side of the veil." Sometimes this nostalgia leads a man to seek relief from it in activity and work. Sometimes the nostalgia for these things is stronger than at others. When we

are successful in this world and the cares of it fill up our five senses with impulses, the weak impulses of the sixth and its nostalgia for Paradise may not be noticeable even for years. But when illness and the accompanying reduction of activity set in, then the old longing returns... and one begins to wonder what life and death are all about. This is inescapable.

One finds the same phenomenon in all races and all cultures (that is what most religions are really about), though there are different ways of satisfying this longing. Some take to withdrawal and meditation, thereby recovering to an extent what they were looking for. Others withdraw more from ordinary activities and devote themselves to good works with the intention of laying up something for eternity and Paradise. Others again search for the cause of this longing and turn to holy books. Those who hear the Christian message learn that the cause of the longing lies in alienation from Paradise and from the Creator, Christ, who made them. Such find that the forgiveness of sin, on the basis of Christ's death, removes the veil between them and the transcendent, giving them the satisfaction of the exercise of the sense of the transcendent in communion with the Son of God.

One thing is perfectly clear, and this one thing we must emphasize. Most human cultures have taken care of the holy man, the one who communes with the eternal and Paradise and passes on his messages from transcendency to his people. Our modern, materialistic culture, on the other hand, is so sure that *there is only matter to reckon with*, (i.e. here and now) and that God, the Devil and the angels are ancient myths behind which ther is no substance, that it has little place for the transcendent even or the holy man. Of course, one may believe in Christ and one may even experience by faith the New Birth, but much further than that our Western culture does not go. If one does not go any further, one remains a perfectly normal, respectable member of society or of some Christian church or another. But experiences such as those described by the writer of the Hebrew letter in Chapter 6 or by the Apostle Paul in 2 Cor. 12 or by the Apostle John in the Revelation, to name but a few examples, are just not talked

about today in our Western materialistic society — or even in its established churches.

Thus our technological, materialistic society has overloaded the five senses of sight, sound, taste, touch and odor to breaking point. We are cluttered up with radio, television, and "taste feasts" offered by cigarette and chewing gum manufacturers, fried chicken purveyors and coca drink retailers. The telephone plagues us relentlessly day and night. Advertisements shout at us from the ruins of the walls of modern cities until we scarcely dare to look around us. And just because we apparently do not get sufficient stimulation of the five senses in one city, the jet age offers us more stimulation by more experience of the five senses in others. Deprivation of sixth sensory experience of joy is the result. It is this deprivation which is at the root of much of the malaise of our Western society today. We were created to live for time and eternity but are in practice living only for time.

While all this cluttering up of the five senses is going on, the sixth sense is crowded out, atrophying even more than it was after the Fall. But, whenever we abuse the body by either overwork or underwork, the body registers its disapproval in no uncertain way .. . even though the signs of disapproval are not immediately recognized or correctly diagnosed by the majority of people. For we are so anaesthetized by the flood of impulses from the affluent society that we often just do not register clearly what is taking place within and around ourselves. If we are deprived of the sense of the sight of the beautiful (or the sense of pleasure of any of the five senses), this will make itself felt in a malaise which is difficult to define, but nevertheless real.

The reactions to this situation may be twofold. First: The cluttering up of the five senses with the impulse flood from the affluent society results in the typical reaction to plethora — one feels the necessity to vomit! The present generation is suffering from the "vomiting reaction". It is "fed up" with the plethora from the affluent consumer society and consequently wants to drop out of it, get back-to the woods, the fields and

to nature. The drop-out even stops wearing shoes so as to get back to the closest proximity to nature once more, and away from plastic and synthetics. Thus he reduces the overloading of the five senses by the "vomiting reaction". He rejects the society producing the plethora, he drops out.

The second reaction is even more important than the first. The present generation brought up in the affluent but materialistic society is not only suffering from sensory plethora of a five sensory kind. It is also suffering from severe starvation in the area of the sixth. Even Western evangelical religion has been largely castrated of transcendent ecstatic experience. One is grateful that salvation through the work of Christ is still preached. But it usually stops strictly at that. The experience of fasting and praying, depriving oneself of perfectly legitimate luxuries so as to be in a position to give more to others — practical forms of sensory deprivation — these things are known only to relatively small circles of an "elite". The subsequent euphoria of this deprivation is therefore also rare. The starvation of the sixth sense category of experience has resulted in a malaise — just as starvation of the eye of the beautiful produces a malaise. So we have rarity of euphoria and plenty of malaise on our hands in Western society.

One of the reasons for the lack of experience in the transcendent lies in a justified fear of the coupling of the sixth mystical sense with the occult. Insofar as this fear is justified — and it certainly is, today — one can understand the reticence of Christians and others to venture out into this "deep". On the other hand, one might just as well say that one will preach no religion at all because of the dangers of misunderstandings which might lead to false religions. Everything one says which is intended to be "good" will be interpreted by some as "bad" One just has to take all possible precautions against misunderstanding and then carry on with the task.

May we take it, then, that the average person of the younger generation, having been brought up in an almost exclusively materialistic atmosphere, may be described as a deprived person? He is in a state of severe sixth sensory deprivation. If any

of my five senses are deprived, those senses will, as we have seen, search for the satisfaction they have not received. The satisfaction may come in supplying, say, the eye with the beauties of the mountains, or the ear with the wonders of Bach or Mozart. But substitutes are also possible, just as a Wiener Schnitzel feast can be temporarily put off by a cigarette. This leads us to the last point in this scheme of thought.

A whole generation is extant today in affluent society in the West which, wittingly or unwittingly, has been deprived of experience of the sixth sense (the sense for Paradise) and its satisfaction. They have eternity in their hearts but have never enjoyed it. The consequence is that when a psychedelic drug like LSD or cannabis (hashish or marijuana comes available as a social drug, that drug fits the need of that generation just like a hand fits a glove. They all go for it. The drug is a poor substitute for the real thing, but it does offer the possibility of a psychedelic peak, a transcendent mystical experience. It does offer the cognitive experience with all its insight. Many have experienced the psychodynamic or psycholytic experience with its catharsis for the psyche, and the relief that it brings. The artists have experienced the beauty of the aesthetic experience and its exquisite mysteries in music, art and poetry. The experience of synaesthesia ("seeing" music, etc.) has fascinated many and led them to go on to attempt to attain the psychedelic peak or the experimental transcendent mystical experience.

These things have all burst in on a largely ignorant Western generation... a generation ignorant of transcendent and starved of its experience. This generation did not even know that the older generation had deprived it of all these beauties, simply because the older generation had neglected to obtain them by natural means without drugs. When the younger generation found out about them by means of the psychedelic drug, it passed on its finding with missionary zeal to others of the same generation — while rejecting the ignorant and guilty older generation.

