

A CHEMISTRY FOR WORLD PEACE

William H. McGlothlin

This paper presents an argument for research into the means of altering individual attitudes, values, and communication abilities in the direction of increased social empathy, which, in turn, would produce a more favorable environment for resolving differences and facilitate peaceful negotiations between individuals and nations. It is proposed that prior research with the drug, d-lysergic acid diethylamide (LSD), shows sufficient promise in producing relatively long-lasting changes in the above areas to merit further research. Furthermore, the use of LSD has been demonstrated to be quite safe under supervisory conditions, i.e., the guided "trip." LSD is also non-toxic and non-addictive.

A brief history of psychedelic drugs is provided along with a description of their psychological effects. Some possible modes of action are discussed. LSD and other psychedelics are seen as possible means of tapping mental resources which are not ordinarily available, but which may be of great value to the individual and ultimately to the society.

William H. McGlothlin, Ph.D., 1924-1980, was born and raised in Tennessee. He was graduated from the University of Chicago, and subsequently earned master of arts and doctor of philosophy degrees in psychology from the University of Southern California. His early work involved the application of sophisticated statistical techniques and models to a variety of subject matters. His doctoral dissertation on gambling—"Stability of choices among uncertain alternatives"—became a classic in the field of decision making. From 1954 to 1966 he was employed by the RAND Corporation where he carried out research in a variety of topics ranging from national defense to drug abuse. In September, 1966, he joined the UCLA faculty where he held professional rank in the Departments of Psychology and of Psychiatry and Biobehavioral Sciences. His work at UCLA was supported for the past decade by a Research Scientist Award, first from the National Institute of Mental Health, then from the National Institute on Drug Abuse.

McGlothlin's best known work was on the psychological effects of psychotropic drugs, and their social implications. He studied many aspects of LSD, including both immediate and long-lasting effects, the role of subject expectation on drug experience, and medical consequences of LSD use on pregnancy, chromosomal patterns, and cognitive functioning. His work on cannabis was also distinguished, and included epidemiological research, investigation of auditory and visual effects, and studies of social policy issues related to the use of marijuana. Recently his research centered on opiates, including various patterns of use in Eastern and Western cultures, and the relative utility of different types of control policies, such as heroin and methadone maintenance programs and civil commitment.

Perhaps, McGlothlin's most remarkable contribution to the field of drug abuse was to bring objectivity to a field often characterized by speculation, opinion and hyperbole. His reasoning was consistently clear, thoughtful, original, persuasive, and influential. In addition to the fine example he set, his gifts as a mentor included a refreshing straightforwardness, a high notion of excellence, great personal warmth, and a quality of integrity that never wavered.

McGlothlin is survived by his wife Katherine and sons Russell, 8, and Robert, 6.

An earlier version of this paper was written while Dr. McGlothlin was with the Rand Corporation. He had worked on it intermittently in subsequent years and had not yet completed it to his satisfaction at the time of his death. Posthumous editing for this theme issue of *JDI* was completed by Richard Wilmot, guest editor of *Drugs: Euphoria and Aphrodisia*.

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No attempt is made in this paper to discuss how the use of a drug such as LSD might be implemented in international peace negotiations. It is contended, however, that results of previous experiments demonstrate increased tolerance for opposing viewpoints, increased understanding, and increased social empathy. It would be very important, based on the above findings, to explore the potential psychedelic drugs may have in reducing the threat of nuclear war.

Introduction

The recent resumption of nuclear arms proliferation particularly by the United States and the Soviet Union is frightening evidence that the arms race is proceeding at a rapid pace. Efforts to achieve a rational solution to this problem of human survival flounder in a state of incredible ineptness. The amount of disarmament on both sides shows the achievement of this end to be extremely meager. Furthermore, an examination of the negotiation transcripts reveals such a general state of distrust that it seems unlikely that either side is able to communicate its views to the other, let alone arrive at an agreement. Diplomats still have the Machiavellian orientation of placing themselves at an advantage—a no-win situation in which either side can annihilate the other regardless of slight gains on either side. Many defense analysts conclude that the nuclear arms race is inherently unstable, and if continued, will certainly end with catastrophe. Furthermore, arms control efforts, as they are currently conducted in terms of military strategy, have little chance for success. In this light several proposals have been initiated in undertaking research on non-military negotiation programs aimed at reducing hostilities and nuclear brinkmanship, and creating peaceful and friendly relations between all nations. To this end research in social psychology and social psychopharmacology should be directed.

What should be the goal of such research? The ultimate goal, no doubt, should be nuclear disarmament and the means of enforcing it. Before this occurs, however, communication must be enhanced between antagonists. Peoples of opposing ideologies must be able to exchange views in a supportive environment which will facilitate alterations in basic values on both sides. Ideological dogmatism must be reduced in favor of human survival. The "good guy"- "bad guy" approach needs to be supplanted by a rational evaluation of survival. We have become very sophisticated at computing the destructive capacity of megaton nuclear weapons and the different thickness of concrete necessary for "protection," we have not devised analytical methods for evaluating the proper allocation of protection from fallout and neighbors competing for the same survival shelter.

Basic research into survival should attempt to find means of attaining world peace, rather than computing possible losses. It amounts to bridging the gap between our technical-scientific position and our level of social maturity. Some author-scientists such as Carl Sagan (1980) believe that if we cannot overcome the cultural lag between our technology and our consciousness, we will be condemned to extinction.

What are the tools available to approach such a task? Cultural exchange is the first answer. However, the type of exchange necessary to produce such social rapport between diverse cultures is much too slow for the pace of nuclear

armament. Religion is a second possibility. All the major religions of the world including the secular religion of communism teach an idealized peace, but in practice they are full of contradictions. Christianity, for example, teaches a pacificity that goes beyond tolerance: *to turn the other cheek when struck*. True Christian practice would require total disarmament regardless of what the other side did.

