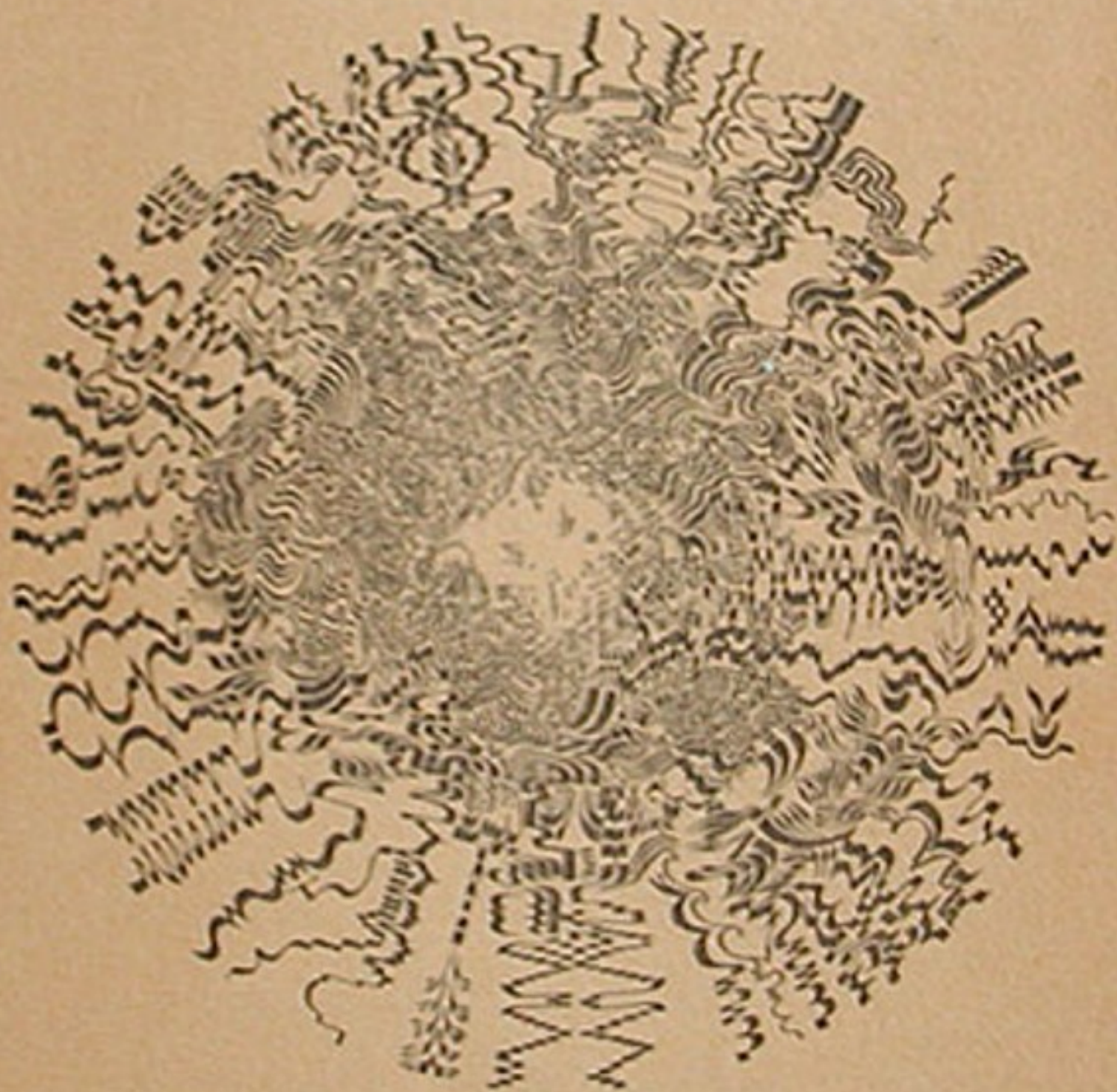


# PSYCHEDELIC REVIEW

1966 / \$2.00  
NUMBER 8



# PSYCHEDELIC REVIEW

NUMBER 8 / 1966

TWO CASES OF ALTERED CONSCIOUSNESS WITH AMNESIA APPARENTLY TELEPATHICALLY INDUCED	Margaret A. Paul	4
THE SECOND FINE ART: NEO-SYMBOLIC COMMUNICATION OF EXPERIENCE	Timothy Leary	9
ASPECTS OF BIOCHEMICAL PHARMACOLOGY OF PSYCHOTROPIC DRUGS	Daniel X. Freedman	33
MYSTICAL STATES AND THE CONCEPT OF REGRESSION	Raymond Prince & Charles Savage	59
DISCUSSION OF PAPER BY PRINCE AND SAVAGE	Walter H. Clark	76
PROGRAMMED COMMUNICATION DURING EXPERIENCE WITH DMT	Timothy Leary	83
PSYCHEDELIC RESEARCH IN THE CONTEXT OF CONTEMPORARY PSYCHOLOGY	Robert E. Mogar	96
SOME OBSERVATIONS ON THE RESISTANCE TO THE USE OF LSD IN PSYCHOTHERAPY	Harold R. Stern	105
SEEDS OF GLORY	Robert Wolff	111
SYNCHRONICITY AND THE PLOT/PLOT	Arthur Kleps	123
SKY TASTE ALIVE INSIDE	George Andrews	125
BOOK REVIEWS		127
NOTES ON CONTRIBUTORS		128

Due to an oversight the cover of *Psychedelic Review* #7 was not credited. It was designed by Don Snyder and Bruce Bacon.

Cover Drawing this issue: Jack Wise

**IMPORTANT NOTICE ABOUT SUBSCRIPTIONS AND  
BACK ISSUES ON PAGE 110**



## EDITORIAL

In the spring of 1965 a young man brought to the editorial office of *The Psychedelic Review*, then located on a country estate in Millbrook, N.Y., a bag of dried mushrooms which he had picked in the municipal park of one of the major cities of the North West. His investigations had shown that this mushroom, whose botanical identity was not yet exactly determined, grew very plentifully all over the Northwestern parts of the United States; and that it was hallucinogenic. An experiment on the part of one of the editors readily confirmed this finding. One can only guess at the number of species of fungi or other plants that have psychedelic properties. The handful of mushroom guidebooks available in this mycophobic culture give no indication: being concerned only with categorizing these astonishing plants as "edible" or not, they will in most cases go by taste. But pleasing taste is no reliable index to psychedelic potency, as every peyote or morning-glory consumer knows.

The point of this story is not merely that our environment contains potentially dozens of psychically active plants and foods. For when we asked the enthusiastic mycophile to write up his results for publication in the *Review*, he declined, on the grounds that this would draw the attention of the law-enforcement agencies to this plant, and would make it difficult to obtain. Similarly, another friend of ours was unwilling to publish a one-step synthesis of dimethyltryptamine he had developed, for fear that the starting product would be made inaccessible, as happened in the case of morning-glory seeds, to a certain extent.