The reaction of the older generation was predictable. It reacted with incredulity, anger and fear. If the older generation had not been so busy making money and wealth at the expense of its own soul, it would have been in a position to first of all experience the transcendent beauties itself, and then pass them on to its children. It could well have gained the experience for itself and for its children with no psychedelic drug aid at all. For most reactions which a drug produces can be produced without the aid of the drug . . . if one knows how. And our affluent society, our meritocracy, did not know how to find the joy of the mystical sense and had no time to find out. Its exclusive preoccupation with affluence and its accompanying plethora of the five senses prevented the older generation from getting experience of the transcendental sixth. It has been so concerned with the cares of this world and the deceitfulness of riches that it has damaged the transcendent receiving part of its own organism, its psyche or soul.

However, the older generation did not only react with fear, anger and incredulity. It produced the police to stop this "nonsense" by force. It classed the psychedelic drugs with the narcotics. Narcotics are, of course, addictive, which is not the case with the psychedelic drug. The older generation then produced all sorts of horror stories about the murderous qualities of the new social drugs — they were said to lead to crime and to heroin. Of course, those who had been quietly getting their satisfaction from the psychedelic drug for years just smiled. They knew that the older generation was not only ignorant of the real nature of the problem; they knew that it was also dishonest and ready to use lies to support a "good cause", that is, to suppress a drug which it did not understand itself.

Thus the gap between the generations widened. The older generation despised the younger for using those "degrading detestable drugs", warned and threatened, threw offenders into prison for astronomical numbers of years for possession of minute quantities of psychedelic drugs — and never asked the pardon of the younger generation for having made such unjustifiable mistakes... at the expense of others. The younger

generation began to see in the old one its enemy and the hater of truth, using lies to get its own way while at the same time allowing itself the luxury of getting drunk on alcohol and of getting lung cancer on its cigarettes. So the younger generation despised the older generation for being unjust, dishonest and pharisaical, while the older generation despised the younger for almost the same reasons.

The Cure of the Drug Epidemic

We are concerned here chiefly with the psychedelic drug epidemic. People take alcohol to drown their troubles (anaesthetize themselves), getting hooked on it thereby. For alcohol anesthesia makes one insensitive or less sensitive to one's surroundings. First of all alcohol releases inhibitions, leading to exhilaration. Then general inhibition takes place, which is anesthesia. Narcotics like heroin do the same, initially. They reduce the sense of pain and release inhibitions, resulting in an initial "high", a stimulation and exhilaration. Then follows the general stupor and anesthesia — the "coasting"

Both these methods of getting drug "highs" are "negative". They *reduce experience* in the long run and are therefore considered in adept circles to be "bad technique". On the other hand, drugs such as amphetamines *increase experience.* As already pointed out, it is probably the case that psychedelics work in the body by means of a mechanism involving amines of the amphetamine class (chemically speaking) such as adrenaline. The psychedelics belong to the "mind stretching" class of drug and *increase experience* too. The psychedelics increase particularly the generalized experience of the transcendent.

The cure to the psychedelic drug epidemic now therefore becomes clear. It does not consist in sending for the police — though that may be necessary. If one deprives a person of his Wiener Schnitzel, he will turn to something else. If one stops the mere supply of hashish, the adept will turn to a substitute. Everyone knows that, though few seem to have drawn the necessary conclusions. *The cure lies in satisfying the latent desire for transcendent, eternal, mystical, paradisiacal expe-*

rience, which is an intrinsic part of our humanity: In short, we need achievement in and of our humanity.

Of course, it is not feasable to preach even the Gospel of Christ just to cure the drug epidemic. That would be prostituting the truth merely to reach an end. Nevertheless it is true that the proclamation of the truth will, as a by-product, cure the drug epidemic. I myself have seen the case of a heroin addict in Istanbul, an addict of several years standing, come off heroin without even a withdrawal syndrome — when he was confronted with and submitted to the transcendent truth of Jesus Christ. Only recently I talked to some physicians working in Detroit who gave me a list of the complete case histories of six heroin and other hard drug addicts who, on being confronted with the Gospel, were freed completely of their drug habit. I read in a scientific journal quite recently that in a scientifically controlled test, a number of "hard" drug addicts, after having been taught *transcendental meditation*, lost all desire for their particular drugs with no difficulty at all. Their desire became satisfied by their experience of the transcendent without drugs (the author is not recommending this practice of abusing psychedelic drugs as such).

At present the main option the younger generation has of satisfying its sixth sense is that offered by drugs. Recently another alternative has been offered, in that Eastern religions with their meditation and withdrawal have become popular. In the same way the enormous and spontaneous success of the Jesus people in dealing with the drug problem has pointed to the unmistakable connection existing between lack of transcendent experience and tendency to drug abuse. For a large number of the younger generation who have now turned to Christ were formerly on drugs of one sort or another — and have now quit them. If true transcendent experience come into a man, then the substitute drug transcendency goes out almost automatically.

Practical Measures to Combat the Drug Epidemic

What then can be done in a purely practical way to combat the Western Drug epidemic which is threatening the estab-

lished order? Is it too naive to state that one must remove the causes of it? Obviously this is the case — remove the causes! But what can we identify as the chief causes? One cause is certainly availability of the drug. But this cannot be very central cause, for in many countries of the world opium and even heroin, besides many other habit forming drugs, are much more freely available to the general public than heroin — often without a prescription, and yet those same countries have no drug problem. Take the case of Turkey. Opium balls may lie around on the kitchen table, as it were, to say nothing of first quality hashish. One can buy amphetamines cheaply — subsidized by the state to ensure low prices — just by going to a drug store and asking for as much as one wants. I have done it myself to see.

Drug availability, then, is only a relatively minor cause behind the present epidemic. It may cause aggravation of the epidemic *once the epidemic is established. A much more important cause of the drug epidemic is not the physical availability of drugs to people but rather the psychical availability of people for the drugs . . . a vastly different matter.* People in our Western culture are psychically available and susceptible to drugs, which, of course, they can obtain almost anywhere, *if they want to*. Peer pressure plays an important role, too, in the drug epidemic.

The next question follows naturally: What people are then available for and susceptible to drugs, particularly to psychedelic drugs? If our thesis developed above is correct, they are people who are needing a radical alteration of state of consciousness (ASC). *Our way of life in the West has obviously produced a state of consciousness in the Western mind which is suffering from some sort of malaise and which is utterly unsatisfactory to the average youngster who is desperately trying to exchange it for something better by any means he can find.* And if he cannot change it for the better, he is so desperately sick of his present state of consciousness that he is just going to change it — for the better or the worse. Everywhere we look in the affluent society, the consumer society today, we find the same symptoms of malaise.