Another interesting discrepancy existing in Christianity is the tendency on the part of its members to score relatively high on scales of dogmatism. In fact recent television evangelical crusades propose that nuclear armageddon is imminent and certain. Television evangelist Jerry Falwell calls nuclear freeze advocates "Freezeniks," and Jimmy Swaggart preaches on "the coming war with Russia" based, he claims, on Scripture. Let us hope their "prophecy" does not become self-fulfilled.

The central tenet of this paper is that open communication and a reduction of fear, distrust, and dogmatism is crucial to achieving world peace.

The solution of Aldous Huxley in "Brave New World" is admittedly science fiction, i.e., giving the populous a drug to create the desired state of social maturity. Incredible as it may seem, it is just such a proposal which I shall argue has sufficient promise to merit serious research.

Psychopharmacology has made very rapid progress in recent years. The discovery of tranquilizers has had an acknowledged effect on reducing the population of mental institutions. Although there has been some well deserved criticism of providing drug therapy as a "quick-fix" solution to mental illness, there is every indication that we are on the threshold of a new frontier in psychopharmacology and transforming consciousness for the benefit of all.

The discovery of the potent psychic effects of d-lysergic acid diethylamide (LSD) had stimulated widespread research until the government curtailed research on LSD in the United States. Although previous research was in areas other than nuclear disarmament and world peace, there is considerable evidence that LSD is effective in facilitating attitudinal change and stimulating social empathy.

For purposes of clarity, I should like to stress three points at the outset. First, I am going to discuss the possible use of certain drugs to enhance social insight and understanding. They *do not* produce a dulling or tranquilizing effect as does alcohol or the barbiturates. Second, I shall be concerned with their potential use for benign and beneficial social change in terms of attitudinal change. Third, I hope to show how such social insights and attitudinal change can be used to create a more favorable environment for communication, empathy, and negotiation. I will not discuss specific implementation of such a program in this paper.

History

The drugs which are of interest in this paper have been most commonly referred to as "the hallucinogens." While it is true that one of their most characteristic features is the producing of striking and colorful mental pictures or visions, these drugs are more accurately described as *illusiogens*, since very rarely do subjects interpret the visions as real, as in the case of a true hallucinatory state. They have also been called psychotomimetic agents in the sense that they tend to produce some reactions which occur in natural psychosis. However, since the range of mental phenomena stimulated by these drugs is so much wider than illusions or mimicking psychosis, Osmond (1957) has proposed the term "psychedelic" which means "mind manifesting" or the ability to produce a heightened degree of perception which is normally unavailable.

A very large number of psychoactive drugs will produce marked mental changes when given in sufficiently large quantities. LSD is given in such minute doses that it is non-toxic. LSD is also metabolized through the body and eliminated *before* its major mental effects begin. Osmond has attempted to limit psychedelic drugs to the following: "substances which produce changes in thought, perception, mood, and sometimes posture, occurring alone or in concert, without causing either major change in the automatic nervous system or addictive craving." This definition excludes all anesthetics, hypnotics (such as alcohol), tranquilizers and barbiturates, derivations of morphine, and cocaine, and the amphetamines. It includes LSD, Mescaline, Psilocybin, and other naturally occurring psychedelic substances including marihuana.

The recorded use of these drugs is very long, and according to Janiger, (1959); and Schultes, (1969) begins with Soma, now known as the mushroom *Amanita Muscaria* (Wasser, 1967; Wasson, 1967) which is commonly called "fly agaric." It is mentioned several times in the Vedic Scriptures of the Hindu Religion, and was used in religious ceremonies in ancient Russia, India, and Asia as a sacrament.

Marihuana and hashish (the more potent form) has almost equal antiquity being recorded as used in China in 2700 B.C. The Hindus termed it "the heavenly guide" (Snyder, 1972). The use of this drug was primarily confined to Asia until it was introduced to 19th century Europe mostly by way of the Napoleonic Wars. The drug became so popular with French soldiers stationed in Egypt, that Napoleon gave orders for all French soldiers not to smoke hashish. However, the practice spread to Europe where descriptions of its effects were recorded by noted literary figures such as Baudelaire, Dumas, and Gautier. The first comprehensive theory of psychopharmacology was laid down by J. J. Moreau de Tours in the 1840s in France by experimenting with hashish on both himself and his students. In the United States, however, marihuana was regarded as a menace after efforts of "moral entrepreneur" Harry Anslinger, the 1930s Commissioner of Narcotics, made it so.

Yet there is a long tradition in America not to tolerate any drug use. While Puritan Pilgrims on the East Coast of the United States fined people for being drunk in their own homes, the Spaniards who invaded Mexico waged a "holy war" against three different psychotropics. The first: *Oloiuqui* is the "morning glory" seed which contains the active ingredient LSD; the second, *Teonanactl*, "flesh of the gods" is the mushroom from which psilocybin is extracted; and the third, and perhaps the best known, *Peyote*, a small cactus whose active ingredient is mescaline. The only "sacrament" the Spanish would tolerate was the Catholic Eucharist, i.e., holy communion. That the native Indians should have their own "flesh of god" was anathema and heresy to the Catholic Spanish. With the characteristic intolerance that follows any religious dogmatism, the Spanish immediately set about eliminating the use of these plants, believing their properties to be signs of "devil possession" (Crahan, 1969) (Schultes, 1979).

The Indians were not easily dissuaded and continued to conduct their secret vision producing rituals even after they were overtly "Christianized." The sacramental use of "peyote" is presently incorporated in the Native American Church and used among the Indians both of the American Southwest and Mexico. Several investigations, including a congressional hearing, have been conducted in this country in an attempt to outlaw this ritualized use of peyote. Christian evangelism has been the force lobbying for this prohibition. They have been singularly

unsuccessful in proving that its use is detrimental. Rather, considerable evidence exists that it is the most effective means in reducing alcoholism among Native Americans—one of the several scourges the Indians have “inherited” from white society (Slotkin, 1956).