Like the medieval alchemists, the psychedelic chemists and botanists of today are forced by the peculiar conditions of their times to pursue their science underground, and to veil their results in the language of allegory. When the alchemists talked of the transformation of coarse substances into fine, of metal into gold, they were talking, in fact, about the chemical transformation of substances which are only one or two steps removed from a psychically active form, and that the enzymes required for these steps also exist in the body. What the alchemists were searching for was an effective way of transmuting body chemicals into psychedelic form. Perhaps this can be done internally, by someone who really understands the workings of his own chemical factory. This is the program of Guardjief. Get to know your own machinery. Manu-

facture your own chemical fuel for a permanently higher state of consciousness. Perhaps certain catalysts, introduced into the system from the outside, will aid the process of transforming our heavy-hypnotic consciousness into spiritual gold.

But why cannot this work be carried out openly? Are we really entering another Dark Age? Who has the right to decide what you put in your own body? The FDA, in a statement released to the press on December 18, 1965, proposed that the Commissioner may determine that a drug had a "potential for abuse" if "individuals are taking the drug on their own initiative rather than on the basis of medical advice from a practitioner," a ruling of questionable legality.

The FDA has now issued a ruling explicitly specifying which drugs come under the restrictions of the new Drug Abuse Control Law. The possession of LSD, DMT, mescaline, peyote and psilocybin thus becomes a federal offense.

Meanwhile, according to estimates published recently in the *Nation* (Marvin B. Freedman and Harvey Powelson, *Nation*, Jan. 31, 1966), "the proportion of college students who experiment with pot or LSD may run as high as 10%" and "the number of drug takers is growing."

Freedman and Powelson propose that "the reason why several hundreds of the brightest and most aware of American youth are attracted to the psychedelic experience" is they "are examining the values of the Western world and are finding them wanting. There is an upsurge of interest in introspection and the life of the emotions."

This withdrawal of interest from externals towards the exploration and mastery of the internal is of course precisely the development that alarms lawmakers the most. No form of rebellion is more threatening to the "power-possessing beings of the moment" than internal detachment.