Our thesis is that the cause of this malaise lies among other matters in the severe deprivation, common in the West, of joyous transcendental experience of the meaning of life. Of course, this is not everything. The Westerner is suffering, too, from a lack of a *simple sense of achievement* in his everyday life. In former days one had to sweat and work for one's bread before one could satisfy one's hunger. But the bread was delicious — after a day's work for it! *Today everyone has a "right" to his bread, he need do very little indeed for it. The consequence is that the bread tastes as disgusting as the free manna the Israelites had poured freely on to them from heaven in the wilderness. There is, thus, not only a lack of sense of the eternal, the transcendent, which characterizes current culture in the West. There is also a "vomiting" reaction arising from pouring everything on to everyone's five senses, if possible, "free". The consequence is a lack of sense of achievement — which reflects itself in an unsatisfactory state of consciousness.* A life of no challenge brings a state of consciousness which lives in a permanent state of disgust ("vomiting") — i.e. joy in nothing.

Thus, the starvation and deprivation of the sixth sense, which gives us the meaning behind life, has been coupled for generations now with a plethora from the five senses which floods the consciousness until it "vomits". Never in all history has the majority of mankind in the West (or indeed anywhere else) "enjoyed" such a plethora of purely material luxuries involving the sense of sight, sound, odor and taste as this present generation. Never in all history has mankind had such five sensory comfort and plethora as we have. At the same time we can safely say that never has a culture enjoyed such good physical health as we, due to medical advances. *And yet never has a culture been so deprived of the sense of ecstasy and transcendent experience of the eternal joyful knowledge of paradise in the state of its consciousness as our culture.* But instead of exulting in triumph that we have been put in the position of making our lot comfortable on earth, many are so dissatisfied with their inward state of consciousness that they have but one end in view – that of destroying ("vomiting")

everything we have, so that at least they get some satisfaction of some *achievement*, namely that of pure destructivness. All this stems from the disgusting sense of lack of any achievement to which our society is heir.

We are quite obviously constructed for something more than physical five sensory comfort and experience of it alone. I do not wish to disparage these comforts. I am grateful for them. But they alone put us into a state of imbalance. The imbalance consists of too much experience of physical affluence, too much purely material experience coupled with too little experience of the joy of paradise (in this life as well as afterwards) for which we were obviously made.

Some reader may ask why it should be so obvious that we were made for paradisiacal ecstasy? Surely the nostalgia which afflicts most of us (when we have time to reflect) is an indication in this direction. How else can we explain one of the "chief activities of man" — *the pursuit of pleasure?* We need the five sensory pleasures — every one of them — but we need the sixth sensory ones as well. It is the exclusive experience of the five senses and their pleasures and the lack of experience of the sixth sense and its pleasures which causes the imbalance. The proportions of the balance of this relationship may change with time — as we get older we need more of the sixth and less of the five — but the balance itself between five and sixth sensory experiences remains essential.

Most imbalances produce malaise, and organisms will try automatically (and often unconsciously) to correct imbalances. Surely the current psychedelic drug epidemic is an obvious, though perhaps unconscious, effort of our younger generation at correction of the imbalance? For, during early stages of an LSD trip, the five senses are cut back as the adept separates from material reality and goes into the withdrawal experience of a reverie. He also withdraws by another method — that of "dropping out" from the "consumer society" with its plethora of five sensory impulses. Then he will take to the woods and fields, play his instrument (do "his thing") and relax. He will even go barefooted to get back to mother earth

as closely as possible, while separating himself from the plastic and synthetic world.

In thus withdrawing by means of drugs and way of life, the younger generation is merely reacting against the riot of the five senses foisted on him by our materialistic Western culture In withdrawing from the five senses he opens up his consciousness to the experience of the sixth. The sixth is, of course, strengthened additionally by the psychedelic experience.

What is then to be done to combat the drug epidemic? Obviously it has been brought on by people becoming available for drugs. *Obviously our way of life has made us available for drugs — what else could be responsible? Equally obviously, then, we need, in order to combat the drug epidemic, a drastic change in our way of life in the West.* If we do not effect this drastic change ourselves, then the consequences are perfectly obvious: they have been seen in other cultures which decayed in the past. What changes, what drastic changes, are necessary?

We need to quit living exclusively for the wealth and therefore *the power* of the here and now of the consumer society. We need to start living for the wealth and power of an altered state of consciousness which comes from Him who made us. Our proprioceptive system of the five senses was given us help us get about safely in time and space for seventy years. But our appreciation, our consciousness of the transcendent, is given us to find our way around matters eternal. Achievement in the world of our five senses is necessary and brings joy. But experience and achievement in the sense of the transcendent brings ecstasy. For the chief purpose of man's creation is "to know God and to enjoy him for ever."

The epidemic nature of religious movements like that of the Jesus People (I use the word "epidemic" in its purely scientific sense) demonstrates my point. Wherever the Jesus People go and gain their transcendent experience of Jesus, their followers quit drugs, including alcohol. They have worked to a great extent in drug oriented society, and quitting drugs has

been one of their marks of recognition in society. In their experience of the transcendent (for that is how their religious experience may be fairly described) they have partly removed the imbalance produced by the affluent consumer society (*only* five sensory plethora coupled with sixth sensory deprivation).They are therefore now joyous, the malaise has disappeared and with it the need for drugs — and alcohol. *The result is that such persons with such experiences of the transcendent are just not available for drugs or other substotutes any longer*. They have something better — not a drug surrogate but the real thing.

The point is that our nostalgia for paradise and its joys is real, even though we may flee a holy God. This nostalgia is like my sense for the beauty of the mountains. My eyes long for it, but in an entirely indefinable, yet equally definite way. To come to a lower plane: my taste buds long for a Wiener Schnitzel if I have not had one for a long time. I could not describe this "nostalgia" for Schnitzel! But that does not mean that this "nostalgia" is not there, because I cannot describe it! The nostalgia for eternity, for beauty, for that which endures, the purity of the guiltlessness and forgiveness, all these things are "appetites" of the sixth sense which need meeting. If they are not met, malaise results, and the malaise may lead to drugs, even if drugs give only temporary relief from it.

Again, the question arises: What must be done? It means that each one of us must start to take time out for his Creator (and I myself believe, for his Christ). It means taking time out to pray, reflect and meditate. It involves taking time out personally to visit the sick, the less fortunate than we – not just giving a subscription to some church or society, but going and doing it ourselves. It means working conscientiously for achievement. For such activity not only helps us — it helps others. It helps us personally as well and enriches our state consciousness, that is, changes it for the good — without the aid of drugs! It means taking time out to encourage others who have resolved to tread the same path themselves. In short, it means taking time out to cultivate the sixth sense and

making sure that the New Creation, the New Birth or the New Way of Life has not only taken root in us but that it is flourishing lustily as well in this material world.

When all this is the case for me and in me then I shall no longer be available for drugs either of the social psychedelic or of the anesthetic kind. The epidemic will have been firmly stemmed in me personally, then others seeing this effect in me may be helped to inquire of the reasons why. The fact that Alcoholics Anonymous is the most effective rehabilitation technique for alcohol abuse to date — and that a central pillar of A. A. is the patients' conception of the Divine — should make us stop and think of the possible impact of a "Drugs Anonymous" working on a similar basis.