In the latter part of the 19th century, the effects of peyote attracted the interest of several anthropologists and initiated scientific investigation including those of Weir Mitchell (1896) and Havelock Ellis (1898 & 1902). These men and others described the drug-induced sensations in great detail. Some time later, chemists found the active ingredient to be mescaline and were able to synthesize it. The same is true of psilocybin from the mushroom, *Teonanactl*. More recently, the mental effects of mescaline have become widely known through the work *Doors of Perception* by Aldous Huxley (1954). There have also been a number of experimental investigations of its use in psychotherapy (psycholytic doses) and in the study of creativity. This research, which began around the mid-1950s, progressed rapidly until the early 1970s when “yellow-press-abuses” of all psychedelics in general, and particularly LSD, curtailed further government sponsored research. Currently there is no LSD research of which I am aware.

LSD

LSD was partially synthesized in 1938 by the Swiss chemists, Stoll and Hoffman. Its hallucinogenic properties were accidentally discovered by Hoffman in 1943. Hoffman (1955) reports that while working in the laboratory with LSD, he became strangely “ill” and notes the following: “I was seized by a peculiar sensation of vertigo and restlessness. Objects as well as the shape of my associates in the laboratory, appeared to undergo optical changes. I was unable to concentrate on my work. In a dreamlike state I left for home . . . a physician was called . . . (I) fell into a peculiar state of drunkenness characterized by an exaggerated imagination. With my eyes closed, fantastic pictures of extraordinary plasticity and intensive color surged through me. After two hours, this state gradually subsided. . . .” Hoffman recalls later that after the initial anxiety of not knowing what to expect, his next “trips” were ecstatic (1968).

Hoffman was later able to set the effective dose limit as low as 10–20 micrograms (mcg.). Doses in this low range, not usually above 50 mcg., are used in psycholytic psychotherapy that makes use of LSD in therapeutic encounters. Other psychedelics require much higher dosages. Mescaline, for example, requires a dosage 10,000 times that of LSD to produce a psychic effect.

Since its serendipitous discovery, more than 1,000 papers have been published on LSD. This unusually wide interest was largely stimulated by hopes of producing a model reversible psychosis which would be helpful in the study of normally occurring schizophrenia. Research has generally concluded that LSD is a strong serotonin inhibitor. Serotonin is a naturally occurring neurohumor which is believed to operate during perception so as to screen-out non-essential or unfocused sensations. Serotonin is probably active during all stages of learning and socialization experience. Such theorizing has led to the hope of discovering a chemical basis for psychosis. However, such a discovery has not yet been found (Trulson, 1976; Jacobs, 1979).

The Use of LSD in Psychotherapy

Observations that LSD inhibited defense mechanisms and facilitated self-

insight led to investigations of its use in psychotherapy (Bush, 1950). Frederking, in Germany, used both LSD and mescaline and found they aided in psychoanalysis (1953 and 1955). He strongly recommended that therapists using LSD should study the effect of high dosages on themselves prior to using it in therapy. Since these early studies, there have been many articles published concerning the use of LSD in psychotherapy, and most of these conclude that it is a valuable aid for doing therapy with psychoneurotics, but the results with psychotics have been considerably less promising. I shall briefly review some of this work since, of the published literature on LSD, it is the most closely related to the subject of this paper.

There is a general agreement that LSD is not successful in the treatment of chronic psychotics (MacDonald, 1956). Withdrawn patients can often be contacted with the drug, but the change is usually of short duration. The more agitated psychotics frequently react to LSD with an intensification of their symptoms, as opposed to the normalizing effect of chlorpromazine. Some investigations have found a combination of mescaline and chlorpromazine useful in the treatment of acute psychosis in the early stages (Denber, 1955).

Psychoneurotics are reported to show improvement much more rapidly than with conventional therapies. Sandison worked extensively with neurotics in England, using low dosages of 25 mcg. initially, with weekly increases up to 100-200 mcg. (1954, 1957). Therapy was done in a hospital setting with a special ward reserved for LSD patients. He stressed the importance of the setting, and the helpfulness of nurses and other aides having had personal LSD sessions. In one study, he reported on 94 chronic neurotics showing 65 percent improvement after follow-up periods of six months to five years. Eisner and Cohen (1958) treated 22 patients with an average of four to five weekly LSD sessions, also using the low initial dose with weekly increments. They report 73 percent improvement based on follow-up interviews ranging from six to 17 months. The improvement criterion was success in behavioral adaptation as judged by therapists, patient, and person closest to the patient. Chandler and Hartman (1960) rated the improvement of 110 patients on an eight-point scale and found, after an average of 6.2 sessions, that 66 percent showed considerable improvement with 46 percent showing marked or outstanding improvement. The dosage and criteria were similar to those of Eisner and Cohen.

Most therapists have maintained that it is essential that LSD be administered in a therapy setting, and that sessions should be interspersed with non-drug therapy, where the material uncovered by the drug is to be discussed and interpreted. Some have used small dosages of LSD to eliminate blocks in conventional therapy.

On the other hand, a few therapists have claimed a high degree of success with only minimal therapy in addition to LSD. Van Rhijn (1960) in Holland, used large initial dosages of 200-400 mcg. administered in a completely dark room containing the patient and a passive "sitter." He normally gives only a single session with very little subsequent patient-therapist contact.