The process of social change that are occurring around us are likely to be enormously heightened and accelerated by psychedelics. The college students and high school students who are taking LSD now are going to be deans and legislators tomorrow. Phenomena and concepts which we now struggle with and resist are going to be taken for granted by the next generation.

Perhaps we are entering a more inward phase of the cycle. After almost two centuries of unrestricted technological muscle-building and exploitation we are beginning to look into the mysterious and ill-understood processes going on within us, attempting to guide and direct our unruly and willful energies into constructive and protective channels.

## TWO CASES OF ALERTED CONSCIOUSNESS WITH AMNESIA APPARENTLY TELEPATHICALLY INDUCED<sup>1</sup>

MARGARET A. PAUL

This is a partial report of my experience under the influence of an hallucinogenic mushroom taken for experimental purposes. The details which are selected for presentation indicate that two of my patients suffered states of altered consciousness with aberrant behavior followed by amnesia for the three-hour period during which I was unconscious. There is no proof that their odd behavior and subsequent amnesia were in any way related to my state of mind, but the coincidence in time and the similarity in mood are sufficiently startling to arouse speculation. The question arises whether symptoms of mental disturbance in one mind may be produced by a disturbance in another mind at a distance and without any of the usual means of communication. If so, our approach to diagnosis must be broadened to take such possibilities into account.

The experiment of which I speak was planned only twenty-four hours before it took place and no one knew of it except the immediate participants. It was conducted at a distance of three hundred miles from my office and neither of the two patients who became involved in it even knew that I was out of town.

On Thursday, June 22, 1961, my husband, Dr. Kurt Fantl, also a psychiatrist, and I traveled by plane from our home in San Pedro, California, to Carmel, three hundred miles up the coast, to attend a symposium on hypnosis. That evening we had dinner with our friend, Dr. Henry K. Puharich, the director of a small research laboratory in Carmel Valley. He told us of recent experiments in which he was attempting to discover whether there is an increase in extrasensory perception under the influence of hallucinogenic drugs. He had another of these experiments planned for the

following evening. My husband and I, in a mutual burst of impulsiveness, offered ourselves as subjects and we were accepted.

The experiment took place on Friday evening, June 23, in the laboratory in Carmel Valley. There were three subjects, the two of us and a professor of philosophy from Stanford University. It was the first time that either my husband or myself had taken any hallucinogenic drug (and the last!) but the professor had experimented previously with various agents and had always had pleasant, mystical experiences. The setting was very informal, with several friends and laboratory assistants wandering in and out at irregular intervals.

At seven-thirty, preceding the ingestion of the drug, I was given a Matching Abacus Test. The purpose of this test is to evaluate one's ability to receive information telepathically. I made only two hits out of fifty tries, which is below the chance expectancy of five. No conclusion about my telepathic sensitivity could be drawn from such a small sample of my performance, of course, but the design of the experiment was merely to test my ability before and after the ingestion of the hallucinogenic agent. Obviously I could hardly go any lower on the scale, and it was hopelessly expected that I might go higher. Unfortunately, all three of us were so disoriented and confused that we were unable to take a second test. Therefore, it appeared at the time as if the purpose of the experiment had been thwarted.

At eight-ten I drank a broth made from the mushroom *Amanita pantherina*, found in the state of Oregon. There is no standard dosage of this concoction, but I drank only half as much as is customary because of a well-established habit of my stomach to reject that which it finds unpalatable. The broth had an unexpectedly pleasant woody flavor and was not at all revolting as I had been led to believe. Since Dr. Puharich said it might take as long as two hours for the first effects to appear, I settled down to read a book on religious mysticism, hoping to direct my thoughts into uplifting channels. Within a few minutes, however, I was nauseous, dizzy and unable to concentrate. I took a short walk outside in the early dusk but when I returned to the laboratory I was swaying unsteadily. I sat down in a straight chair, folded my arms on a table, and rested my head on my arms. I just wanted to be left alone.

By now it was eight-thirty. After a few extraordinary perceptions, such as gray lines converging upon me, interspersed with flashes of orange and turquoise, telescopic vision, bringing the far end of the laboratory clearly before my eyes, the interpretation of voices recorded on tape as an EEG record which I read in the air, and the sensation of my own body being tossed on the waves of a storm, I subsided into a coma.

For the next three hours I lived in a world of nightmares. Reality disappeared as I was whirled from one fantasy to another.