Footnotes

1 John 20:16.

2 Heb.13:8.

3 2 Cor. 12, 1-4.

4 1 Cor.2:9.

5 Eccles. 3:11.

Chapter 8

Basic Physiology and Acute Therapy

O.H.G. Wilder-Smith

Introduction

Why?: Defining drug abuse

We are living in an age which the abuse of drugs for non–medical or non–therapeutic purposes is modifying the very nature of our society. It is a fact that, up to the present, all human societies have abused drugs. Our present day society, however, distinguishes itself not only in the degree to which drugs are abused but also in the destructive influence which these abuses have in almost all aspects of life.

For the purpose of this chapter I would like to define drug abuse as the use of chemical substances for non–medical purposes. Non–medical purposes, in turn, are those which do not serve to treat illness (i.e. pathological processes). In parallel, I would define drug addiction as compulsive automedication resulting from the stimulation of a system of reward seated in the brain. This definition does not demand the concept of a classical withdrawal syndrome.

Aims of drug abuse

To what end are drugs abused? In general they are used because of their ability to alter the perception of reality. Reality is often regarded, for various reasons, as intolerable

by drug users. The dilemma of intolerable reality is only solvable in two ways:

- either to alter the nature of reality,
- or to modify our subjective perception of that intolerable reality.

The second alternative forms the basis of our present "drug epidemic", which is based upon the rejection of the principle of truely altering reality as a solution for existential problems. As a result, chemical (or other) manipulation of the *perception* of reality supplants the ability to deal concretely with reality. The satisfaction resulting from having successfully tackled and solved real problems is replaced by a chemically produced feeling that "all is well". This in turn produces a lack of interest in relating to or changing reality with a view to improving the same. And it is surely clear that such a change the fundamental philosophy of a society – particularly if this change becomes wide–spread – will profoundly influence the nature of that society.

Possible mechanisms of action of commonly abused drugs

Looking at the chemical substances abused today, one would logically expect them to have in common the ability to change sensory processing by the central nervous system . Commonly abused drugs do in fact all share such an ability to profoundly change CNS sensory processing. The mechanisms by which they influence the CNS can be divided into three main types:

- either depression,
- excitation (stimulation),
- or fragmentation of CNS function.

In general, the drugs under discussion here demonstrate combinations of these three mechanisms, with each pattern producing a unique decoupling of perception and reality. The resulting pattern of behaviour is in general dose–dependent. In addition, it varies from individual to individual and is dependent upon his original state of consciousness – e.g. whether he was depressed or exhilarated at the time he began his experiment with CNS active drugs.

Side effects: general and specific

Side effects are effects which are not desired or envisaged by the drug abuser and are unavoidable during the use of medicines ("there are no drug effects without side effects"). In general, such side effects fall into two categories:

- unwanted effects on the target organ (specific side–effects)
- damaging effects on other organ systems (non–specific side–effects).

In the case of drugs used to manipulate sensory perception, specific side effects can range from minor alterations in CNS function, e.g. unwanted percepts of reality such as "bad trips", to major irreversible damage to CNS function, such as MPTP – precipitated Parkinson syndromes or permanent psychoses after ingestion of LSD.

Non–specific side effects of drug abuse are precipitated by the effect of the drug on organ systems outside the CNS (for example myocardial infarction during the abuse of cocaine). The route of application plays a major role here, with, for example, the intravenous application of abused substances often being coupled with a high rate of infectious complications, including AIDS or hepatitis.

The neurobiochemical basis of the desired drug effects

How do the chemical substances which we are dealing with modify the perception of reality and its processing by the CNS? The CNS is the most complex organ system of the whole body and its functioning is based on many biochemical and neuronal equilibria. Thus there are many points of attack which CNS drugs can use to achieve their effects.

Vastly simplifying the mechanisms of action of drug abuse to alter the perception of reality, we can identify two main modes of action in the CNS:

- modification and modulation of the transmission of chemically mediated messages between the nerve cells (neurotransmission)
- and modification of the equilibrium existing between var-

ious brain structures and between excitation and depression in the CNS.

Disturbance of neurotransmission

The connection between the outside word and the CNS (i.e. spinal cord and brain) is maintained via long peripheral nerves. The entry into the CNS of the information transmitted by peripheral nerves takes place with the help of chemical substances crossing nerve junctions or synapses. To this end the nerve entering the synapse liberates a chemical substance (a neurotransmitter) into the free synaptic space. The neurotransmitter then diffuses across the synaptic space to react with a specific reactor on the postsynaptic membrane, part of the nerve leaving the synapse. Once the neurotransmitter and the receptor combine, the resulting effect is – according to the substance concerned – either a tendency to stimulate or to depress nerve activity. Since many nerves communicate with one nerve in a synapse, the different messages of the entering nerves are summated, resulting in a tendency either to fire off an electrical impulse (excitation) or not (inhibition).

Such synapses exist not only at the entrance of peripheral nerves into the spinal cord, but also in the rest of the CNS. Synapses in fact constitute the fundamental basis of CNS processing. It is therefore easily understood that any disturbance of neurotransmission seriously impedes sensory processing by the CNS.

Chemical substances with the potential for abuse disturb neurotransmission either by agonistic or antagonistic effects – or by a combination of both. An agonist is a substance which binds to a postsynaptic chemical receptor, thus producing a specific receptor effect. On the other hand, an antagonist, while binding to a receptor for the particular chemical substance, does not, however, produce the expected effect. Thus it blocks the effect of the original chemical substance.

Excitation and inhibition

Different systems and centers of the CNS tend to preferentially use certain neurotransmitters. Looking at CNS function

at a higher plane of integration, its functioning is based on a dialectical equilibrium between excitation and inhibition of these centers. Therefore the drugs under discussion can, via their selective agonistic and antagonistic effects on neurotransmitter systems, have specific effects on brain centres or systems too, resulting in regional or global excitation or inhibition.

Dose effects

The net effects of CNS–active drugs are by no means static: they vary dynamically with the dose given; or more correctly, according to the drug concentration reached in the brain. The sensitivity of the various brain structures to the effects of the medicaments is by no means uniform. For example, inhibitory CNS systems are in general more sensitive to depression than are excitatory ones. Thus, for CNS depressant drugs, as the dose is increased, the inhibitory CNS centers will be affected first. The result of is, of course, CNS excitation, because excitory centers are no longer inhibited. It is only later that the excitory centers themselves are inhibited, resulting in general CNS depression.

THE TARGET CNS SYSTEMS: A SIMPLE CLASSIFICATION.

Which CNS structures are the target of abused drugs? Typically, it is sensory and associated systems throughout the CNS that are affected (table 1).