Some Canadian investigators have employed a single session with minimal additional therapy, utilizing dosages of 400-500 mcg. (Maclean, 1961). In a sample of 61 alcoholics and 30 other psychoneurotics, they found that 49 percent of the alcoholics and 56 percent of the others were much improved after follow-up periods ranging from 3 to 18 months. Two other Canadian studies have found similar

results with alcoholics using a single session of 200-400 mcg. of LSD or .5 gram of mescaline (Smith, 1958; Chewels, 1959). It will be mentioned in another subsection that 67 percent of Ditman and Hayman's (1962) alcoholics claimed some improvement in drinking behavior resulting from a single LSD session, although no therapy was intended in this study and the dosage was only 100 mcg.

The role of the transcendental or mystical experience in LSD therapy is of interest. Several therapists have failed to observe, or at least report, this type of phenomenon in their patients. Others regard the integrative effect resulting from these experiences to be one of the most important aspects of LSD therapy. Terrill reports, "One of the most intriguing aspects of the use of LSD in psychotherapy is that when positive changes have occurred they often seem to have occurred in terms of the person's value system rather than in terms of revived memories, interpersonal insights, and the like, as is usually the case with more traditional forms of psychotherapy. Such changes are apparently in the direction of a higher valuation of esthetic, creative, philosophic, and perhaps even religious interests" (1960). The incidence of transcendental experiences appears to be greater with the higher dosages. Also, the orientation and methods of the therapist are very important in determining the content of the LSD experience (Savage, 1960; Leary, 1967; Clark, 1967; Pahnke, 1970).

In general, the literature on the use of LSD in psychotherapy is rather difficult to assess because of the wide difference in types of patients, methods, number and size of dose, and criterion for evaluating the results. It appears, however, that as in other forms of psychotherapy, those patients who are strongly motivated to change receive the most benefit, while those with personality difficulties do not have a good prognosis (Sandison, 1956).

The LSD Experience

The physical and mental effects of LSD on human subjects have been described many times in the literature. There is a general agreement among experimenters that certain physical and perceptual changes frequently occur; however, there is much less agreement on the occurrence of some of the more profound mental experiences. Some of the early investigators were impressed with the high frequency of paranoid reactions to LSD. Subjects became highly suspicious that various diabolical tricks were being perpetrated on them. Other experimenters have worked with large samples of subjects and reported very few paranoid reactions. Some workers have indicated that the recall and re-experiencing of previously repressed childhood incidents is quite common while others have found such experiences considerably less frequent. Several investigators have observed that those subjects who have religious or mystical experiences under LSD also report a high incidence of lasting beneficial effects (Smith, 1967); however, the percentage of subjects attaining such states varies quite widely among experimenters.

More recently, it has been realized that there are several important variables which help determine the content of the LSD experience. The personality, the defense system, and the motivation of the subject play major roles; the attitude of the experimenter is of almost equal importance. The overly-controlled individual, who has only an intellectual curiosity about the drug's effect, is likely to experience minimal psychic changes and runs a good chance of acute anxiety, nausea, and other unpleasant physical symptoms. The person who is interested in

using the drug to facilitate personal insights is more likely to report a pleasant and beneficial experience (McGlothlin, 1967).

If the person administering the drug is supportive and had himself experienced a wide range of LSD effects, he will tend to allay anxiety on the part of the subject and will substantially increase the probability of attaining a maximum effect. If the experimenter adopts an impersonal probing method, the subject is apt to become acutely anxious and exhibit anger and paranoid reactions. Some investigators have stressed the importance of a pleasant environment with background music and the prevention of intrusions.

Several authors have remarked on the impossible task of communicating the LSD experience to persons who have not experienced it. Janiger writes, "Understanding, at best, derives from the communality of the experience, where feelings and impressions are cached when words have lost their meaning" (1959). Cohen remarks, "Any attempt to communicate the total LSD experience will surely fail. Much of it occurs on a non-verbal level and . . . furthermore, it is so foreign to everyday existence that our vocabulary is lacking in words to describe precisely even that which could be described" (1960).

Bearing this in mind, I shall nevertheless attempt to provide the reader with some of the components of the experience. LSD is normally given orally following at least four hours of fasting. The dosage reported in the literature has varied from 10-1500 mcg., with the most frequent size being around 1 mcg./kg. of body weight. Janiger reports that the psychological effects are reinforced as a function of dose size up to 75-125 mcg. (1959). Most investigators have worked with the lower dosages (25-100 mcg.); however, some report a higher incidence of the more marked psychic effects with dosages of around 200-400 mcg.

Physiological effects are minimal compared with the psychological. Pupillary dilation is the most consistent; and a slight rise in blood pressure is common. Slight increases in body temperature are usually noted with the lower doses while decreases in skin and body temperature were observed at dosages of 8 to 16 mcg./kg. of body weight. Respiratory and blood chemistry changes are minimal. Nausea is rare except with very high dosages.

About 30 minutes after ingesting LSD the subject normally experiences a feeling of dizziness or intoxication. One of the most common early emotional reactions is smiling and laughing, which sometimes develops into uncontrolled laughing and/or crying. With closed eyes there is a lightening of the normal gray-black expanse and almost invariably colorful and luminous geometric designs appear in the field of vision. They may change into architectural structures which frequently are in very saturated colors and appear to be glowing from an internal light (Wallace, 1969).

With the eyes open numerous perceptual changes are observed. Cohen writes, "An intensification of the beauty and meaning of everyday things can be impressive enough to make one assume that this is how certain artists must have seen commonplace objects. Everything glows with a luminescence of its own and texture becomes three-dimensional. There is a tendency to dwell on the minute, a fleck on the wall, the grain in a piece of wood. Objects develop a significance far beyond their ordinary meaning. The 'breathing' of manifestly inanimate objects is one of the more common illusions. Flowers open and close before your eyes. Wood paneling goes in and out of focus as though the fine adjustment of a microscope were being manipulated. Misperceptions may be more complex. A face can rapidly

alter its expression and appearance so that a succession of changing faces are perceived" (1960).