Certain traumatic childhood experiences were relived with total recall, but they soon became interwoven with incidents from my adult life. I felt terribly threatened by a destructive force and the only comprehensible escape was through love, love of all kinds: parental, brotherly, humanitarian, and sexual. The atom bomb fell as in my fantasy I thought I had predicted, and I was killed. Dying was a sweet ecstasy which I expected to be followed by a vision of heaven. But it was not. I found I had to return to earth and live through the whole ghastly sequence, time and time again. I wrestled with the conviction that I was either psychotic or in hell, and I could not decide which. It was truly a catastrophic experience for me, and one from which I sought desperately to escape.

At eleven-thirty in the evening I awakened abruptly from the world of hallucinations. Within two or three minutes I was completely oriented for time and place though I was still quite labile emotionally, and unsteady physically. In fact, as I was driving the car home from the airport on Sunday evening my husband says I almost took a wrong turn off the freeway which might have meant instant death, but since he was not even in a condition to drive I don't know how far to trust his judgment. Anyway, for several days, intervals of lucidity alternated with waves of hysterical laughing and crying, wild and very loose associations, confused thinking and lapses of attention.

On Monday, June 26, I saw patients as usual, though I was still prone to spells of absent-minded day-dreaming. I was startled quite wide awake, however, when Mr. X, a thirty-year-old bachelor clinical psychologist, said that he had been depressed and unable to work or to think straight since he had 'lost' three hours on Friday evening. He went on to say that ever since Friday he had been 'floating in and out of a mild psychotic state.' Since I had also lost three hours on Friday and was still floating, I asked him to tell me more.

As far as he could remember, he said, he had gone to the market on Friday afternoon to buy food for his dinner, which he cooked himself. On this day the mushrooms looked especially delicious, and though he had never cooked mushrooms before, he bought some and prepared them with hamburger. After dinner he had planned to watch a particular TV show on science fiction at eight o'clock, but he said he must have fallen asleep because the next thing he knew he was watching the eleven o'clock news. On Saturday he was tense and anxious, worrying about the world situation, particularly the Berlin crisis. He felt that an atomic attack was imminent and thought he should lay in a supply of canned goods and water.

Mr. X was unusually concerned about the three hours which he could not remember because it did not seem to him that he had been in a normal sleep. He feared that he might have left his home in a trance-like state and done some awful unknown thing. He had

called several friends, with whom he might conceivably have spent the time, but none of them could tell him anything. On Monday, when I saw him, he was still dazed and anxious. When I told him of my experience on Friday night and remarked upon its similarity with his, his depression lifted but his wonderment increased. And so did mine, for it seemed to me that we now had an example of telepathic communication, though it was not at all according to experimental design, since I was on the sending rather than the receiving end.

On Tuesday I saw another patient, Mrs. Z, a twenty-eight-year-old unhappily married woman who had been doing very well for the past few weeks with a gradual rise in spirits and lessening of anxiety. On this day, however, she reported that she was afraid she had had a setback since Friday because she had become quite disturbed on that evening and ever since then had felt that she was in a fog. I asked her what had happened on Friday, but try as she might she could only recall that she thought she had company for dinner and that she had cooked *teri-yaki*. Though she could recall every other day of the past week, she could not recall Friday evening. I told her of my experience on Friday and mentioned that one of my other patients had had amnesia for that period. We discussed the possibility that the same sort of thing might have overtaken her. She was relieved and expressed a desire to find out what she had done during those lost hours.

Fortunately, she was able to check on her actions by questioning her husband. He confirmed the menu and the fact that there were guests. He told her that she had not been drinking; in fact, he had fixed her a wine & soda but she had not finished it. Instead, shortly after dinner, that is, around eight o'clock, she had asked one of the women guests to accompany her to the ice cream store and she had not come home until midnight. Continuing her investigations, my patient had asked her friend who had accompanied her to buy ice cream how they had spent all those lost hours. She was astonished to learn that she had insisted upon driving to the home of a man with whom she was secretly in love, that she had sat outside his house mooning over him for at least two hours, and that only her friend's vigilance had prevented her from throwing herself into her lover's house and arms. She was horrified to realize that she had divulged her secret to her friend who was likely to gossip, but grateful that she had been prevented from making a further fool of herself.

Following our assumption that these two patients were responding to a stress experienced by their therapist in a crisis situation, we must note that each responded differently according to his own personality. Mr. X, a very cautious man, picked up the fear

## THE PSYCHEDELIC REVIEW

of a nuclear holocaust and wished to prepare himself against such a disaster. Mrs. Z, a frustrated and impulsive woman, reacted with strong sexual desires and poor judgment.

Both patients had earlier expressed an interest in ESP phenomena, Mr. X with fearful fascination and Mrs. Z with reluctant acceptance. Mr. X had had no previous ESP experiences; Mrs. Z had often reported precognitive dreams and intuitions. Both patients had an unusually strong but ambivalent emotional attachment to their therapist.