CNS area	***typical structures affected***
spinal cord	dorsal horn
brain stem	autonomic nuclei, hypothalamus
midbrain	thalamic nuclei, limbic system
cerebrum	frontal, somatosensory and temporal
cortex	

Table 1. The sensory structures typically affected by abused drugs in various parts of the CNS

At our present state of knowledge it appears that certain neurotransmitter systems are particularly prone to modulation by abused drugs. These include systems involving biological-

ly active amines (catecholamines, serotonin, dopamine, glutamate, aspartate and GABA) and certain neuropeptide transmitters (endorphines and enkephalines).

In the following section we shall therefore look at examples of the interaction between these neurotransmitter systems and two of the most abused drugs.

Some examples

Cocaine

Cocaine is one of the most frequently abused drugs today. Its abuse has become an epidemic, with about 25 – 30 million Americans having used cocaine at least once, and 5–6 million taking it on a regular basis. In the Federal Republic of Germany 2500 kg (over 5000 lbs) of cocaine were confiscated by the police in 1990. In 1975 only 1 kg was confiscated! Cocaine has become infamous on account of the dimensions of its abuse and the associated criminality. It has achieved the status of a special drug amongst abusers because of its alleged lack of toxicity and addiction potential. Thus it is found being used in the highest echelons of society.

However, reports of its toxicity are increasingly appearing now. Prominent athletes who abuse cocaine are reported as succumbing to sudden cardiac death. Cocaine is being found to show considerable toxicity no matter whether applied chronically or acutely. The alleged lack of potential for producing addiction and dependence is increasingly relativised, too.

Cocaine possesses two main areas of activity. In the first place, it exhibits a marked local anaesthetic activity by blocking the rapid sodium ion canals in cardiac tissue. Secondly, cocaine increases the central and peripheral liberation of catecholamines (e.g. noradrenaline, adrenaline or dopamine, the "stress hormones"). At the same time, it inhibits the reabsorption of catecholamines at synapses of both the peripheral and central nervous systems.

What are the results of the above effects? The local anaesthetic effect first of all produces excitation by inhibiting inhibitory centres in the brain and nervous tissue. This inhibit-

ing action is especially pronounced in the cardiac muscle, with the possibility of causing heart failure. Parallel to this, its catecholamine effects lead to a massive increase in the concentration of catecholamines in the heart and brain. The result is a massive excitation of not only the brain but also of the heart and circulation. The stimulation of the heart and circulation alone may suffice to precipitate serious cardiac arhythmias, and may lead to circulatory collapse or even cardiac infarction, ending in sudden death. The literature reports a series of cardiac infarctions in young people (from 20 years of age onwards), some of which ended in death.

The cocaine abuser desires the stimulative effect which cocaine certainly produces. After his dose of cocaine he feels very much awake, pleasantly stimulated, strong and euphoric. He has endless energy, the whole world lies – as it were – at his feet. Everything is perceived in a magnified manner, because the high catecholamine concentrations work like an amplifier of the sensory system. The high concentrations of dopamine (one of the catecholamines) even directly stimulate the CNS "reward system" (the ventral tegmental area of the mesolimbium), thereby producing pleasant sensory effects.

However, the above–mentioned type of stimulation exhausts the body's metabolic energy reserves. Once these reserves are exhausted, the "high" comes to an end, and depression follows automatically....

The chronic use of cocaine leads not only to biochemical changes, it also changes the tissues and functioning of the brain, as well as of the heart and circulation. For example, cardiac tissue becomes scarred and loses some of its efficacy. Blood vessels (including the coronary arteries) become loaded with fat and calcium deposits. The functioning of the nervous system changes. On the one hand, the number of catecholamine receptors diminishes – and those that remain become less sensitive. On the other hand nervous tissue becomes more irritable. The nervous system becomes more labile and unstable, with an increased tendency to epileptic episodes. Unfortunately, the cocaine abuser starts discovering

that a renewed dose of the drug improves his unstable state. While it has been assumed that tolerance to cocaine does not arise (that is, that there is no need to raise the dose when the drug is used chronically), this assumption is increasingly being challenged today.

To conclude this summary on cocaine abuse, another acute danger of cocaine must be mentioned. It concerns the use of cocaine during pregnancy. Cocaine rapidly passes the placental barrier, and thus easily reaches the circulation of the developing child. The brain, nervous system and heart of the fetus are all very sensitive to cocaine during their development. Malformations of the organs mentioned all occur under cocaine abuse during pregnancy. In the USA there is already an epidemic of congenital deformed babies to the dealt with ("crack babies") who show impaired brain function together with a disturbed cardiovascular system.

Heroin

Heroin is still the classical addictive drug. In 1990 ca 850 kg (1600 lbs) of heroin were confiscated in the Federal Republic of Germany. In 1980 only 270 kg were so taken out of circulation by the police. Compared to cocaine, the ability of heroin to produce dependence is very high indeed, which means that relatively few heroin abusers can kick the habit spontaneously. The non–therapeutic use of heroin is coupled with a high incidence of illness and death, due to its pharmacological properties and the circumstances of its use.

Heroin is an opioid which is chemically closely related to morphine. It binds to the mu–subtype of opiod receptors, of which the natural ligands (binding substances) are the enkephaline and endorphine peptides. These peptides are involved in the regulation of many bodily functions. Thus they influence not only the sensation of pain, but also modulate respiration, circulation and the sympathetic nervous system. In addition the enkephalines and endorphines modify the function (secretion and movement) of the gastro–intestinal tract as well as controlling appetite and the endocrine system (i.e. growth, lactation, excretion of urine, thyroid function,

regulation of body temperature, etc.). A high concentration of these receptors is found in parts of the midbrain. They have to do with the regulation of emotion, feeling or affect (the limbic system). As would be expected from the pain regulating properties of the opioid substances, many of the opioid receptors are found in close neighbourhood to sensory nerve tracts and their processing structures. Just as in the case of cocaine, the use of heroin produces a stimulation of the reward centre. However, in the case of the opioids the effect is indirectly mediated, namely by the inhibition of inhibitory influences on afferent nerve tracts.

From the foregoing list of properties, it is easy to deduce the far reaching effects of the consumption of heroin. The opioid receptors (especially those of the mu–subtype) possess classical depressant effects on virtually all body systems. However, all of these neurotransmitter systems can also produce paradoxical excitory effects. The effect of heroin on the sensory and perceptive system is dependent on the circumstances surrounding the heroin consumer when taking the drug. In this context, the effect of heroin is especially dependent on the presence or absence of pain. If pain is present the unpleasant side effects of heroin are markedly diminished. In fact it can be said the toxicity of heroin is markedly reduced the more pronounced the pain is at the time of taking the heroin. This property renders heroin so useful in painful terminal conditions.

This was one of the reasons why Winston Churchill refused to support the banning of heroin by Parliament in Great Britain. Churchill's medical advisers informed him and parliament that there was no opioid substitute for heroin in advanced terminal pain. As a politician with no medical background he wisely refused to give advice to the medical profession on matters he as a politician did not understand.