Auditory sensations are also enhanced. Noises which are ordinarily ignored may become very irritating. Music is generally heard in a new dimension and with greater appreciation.

Subjects usually report food tastes flat and appetite is generally diminished although marked increases have been noted. Intellectual function is slightly impaired—one study showing a mean drop of 9 points on I.Q. tests (Cohen, 1958). The drop was primarily in the abstract reasoning portion of the test. Subjects typically remain quite alert to their surroundings and fully aware that the phenomena they are experiencing are drug induced. Sleep has been only rarely reported. A very common report is that thoughts appear with an unbelievable rapidity, or that there are lightning shifts in the frame of reference in which an issue is examined. Almost invariably the thoughts and visions come in a wave-like fashion. The impression of reliving the experiences of a lifetime in a few moments is sometimes reported.

Many subjects tell of changes in body image or self-concept. They may feel that their feet are far away or one side of the body may appear to be longer than the other. When looking in a mirror the face takes on a wholly different appearance and, on continual staring, changes into a multitude of shapes. A related occurrence is the phenomena of depersonalization. The person may actually feel physically separated from his body, such that he sits in the corner of the room and observes himself on the couch. This is very similar to several reports of pilots flying at very high altitudes in which they seem to be outside the cabin looking at the shell of themselves on the inside (Jones, 1957).*

More commonly, instead of a physical depersonalization, the LSD subject will report a greatly enhanced ability to view himself in an unprejudiced and detached position, which enables him to gain important personal insight. He is able to see clearly the mechanisms which prevent such an unvarnished self-picture in the everyday, drug-free state.

Probably the most remarkable LSD experiences are those variously described as mystical, transcendental, or cosmic. They bear a close similarity to the very rarely reported spontaneous mystical experiences described by Huxley (1958) and James (1916). The naturally occurring ones are almost invariably strongly religious, particularly in the sudden realization of the presence and reality of God. The LSD-induced experiences may be religious in nature, but they are by no means always such, except possibly when religion is interpreted in the broadest sense. The experience is often described as beautiful, pleasant and integrative—creating a feeling of oneness with the universe; however, it may be a very unpleasant one in which the world appears ugly, drab, and hostile. A frequent description is of a struggle to find one's place in the universe. Sudden visions are often presented in the form of opposites or paradoxes with such impact that their reality defies questioning.

For example, man may be seen as constantly attempting to survive as an individual in an environment where struggle for physical survival is replaced by the seeking of status and possessions which will isolate the "I." Then suddenly the picture changes and the desperate need for companionship appears. He realizes that the struggle to create an island about himself results in aloneness and unhappiness, but he nevertheless seems to be irrevocably committed to this course

by a stronger, evolutionary force. This is but one of a seemingly infinite variety of universal-type insights into the nature or meaning of life that are reported. Paradoxically, this type of experience is usually claimed to have been beneficial by the subject, regardless of whether it is described as pleasant or unpleasant in nature. I shall have more to say about this subject in a later section, since it appears that this, together, with the achieving of personal insights into one's own behavior, seems to have the most lasting effect—which is the subject of primary interest in this paper.

Another LSD phenomenon which is of interest is the tremendously enhanced sensitivity of the subject to a wide range of non-verbal cues from those around him. Cohen writes "(the LSD subject) can sense the therapist's unspoken feelings with phenomenal accuracy" (1960). Subjects often report that they are amazed at their sudden ability to receive these cues after an LSD session. It is as though they had recaptured a facility they had as a child which had since been blunted in the adult world. This feature of the LSD experience is subject to a fairly rapid decrement within a few days, but possibly enough of it is retained to account for the claims of improved social relations which will be discussed in the next section.

Changes Resulting from the LSD Experience

The effect of LSD, as described in the previous section reaches a height in 2 to 4 hours and is essentially over in twelve. Almost everyone who takes LSD finds it a fascinating experience for which it is difficult to find adequate superlatives. In one study, 49 percent of the subjects checked the descriptive statement, "The greatest thing that ever happened to me (Ditman, 1962). Admittedly, then, it is a great experience, but are there any lasting effects such as changes in values, attitudes, communicative ability, and social insight?

If proven effective, this would, of course, be an important use; however, for this type of drug to have a promising role in the present context, we must show indications that (1) it is capable of producing the desired changes in human behavior with minimal preparation and (2) it is effective with so-called normals, persons who are not patients, actively seeking a cure or solution to their mental and emotional problems. There have been a number of LSD studies conducted with normals for various purposes, and some of these have remarked that the participants claimed they had obtained definite lasting benefits from the experience. Rinkel (1955, 1956) reports that many nurses and other normal subjects who participated in LSD experiments proved more effective in their hospital jobs and reported better adjustment. Abramson (1956) writes that when LSD was used in group studies (not intended as therapeutic) it led to insight and better adaptive techniques both at work and in community activities. Terrill (1960) reports beginning a study using LSD in personality evaluation; but when his subjects (mainly professional volunteers) so frequently claimed increasing feelings of well-being and confidence, as well as lasting insights, the study was broadened to investigate the psychotherapeutic use of the drug with psychiatric patients.

Ditman and Hayman (1959) conducted an experiment on 87 subjects consisting of both normals and patients (mostly alcoholics) to compare the LSD experience with that of delirium tremens. They were impressed by the numerous subsequent claims of benefit from the subjects and decided to administer a lengthy follow-up questionnaire covering social, economic, and psychological areas (1962). The

results of the questionnaire are of particular interest to the present subject so I shall report them in summary form here.

Three-fourths of the subjects received only a single LSD dose of 100 mcg.; the others had 2-4 doses. Of the 87 subjects, the questionnaires were completed by 74. The interval between administration of LSD and the questionnaire ranged from 6 months to 3½ years. Of the 74 returns, 40 were from patients receiving psychological or psychiatric treatment, 27 of which classified themselves as alcoholics. Of the 34 normals, about one-third were psychotherapists.

Improvement in excessive drinking behavior was claimed by 67% of the alcoholic group. On a second questionnaire, administered only to the alcoholics approximately 3½ years after their LSD experience, "about one-third of the 16 returns still claimed abstinence ranging from 1 to 1½ years, and three-fourths of these subjects still claimed some lasting benefit (fewer arrests, increased self-understanding and esthetic interest), but none of the subjects had maintained their sobriety to the time of the second questionnaire."

The following results were extracted from the table giving the percentages of claimed improvements attributed to the LSD experience for the 74 respondents.

<i>Item</i>	<i>Percentage</i>
Changes noted by the person closest to you (better)	42
Comfort with people (more)	37
Changes in "perspective"	
Deeper significance to things	46
Things seem more real	40
Changes in attitudes	
More tolerant	40
More accepting of ideas and viewpoints formerly rejected	38
More broadminded	37
Less irritable or easily annoyed	33
Changes in sense of values	47
Was of temporary benefit	55
Was of lasting benefit	50
Gave great understanding into self and others	54

Seventy-two percent of the respondents described the LSD experience as very pleasant and 66 percent felt it was an experience of great beauty. In general, the patients tended to claim somewhat greater benefits than did the normals.

In addition to the data shown above, I was fortunately allowed to extract some data out of 194 similar questionnaire returns from Dr. O. Janiger's files. This sample represents approximately 70 percent of the subjects who were asked to complete the questionnaire. Of the 194 subjects, 73 were undergoing psychotherapy and took LSD an average of 3.6 times as a therapeutic aid. The remaining 121 subjects were volunteers and averaged 1.9 sessions. The average interval

between the administration of LSD and the completion of the questionnaire was ten months and the average maximum dosage 171 mcg.

The following is a summary of the percentage of subjects making claims of change attributable to LSD.

<i>Item</i>	<i>Percentage</i>
Major objective change (job change, marriage, divorce, etc.)	16
Positive change in interpersonal relations	41
Positive change noted by person closest to you	45
Value changes; money, status, human relationships, etc.	48
Percentage of subjects who described the LSD experience as:	
Very pleasant	66
Would like to try again	74
Religious	24
Gave great understanding of self and others	61
Feel experience was of lasting benefit	58
Percentage of subjects who felt LSD should be used in:	
Becoming aware of self	75
Gaining new meanings to life	58
Getting people to understand each other	42

Some subjects may have a bias to answer questions in a manner to agree with his concept of the investigator's position. Also, questionnaires are particularly vulnerable to the halo-effect, i.e., the generalizing of the extraordinary LSD experience to claims of change in areas which are not necessarily supported by corresponding behavioral changes. However, the claims in both studies were at least partially corroborated by the evaluation of the "person closest to the subject." Finally, there is the bias of the sample of subjects participating in the studies. They were largely volunteers and, therefore, could be assumed to have a higher degree of motivation than could be expected in the general population. Nevertheless, the findings that approximately 40 percent of the subjects felt, as a result of the LSD experience, they were more tolerant, broadminded, and acceptant of ideas and viewpoints previously rejected would seem to indicate that further research in the use of LSD to enhance communications is desirable. In this context, it is interesting to note that 42 percent of Janiger's subjects felt LSD should be used in getting people to understand each other.

For the purpose of the present paper it is important to investigate the longevity of beneficial claims resulting from LSD. In general, those persons for whom the interval between LSD administrations and the completion of the questionnaire exceeded one year claimed benefits about two-thirds as frequently as did those for whom the interval was three months or less. Positive replies to the question pertaining to increased interest in universal concepts, meaning of life, etc., were strongly related to claims of lasting benefits and value changes. This tends to support the findings of several other investigators that beneficial claims are more frequent for those persons having transcendental type LSD experiences (McGlothlin, 1967, 1971).

Side Effects of LSD

An important consideration in the use of LSD is the possible side effects and complications. Cohen has published a thorough study on this subject, giving the results of a questionnaire from 44 investigators (Cohen, 1960). It involves almost 5000 individuals who received LSD or mescaline on more than 25,000 occasions. The number of sessions per individual ranged from one to 80, and the LSD dose size from 25–1500 mcg.; that for mescaline from 200–1200 milligrams. Major adverse reactions are very rare as indicated by the following table taken from Cohen's study.

Estimated Rates of Major Complications Associated with LSD

	<i>Attempted Suicide</i>	<i>Completed Suicide</i>	<i>Psychotic Reaction over 48 hours</i>
Experimental Subjects	0/1000	0/1000	0.8/1000
Patients Undergoing Therapy	1.2/1000	0.4/1000	1.8/1000

No serious, prolonged physical side effects have been found, and no instance of physiological or psychological addiction to LSD was reported. Cohen writes, "Physiological addiction is unlikely because of the extremely rapid onset of tolerance." Abramson found that tolerance to LSD was generally lost in 3–5 days but lasted as long as 8 days in some subjects (Abramson, 1956).

Minor adverse reactions were more frequently reported, the most common being short-lived depressions. Occasionally there are panic reactions during an LSD session and frightening or unpleasant episodes are often reported. Should these reactions become too prolonged or severe they can be rapidly terminated by LSD antagonists, such as chlorpromazine. Normally, the drug effect is completely over in 24 hours; although, there have been a few reports of prolonged LSD states lasting into the next day. As seen in the above table, however, psychotic reactions lasting more than 48 hours are very rare.