Quite different effects are observed if morphine or heroin are given in the absence of pain. If no pain is present, the result of heroin consumption is often a euphoric "floating" feeling (the "high"). Often the high is accompanied by senso-

ry distortions, which at the beginning of heroin dependence are the main motivation for the desire to take the substance. A non–negligible proportion of abusers become dysphoric (a feeling of being unwell) on taking heroin where no pain is present. Such dysphoria may be accompanied by vomiting and/or depression. It is characteristic for the abuse of heroin that tolerance appears with chronic use. In the course of time more and more heroin has to be taken to achieve a constant effect.

The causes of the pronounced withdrawal symptoms in heroin abuse are possibly twofold:

- Firstly, chronic abuse inhibits the enzymes (cyclo–adenosine–monophosphatase) which normally metabolise substances stimulating sympatho–adrenergic systems, resulting in sympathetic upregulation
- Secondly, there is an interaction of heroin with the opiate type receptors (alpha–2 receptors) which normally suppress the release of sympatho–adrenergic substances such as noradrenaline, again resulting in an upregulation of catecholamine production.

Therefore the sudden withdrawal of heroin results in a massive rebound and activation of the sympatho–adrenergic system, a classical symptom of the withdrawal syndrome.

Damage to health during heroin abuse appears for two main reasons:

- Firstly, by means of direct pharmacological effects of the medicaments,
- and secondly, due to the circumstances accompanying heroin abuse.

The suppression of respiratory activity right up to respiratory arrest and death is a typical example of the side effects attributable to the first category mentioned above. To such effects must be added those of loss of weight and malnutrition, chronic digestive troubles, impaired endocrine function and reduced immune function.

Especially dangerous are the illnesses which result from the **circumstances** accompanying heroin abuse.Heroin is usually

injected intravenously. Thus direct access into the circulation is achieved, robbing the body of many barriers to infections. The needles used are often shared, facilitating the passage of infectious agents from person to person. Thus the abuse of heroin goes hand in hand with a high risk of infection not only of a bacterial nature (abscesses, septicemia) but especially of the viral type. Amongst the viral infections, the various types of hepatitis (especially the dangerous hepatitis B) and also the lethal acquired immune deficiency syndrome (AIDS, HIV) must be particularly mentioned.

Withdrawal

As already noted, the chronic abuse of drugs results in typical changes in metabolic and physiological body functions. In fact, the body's metabolism becomes dependant on this drug for its proper functioning. If the chronic drug application is now stopped abruptly, the drug to which the body's metabolism has become habituated is lacking, and acute withdrawal symptoms ensue. The withdrawal symptoms affect both body and mind, and can be exceedingly unpleasant. They usually commence within a day of stopping the drug and can last for weeks. This chapter will restrict itself to the physical manifestations of withdrawal. It must be kept in mind that withdrawal can precipitate serious disturbances in metabolic processes, which usually need intensive medical treatment.

The physiology of acute withdrawal

The consequences of chronic drug consumption

As we have already indicated, chronic drug abuse alters the metabolism of the body, particularly that of the CNS. This alteration occurs because a compensatory up or down–regulation sets in to cancel out the phamacological effects of the drug, attempting to bring the body back to its original metabolic state. In the case of cocaine, which does not cause a marked physical withdrawal syndrome, an increase in tonic inhibitation occurs in order to compensate for the chronic biochemical and neuronal *stimulation* by cocaine. Thus acute withdrawal of the drug leads to generalised depression.

In contrast, the abuse of heroin leads to a chronic *inhibition* of the sympatho–adrenal system. This results in a marked increase in the sensitivity of the sympatho–adrenal system. This up–regulation is achieved via receptor modulation (number and sensitivity), by alterations in the release of neurotransmitters, as well as direct changes in the behaviour of affected brain structures. All these changes are most developed in heroin abuse, so that we propose to use heroin withdrawal as the classic example in the following section.

Clinical course and consequences of withdrawal

As already mentioned, the body's response to the chronic CNS inhibition resulting from heroin abuse includes sensitisation of the CNS and particularly of the sympatho–adrenal system. What happens during acute withdrawal?

Suddenly, the inhibiting influence of heroin is no longer present, resulting in an overshooting excitation of the whole CNS and sympatho–adrenal system. A state of increased wakefulness and perception is soon followed by inner restlessness and dysphoria. Next, full–blown withdrawal develops, with a general feeling of malaise being accompanied by pain, giddiness, sweating, trembling and gastrointestinal disturbances. On the subjective plane this condition is highly diagreeable. Often, the addict can hardly walk in this condition. In a reduced general state of health (as is often the case with heroin addicts), the additional stress of a such massive sympatho–adrenergic activation is often accompanied by serious sequelae: epileptic fits, respiratory impairment, acute malignant hypertension and/or circulatory failure up to and including generalised shock leading to the necessity of intensive care.

SPECIAL THERAPY

Neurobiochemical restabilisation

The treatment of the full–blown withdrawal syndrome rests on two main therapeutic pillars:

- Firstly, specific depression of the activated sympatho–adrenal system,

- and secondly, supportive therapy of impaired body functions.

Depression of the sympatho–adrenal system is achieved by sedatives, which produce generalised CNS inhibition, as well as by substances inhibiting only specific functions of the sympatho–adrenal system (e.g alpha or beta–blockers). To this are added general therapeutic measures such as bedrest, darkening of the room, restriction of visits, etc. Examples of other kinds of supportive measures include i.v. infusion therapy in the absence of adequate oral fluid or food intake, circulatory support with cardioactive drugs, treatment of cardiac arrhythmias or mechanical ventilation in the presence of pulmonary or respiratory failure.

The transition to long–term therapy

Once the acute phase of withdrawal is over and sympatho–adrenal restabilisation has been achieved, thought must be given as to how to manage the patient's transition to a "normal" mode of life.

In the first place it must be ascertained, by extensive and thorough discussion with the patient, whether he is willing to undergo complete withdrawal from his drug habit. The success of such a treatment is obviously dependent on many factors – spiritual and intellectual, psychological and sociological–social in nature – which have been discussed in the preceding chapters of this book.

In many cases the patient is not willing to go undergo complete drug withdrawal. It has been repeatedly shown that forcible drug withdrawal is in general not associated with long–term success. Thus it is often considered wise – as a choice between the lesser of two evils – to institute long–term substitution therapy. For example, intravenous heroin can be substituted by oral methadone, a synthetic opiod active per os. It produces no "high" if taken by mouth, and largely prevents the achievement of a "high" with intravenous heroin. The adequate chronic substitution of methadone for heroin can lead to the psychological stabilisation of heroin addicts. It is useful in

the avoidance of the problems resulting from illegal i.v. application of heroin. These include the risk of AIDS from the use of contaminated needles as well as the criminality of the black market as a source of illegal drugs. However, the use of methadone remains a crutch and does nothing to alleviate the personality and other problems which result from the chronic abuse of opiates.