Cohen concludes that "with proper precautions (LSD is) safe when given to a selected healthy group." Precautions include the exclusions of detectable psychopathologies and the constant attendance of a trained and sympathetic person capable of providing reassurance during the active phase. Experimental subjects can be released to a friend or relative 6–8 hours after drug intake, but they should not drive for 24 hours. In addition to Cohen's study, Sim reports on the very large sample of Army LSD subjects as follows: "Every one of the exposures reported in this paper, and about which the author has personal knowledge, was followed by complete recovery" (Sim, 1961).

Discussion

In the previous section I have attempted to show:

1. There is considerable evidence that LSD is capable of producing fairly long-lasting, favorable changes in the areas of communication, attitudes, values, and general social insight;
2. A remarkably high percentage of normal subjects have claimed these types of changes after a single LSD session, with very little or no additional formal therapy; and
3. There is a wide amount of experience with LSD, showing it to be quite safe, especially with normals.

In addition to these arguments that LSD is effective, fast, and safe, it is usually enthusiastically endorsed by subjects as being a pleasant and richly-rewarding experience. On the other side of the ledger, subjects lacking personal motivation for taking the drug tend to claim fewer benefits from the experience; and in addition, most of the evidence that LSD produces favorable changes is subjective in nature. Nevertheless, I contend that the evidence is of sufficient impact to cause us to seriously consider Huxley's statement regarding these experiences, "the man who comes back through the Door in the Wall will never be quite the same as the man who went out. He will be wiser but less cocksure, happier but less self-satisfied, humbler in acknowledging his ignorance yet better equipped to understand the relationship of words to things, of systematic reasoning to the unfathomable Mystery which it tries, forever vainly, to comprehend" (1954).

Various conceptual models have been suggested to explain the effects of LSD and similar drugs. There have been several physical models which hypothesize the inhibitory effect of LSD on various chemical or electrical activities of the central nervous system, and considerable experimental work has been done on animals in this area. While this is certainly an important approach, the purpose of this paper can be served by a less technical conceptual interpretation.

The most commonly mentioned explanation of this type contends that LSD disrupts the inhibitory functions of the mind. It has long been hypothesized that much of mental functioning is blocked from consciousness by some inhibiting mechanism, and that this has survival value, since it permits the organism to deal more effectively with stimuli coming from the outside world.

It is supposed that LSD at least partially dissolves this mechanism, and for a short time allows the unimpeded flow of psychic processes which are normally suppressed. During the few hours that this condition prevails, the subject is able to view himself and his environment from a new and perhaps much clearer perspective. After the cessation of the drug effect, he is left with this learning experience plus a new awareness of the vast amount of material contained in the mind's unconscious. It seems unlikely, however, that such a short learning experience could produce such drastic changes as are frequently claimed by the LSD subject. It has been shown that LSD is essentially eliminated from the central nervous system even before the maximum psychological effect occurs, some 2 to 3 hours after ingestion (Cerletti, 1956), so long-lasting effects must be explained in some way other than a continuing chemical action of the drug.

Ditman and Hayman (1962) have suggested that the effect of LSD may be similar to that hypothesized by Wallace (1956) to account for sudden and dramatic personality changes observed under naturally occurring stresses. He postulates that there may occur "a massive and sudden mental synthesis of a therapeutic or adaptive character, under more or less extreme stress . . . (with a) partial or total abandonment of certain values and acceptance of others."

Several authors have written of the stress of reaching rock-bottom causing a sudden and lasting break from alcoholism, and the Abramson Canadian group, starting from this idea, have been quite successful in treating alcoholism by producing an "overwhelming experience" with a single large dose of LSD or mescaline. Eisner postulates that the organism has a "health-seeking orientation" and, temporarily freed from the rigidity of certain mental protective mechanisms, it will tend to reorganize in a more effective adaptive fashion. Electro- and insulin-shock therapy might be hypothesized to have a similar mode of action, although

they are much more violent in their physical effect, and consciousness is not maintained, as it is with LSD.

Dramatic objective changes have been noted in the artistic-creative areas as a result of LSD. Sandison reports of one artist who drastically changed her style of painting after taking LSD and these changes have been maintained (1960). Esiner and Cohen (1958) write that in one patient, "previously unsuspected artistic creativity broke through in the form of song writing and a novel of some merit." One of Janiger's subjects (a writer) reports that he wrote and sold four novels after LSD, whereas he had previously been unproductive (Tonini). Ditman and Hayman mention one subject who "even became a minor prophet of sorts." Janiger has given LSD to some 30 artists, writers, and musicians and reports that they almost invariably commented on the similarity of the drug-induced state to the creative feeling, and as a result of the LSD experience, claimed greater insight into the nature of art and the esthetic idea.

The transcendental or mystical experience is one of the most intriguing effects of LSD. As mentioned earlier, this is variously described as "feelings of oneness with the universe" or "seeing the meaning of life," etc. Some authors have treated the LSD transcendental experiences as an all-or-nothing occurrence; however, it may be experienced in various intensities ranging from a glimpse to a full-blown phenomenon which tends to have a tremendous and lasting impact on the subject. The extent to which claims of lasting benefits are linked to these types of experiences as opposed to those of personal insight is unclear. Subjects frequently report both types of experiences, and the two are sometimes fused so as to be indistinguishable. An examination of the subjective reports written by Janiger's subjects revealed that those persons who had marked transcendental experiences tended to claim a wide range of lasting benefits on the follow-up questionnaire.

These drug-induced mystical experiences bear a close resemblance to the very rare naturally occurring ones. James, (1916) who has written the most objective and thorough account of mysticism, finds the experiences sometimes produced by anesthetics (particularly nitrous oxide) to be quite similar to those occurring spontaneously. The modern philosopher and authority on Zen Buddhism, Alan Watts, writes that the LSD experience is quite similar to the mystical states which are sometimes attained by those practicing Eastern philosophies and religions. He notes, however, that by no means all persons taking LSD experience them.

Russell (1925) has examined descriptions of mystical experiences and lists the following as being four of their most common characteristics:

1. Sudden insight or revelation with a sense of certainty;
2. Belief in unity—denial of the existence of opposites; good and evil are one;
3. A denial of the reality of time; and
4. Evil is illusory.

Excerpts from a description given by Janiger are evidence that most of these features tend to occur in the LSD experience: "As you watch this show, you may lose all track of time. A new vista opens up all in a moment, and while you feast upon it 'time stands still.' You have a feeling of 'nowness.' There is no past or future. . . . It is as if you saw a new color, one outside the band of the spectrum people normally see. . . . No amount of logic can refute it. For it didn't come to you via logic, but through direct contact, as if it sprouted within you *sui generis*. At the height of the drug I was really aware of only two things: my own existence and the world of nature which seemed to me beautiful and right! At the very summit of the

drug's effects, there is a feeling of continuum, of flowing: I felt as if we were, as individuals, no more than whirlpools in a river, but whirlpools with wills which can come together and join as one, or disappear and join the river."

The modern, rational man has virtually excluded mysticism from his concept of the mind's function. Reports of spontaneous occurrences of this type are extremely rare and they tend to be accorded the same kind of skepticism as are claims of extra-sensory perception. Modern man accepts an appreciation of music and art as being something outside the rational mind, but the claims of sudden insights and truths which are independent of logic are too much in conflict with the scientific approach for the strongly rational mind to consider. Perhaps a more palatable way of considering the subject is to look at the unconscious portion of the mind as a resource which may be tapped or triggered at times by a drug to increase the total effective power of the mind. This increased "brain power" would perhaps not aid in the solution of systematic logical problems, but then we are doing very well in this area anyway—it is a lack of progress in social understanding and insight that is threatening the survival of the race. William James' observation of his experience with nitrous oxide intoxication describes this viewpoint very well:

"One conclusion was forced upon my mind at that time, and my impression of its truth has ever since remained unshaken. It is that our normal waking consciousness, rational consciousness as we call it, is but one special type consciousness, whilst all about it, parted from it by the filmiest of screens there lie potential forms of consciousness entirely different. We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are there in all their completeness, definite types of mentality which probably somewhere have their field of application. No account of the universe in its totality can be final which leaves these other forms of consciousness quite disregarded. How to regard them is the question—for they are so discontinuous with ordinary consciousness. Yet they may determine attitudes though they cannot furnish formulas, and open a region though they fail to give a map. At any rate, they forbid a premature closing of our accounts with reality." (1916)

Russell (1949) with his characteristic incisiveness, has argued that mysticism cannot compete with science in revealing truths. He discounts such claims resulting from experiences with anesthetics as arising from abnormal physical conditions and as such are abnormal perceptions. "Normal perceptions, since they have to be useful in the struggle for life, must have some correspondence with fact; but in abnormal perception there is no reason to expect such correspondence, and their testimony, therefore, cannot outweigh that of normal perception." Russell wrote this in 1935. In view of his more recent writings (1959) and other activities in the nuclear age, there are indications that he may no longer hold the stage of normalcy in such high regard. In fact, with the present arms race, and with the feasibility of dooms-day machines being seriously discussed, the value of statistical normalcy is certainly open to question.

We have recently observed mass psychosis on a nationwide scale (Nazi Germany), and there are many indications that it may occur on a worldwide basis (Fromm, 1955, 1961). Under such conditions, mass drug therapy is within the realm of possibility. The alacrity with which the public has taken to tranquilizers

would seem to indicate its introduction might not meet with as much opposition as thought. While tranquilizers dull the mind to emotional stresses and conflicts, LSD sharpens the mind and appears to enable closer examination and resolution of the conflicts.

In any event, Russell goes on to state that, while he cannot consider mysticism as a source of truth, the mystical emotion can be of "very great value" to the individual experiencing it. In a similar vein, James draws a sharp distinction between institutional and personal religion, and confines himself to examining the characteristics and benefits of the latter.

Bergson's philosophy (1935) argues for the superiority of the nonintellectual portions of the mind, which he labels "intuition," as a source of true beliefs. He contends that intellect is capable of achieving only relative knowledge, while with intuition it is possible to attain the absolute. Bergson's theory maintains that the intellect is a purely practical faculty developed in the struggle for survival, and it is this value which has led to its ascendancy over intuition with advancing civilization. In countering this argument, Russell admits that intuition "seems on the whole to diminish as civilization increases." He continues, "It is greater, as a rule, in children than in adults, in the uneducated than in the educated. Probably in dogs it exceeds anything to be found in human beings. But those who see in these facts a recommendation of intuition ought to return to running wild in the woods, dyeing themselves with woad and living on hips and haws." However, on the same page Russell writes, "Intellect in civilized man, like artistic capacity, has occasionally been developed beyond the point where it is useful to the individual." This was written in 1914, and its truth is certainly much more in evidence in today's nuclear age.

Ardrey in *African Genesis* (1961) pulls together some anthropological findings in Africa to make a case for man's direct descent from the "killer ape" who was apparently adept at using weapons to bash baboon skulls. He further theorizes man's evolutionary rise was due to his superiority in making and using weapons, which suggests that a dooms-day machine may be the natural result of man's origin. It might not be too bold to suggest that a backward step in evolution with occasional drug-induced mysticism and intuition may be in the interest of *Homo sapien's* survival, if not in the overall evolutionary pattern. We cannot afford to disregard the resources of a large portion of the mind when the stakes are our actual survival.

NOTES

*It has been suggested that LSD might have some use in conditioning space personnel to the phenomena of depersonalization. In view of pilot experiences and similar results from sensory deprivation experiments, it seems likely that this may present a problem in space travel.

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