The optimal treatment of drug abuse is, of course, total withdrawal. This is the only sure way of avoiding the physical damage resulting from any abuse of drugs. In the context of acute drug withdrawal, slow, controlled withdrawal can be achieved under pharmacological depression of the sympatho–adrenal system. This must be carried out, however, under competent medical supervision. But ultimately we must never forget that the long–term success of withdrawal depends on the conquest of the accompanying anhedonism (inability to be happy) as well as the problem of our intercourse with reality – and that these are not problems of pharmacotherapy, but rather of our relationship to the reality of life and thus God.

Literature

1 Täschner KL, Wiesbeck GA. Heroinsucht. Teil I: Verteilung, pharmakologische Grundlagen und Wirkungen des Heroins. Dtsch. med. Wschr. (1991) 116: 1603–1609

2 Täschner KL, Wiesbeck GA. Heroinsucht. Teil II: Therapie und Prävention. Dtsch. med. Wsch. (1991) 116:

3 Goldstein A, Heroin Addiction: Neurobiology, Pharmacology, and Policy. J Psychoact Drugs (1991) 23: 123–133

4 Grönbladh L, Öhlund LS, Gunne LM. Mortality in Heroin Addiction: Impact of Methadone Treatment. Acta Psychiatr Scand (1990) 82: 223–227

5 Evanko D. Designer Drugs. Treating the Damage Caused by Basement Chemists. Postgrad Med (1991) 89: 67–71

6 Kloner RA, Hale S, Alker K, Rezkalla S. The Effects of Acute and Chronic Cocaine Use on the Heart. Circulation (1992) 85: 407–419

APPENDIX

1. DRUG DEPENDENCE

There is one matter of interest in dealing with drug abuse which we have not been able to mention yet. It does not really specifically concern the psychedelic drug problem. We have therefore left it for an appendix.

Psychedelic drugs do not bring with them the phenomenon of drug dependence (addiction). Heroin and the opiates, barbiturates, anesthetics such as alcohol and even amphetamines, on the other hand, do. Is there any rule by means of which one can rationalize this drug property of dependence production?

There is no absolute rule by which one can rationalize drug dependence or the reason why it arises. Indeed, it is difficult to ascertain just what dependence, in some cases, really is. A person can become physiologically and/or psychologically dependent on a drug. In the case of the morphinics, physiological dependence shows itself in that the dependent person (addict) will sweat, vomit, suffer from cramps and general malaise if he does not get his "fix". His physiology is dependent on the presence of the morphinic drug. He will probably be psychologically dependent at the same time. Drugs such as amphetamines are more likely to produce a psychological dependence than a physiological one. Amphetamine users will feel the "need" of the drug in order to live "normally". But they do not suffer from vomiting or cramps and sweating

when deprived of the drug (though their EEG may change). They will suffer from depression as a rule.

Of course, both types of dependence (psychological and physiological) are difficult to define accurately. I may like a rump steak once a week, but it could not be accurately said of me that I was therefore addicted to rump steak and that I was psychologically or physiologically dependent on steak — unless I began to suffer from a compulsive drive to eat steaks. There is a continuous line running from "liking a steak" through compulsive eating right up to dependence on some drug or other.

To illustrate the wideness of the phenomenon of dependence, one may cite the story of the little old lady put into hospital for the treatment of some metabolic ailment. After treatment and discharge from hospital, she was carefully instructed in the art of putting a "Clinistick" in her morning urine to check up on her metabolic state. Later, when this "Clinistick" check every morning became no longer necessary she was completely discharged — and received, therefore, no more Clinisticks. However, after a week or so she returned to hospital in a state of anxiety. It took a good deal of clinical acumen to diagnose her new trouble. She had become so accustomed to testing her urine with Clinisticks every morning that she felt uneasy if she omitted to do this little routine. She was no longer sure that she was in good health without her Clinisticks and their way of life. The result was that the removal of her Clinistick crutches had produced a withdrawal symptom. She was "dependent" on her Clinisticks !

2. Mechanisms behind Addiction

The following is not intended to be in any way an "explanation" of how addiction occurs with drugs that are dependence producing. But the information may be helpful in alerting to where addiction to drugs is likely to arise.

If a drug depresses the central nervous system — such as a barbiturate like phenobarbital will do — that drug will slow down cerebral processes and produce a "down" effect on the

person taking it. Such drugs are commonly referred to as "downers".

If one gives a dose of, say, 10 mgs/Kg. body weight i. v. morphine to a rabbit, the rabbit's respiration rate will fall in a matter of about 20-30 minutes from about 200 per minute to anywhere between 100 and 75 a minute. Besides this, the breathing will become shallow and the rabbit cyanosed due to hypoventilation. At the same time the animal becomes less sensitive to pain. Its digestion is slowed down and it tends to become constipated. The pupils of its eyes are reduced to pin point size and the animal becomes stuporous. These effects of morphine can be well demonstrated before audiences large or small — they are striking.

On giving *mice* a large dose of morphine — say 45-50 mgs/Kg. body weight i. p. — a quite remarkable effect is observed within about 30 minutes. Instead of becoming stupefied as did the rabbit, the mice are stimulated, run about continuously and their tails go up like a dog's does when it is excited having sighted a rabbit. Sometimes the tail goes up so high that it reaches the space between the mouse's eyes. The spectacle of mice running for dear life with their tails high in the air or curved right over their backs and falling into their eyes is impressive. This raising of the mouse's tail under morphine is diagnostic for morphinics and is known as the Straub tail. It is due to the stimulating action of morphine on the spinal column. The morphine releases the inhibitions of the spine, giving a resultant stimulation. Two negatives (inhibition of an inhibition) produce the net result of stimulation. Morphine thus *stimulates the mouse* (indirectly) while it *depresses the rabbit.*

It is a well known fact which has often been confirmed, that, if a drug stimulates, or produces a euphoric effect, as well as depresses, or has a dysphoric effect, that drug is liable to be addictive. One sees this effect excellently in the pharmacology of morphine. It can be effectively shown in drug abuse demonstrations on animals. In the mouse morphine stimulates, while in the rabbit it does the exact opposite. The same

two effects are noted in the human. Under normal circumstances, morphine in the human is a "down" drug. It lowers the respiration rate and generally quiets the patient. However, under certain circumstances the drug does the exact opposite and produces what is known as "sham rage". The patient will be stimulated and uncooperative — the exact opposite effect to the normal morphine reaction. Normally morphine works in the human as it does in the rabbit. Abnormally in the human morphine works as it does in the mouse.

Thus, morphine possesses a double spectrum of action — it stimulates and depresses at the same time according to circumstances. Cocaine is another drug showing paradoxical properties. The Indians in the Andes use cocoa leaf chewing as a means of fighting fatigue. Cocaine is present in a bound chemical form in the cocoa leaf. By chewing, the enzyme systems in the saliva break down the cocaine-bound forms into free cocaine, which then acts as an anti-fatigue drug like amphetamine. This means that cocaine is a strong "up" drug. Cocaine is, however, at the same time an excellent surface anesthetic. Formerly it was used as such in dentistry. Anesthetics are, of course, "down" drugs. We conclude then that cocaine is at once a good "downer" and a good "upper". It possesses, in fact, paradoxical properties just as morphinics do. As expected, cocaine turns out to be an addictive drug.

This line of observation may be extended as follows. If one takes a strong "downer" and a strong "upper", such as heroin or morphine, and mixes it with a strong "upper" and a strong "downer", such as cocaine, the two substances act on one another in a potentiating manner — their net effect together exceeds the summated effect of the two drugs given separately. This applies to the dependence producing properties of the two drugs separately or given together as a mixture. Heroin taken together with cocaine produces one of the most highly addictive mixtures known to pharmacology. The two together represent the acme of addiction potential. The chances of successful rehabilitation after addiction to cocaine and heroin are small.

Let us return to more everyday drug problems. After a glass or two of an alcoholic beverage the tongue becomes "loosened", the "spirits" are raised, inhibitions are lessened, conviviality is increased and the drinker is stimulated. His inhibitions are released. Alcohol is an "upper". However, if the convivial drinker continues in his drinking, after an hour or so his stimulation turns into depression, anesthesia, and he may land up in a state of stupor underneath the table, inebriated. Alcohol is a definite "downer", an anesthetic. Having these paradoxical properties, we are not surprised to find that alcohol is an addictive substance.

After a small dose of phenobarbital one will, if one watches oneself very carefully for the first twenty or thirty minutes, find that one's inhibitions are released under the influence of phenobarbital. One's thoughts become crystal clear and may "race". Phenobarbital is a weak temporary "upper". Then, as the dose level of barbiturate builds up in the blood, quite suddenly general inhibition takes place and sleep ensues. Phenobarbital is a weak "upper" but a strong "downer". The paradoxical properties allow us to expect the substance to be addictive, which, of course, is the case.

There is one more consequence of these observations which we must glance at. It is highly practical. Many people, especially housewives, when they wake up in the morning, feel depressed and unfit to go into the day. They know that a dose of amphetamine will wake them up and give them a feeling of well-being. The amphetamine "high" is well liked nowadays. However, it has the disadvantage that if the dose is not hit exactly and correctly, a type of "jitteriness" may result. This means that the taker is "on edge" until the effect wears off. But, why wait until it wears off? There is no need to! Take a small dose of a "downer" until you are "just right". So they will take a slightly too high dose of amphetamine or other "upper" to wake them up. Then, when they find they have overdone it a little, they will drop a dose of a "downer" to "bring them back" to where they think they ought to be.

What have they done exactly in following this widespread practice? They have taken an "upper". Then they have added on top of it a "downer". That is, they have put into the body drugs with paradoxical properties. In fact, they have put into the body drugs with some of the combined properties of cocaine or heroin — of course the effect of the two mixed drugs is not so strong as that of morphine or cocaine. But the principle is exactly the same, nevertheless. The consequence is that the taker of such mixtures not only gets the toxicity of the two drugs, he gets "hooked" on them too, somewhat as the addict gets hooked on heroin. Mixtures of "uppers" and "downers" (amphetamines and phenobarbital or other barbiturate) are commonly sold under the designation of "goof balls", which are highly toxic — and addictive, but the housewife can achieve a similar "goof ball" effect by titrating herself "up" and then "down" in her kitchen.

The consequences of another common practice are highlighted by the above. If you drink a glass of an alcoholic beverage you have, in effect, taken a weak "upper" and a moderate "downer". Add to this effect of the alcohol a dose of a barbiturate to "help you get off to sleep" at night. The barbiturate is a strong "downer" and a weak "upper". However, the two together potentiate one another strongly, increase their toxic effects and produce addiction. That is, the two substances separately produce a much weaker effect than the two substances together— their sum properties are much greater together than when taken singly. And, of course, they produce dependence by possessing paradoxical properties.

It takes an experienced pharmacologist to predict what the effect of two drugs taken together may be. It is relatively easy to predict the outcome of, say, giving one drug of known properties. But two or more drugs taken together present much greater problems. Hence the great danger of buying drugs "cut" or "laced" with other unknown drugs on the black market.

Other Books

by Dr. A.E. Wilder–Smith

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A comprehensive presentation of the facts about this plague: it's discovery, it's spread throughout the world, medical effects of the disease, and the efforts to combat the disease and the politics involved.

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The Day Nazi Germany Died Beate Wilder–Smith BW001

This is an autobiography by Beate Wilder–Smith, Dr. A.E. Wilder–Smith's wife. Beate was an eyewitness to the Allied & Russian invasion of Nazi Germany during World War II. Mrs. Wilder–Smith was a member of a clergyman's family... just a teenager at the time, living in a clerical home.

ABOUT THE AUTHOR

A. E. Wilder-Smith studied natural sciences at Oxford, England. He received his first doctorate in Physical Organic Chemistry at Reading University, England, in 1941. During World War II, he joined the Research department of ICI in England. After the war, he became Countess of Lisburne Memorial Fellow at the University of London. Subsequently, Dr. Wilder-Smith was appointed Director of Research for a Swiss pharmaceutical company. Later he was elected to teach Chemotherapy and Pharmacology at the Medical School of the University of Geneva for which position he received his "habilitation" (the senior examination required for professorial appointments to European continental universities). At Geneva, he earned his second doctorate, followed by a third doctorate from the ETH (a senior university in Switzerland) in Zuerich.

In 1957 - 1958 Wilder-Smith was Visiting Assistant Professor at the Medical Centre of the University of Illinois, 1959 - 1961 Visiting Full Professor of Pharmacology at the University of Bergen Medical School in Norway. After a further two years at the University in Geneva, he was appointed Full Professor of Pharmacology at the University of Illinois Medical Centre. Here he received - in three succeeding years - three "Golden Apple" awards for the best course of lectures, together with four senior lecturer awards for the best series of senior year lectures.

Wilder-Smith is also a well known speaker on many other topics. He is Author and Co-Author of over seventy scientific publications and more than thirty books which have been published in some seventeen languages. His "Man's Origin, Man's Destiny" and "The Creation Of Life" are Christian classics. Other books authored by him include "AIDS: Fact Without Fiction", "He Who Thinks Has To Believe", "Is This A God Of Love?", "The Natural Sciences Know Nothing of Evolution", "The Scientific Alternative to Neo-Darwinian Evolutionary Theory", "Why Does God Allow It?!", "Baptism and it's Influence on Christian Devotion", and "The Time Dimension: It's Relationship to the Origin of Life".

The film series "Origins", which enjoys great popularity in many countries was produced by Dr. Wilder-Smith. He has also produced two new films in the "Origins" series - one on Thermodynamics, and another on Information Theory.

Dr. Wilder-Smith's last Golden Apple award was inscribed, "He made us not only better scientists, but also better men."

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