These incidents are of no great importance in the field of parapsychology because more dramatic events are being reported daily; nor are they important in the field of psychedelic research since almost every subject feels he has great clairvoyant powers. But they may be important in the field of psychiatry since they suggest the possibility that one mind may influence another at a distance even to the extent of producing temporary psychotic-like symptoms. Perhaps many unaccountable moods and impulses stem from telepathic communications, and they remain unaccountable because we have not learned where or how to look for their source. This sounds uncomfortably like witchcraft but may indeed be a phenomenon which must be incorporated into our diagnostic system. Certainly I never expected to be involved in witchcraft, even less to be a witch, and least of all, an unwitting witch.

## THE SECOND FINE ART: NEO-SYMBOLIC COMMUNICATION OF EXPERIENCE

TIMOTHY LEARY

### INTRODUCTORY

Science is the description of the behavior of external processes—movements in space-time. Everyone is a scientist—amateur or professional—when he communicates about external events. The reporter, the gossip, the cop on the corner who gives you directions are, like the nuclear physicist, describing what's happening, out there, when and where.

"Dear, where is my red sweater?"

"It's in the second drawer of the bureau in the guest room."

Located in space-time.

The philosophy of science spells out the rules for defining good and bad science and all of us—amateur or professional—would benefit from a more explicit understanding of the rules of external descriptions.

Art is the description of experience, internal reactions, the state of one's consciousness. Everyone is an artist—amateur or professional—when he communicates about his experiencing.

"How are you?"

"I feel lousy."

The description of an inner state. A cliché, ineffective description. Bad art, but art.

The purpose of science is to locate movements in space-time and to describe them to others. The purpose of art is to describe experience to others, to "turn on" others, to produce the experience in others.

Our current vocabulary of experience leaves everything to be desired. The subject-predicate, cause-and-effect, linear nature of Indo-European languages is adequate for describing only a narrow, macroscopic, symbolic fragment of external and internal happenings.

The physical and biological sciences have had to develop multi-

dimensional-flow languages to describe external energy processes. These scientific languages work because they go beyond the verbal mind to follow the data. An experiential language which aims at communicating experiences beyond the lifeless-static-symbolic must imitate the pysical sciences and develop multiplicity-simultaneity-flow. It must break out of the grammatical strait jacket.

It is convenient to consider four broad classes of experience.

Four levels of consciousness:

1. Awareness in terms of conventional symbols; awareness of the game.
2. Awareness in terms of new combinations of symbols; the dream, the fantasy.
3. Awareness of direct energy as it hits the nervous system; no symbolic or game perceptions; raw sensed mosaics.
4. Awareness in which symbolic forms are imposed on patterns of direct energy; hallucinations.

Art has been defined as the communication of experience.

It is useful, therefore, to consider four broad classes of art which are used to communicate the four types of awareness.

The Four Fine Arts:

1. Communication in terms of symbols which are connected in conventional game relationships. This is reproductive art. Descriptive prose.

"Willy Mays ran to second base."

Familiar game symbols hooked up according to the accepted rules.

2. *Neo-symbolic Art*. Communication using symbols but in new combinations which shatter the conventional game expectations (gammatial, visual, temporal).

"Second base to swam Willy Mays."

3. *Tranart*. Communication which bypasses symbols and uses direct energy to "turn on" the receiver of the message. Here the symbolic mind of the artist is not active. The artist is an energy transformer and his artistic instruments are energy transforming machines, projectors, polarizing and diffracting lenses, sound recorders and transformers.

4. *Hallucinatory Art*. Communication in which symbols are imposed on sensations of direct energy in an idiosyncratic way.

The artist takes a psychedelic drug. He "goes-out-of-his-mind" into a kaleidoscopic flow of direct energy—swirling patterns of capillary-coiling. He then tries to interpret this raw energy. He "sees" multi-colored snakes. He communicates this vision. In

order to communicate his hallucination he must have access to energy-transforming machines which duplicate the capillary flow and he must then have some means of imposing the perceived form on the direct-energy flow.

Hallucinatory art is multiple-exposure art. A highly complicated form of communication.

A detailed survey of the types of experience, the four classes of art and illustrations of the Four Fine Arts forms is presented in a book, "Static and Ecstatic Dimensions of Consciousness and Their Communication," (to be published by University Books).

This essay presents an example of the Second Fine Art, Neo-Symbolic Communication. The illustration combines familiar symbols, words, in new references.

The particular method used here has been used by poets for centuries, was developed to a unique art form by James Joyce in *Finnegans Wake* and by two psychedelic poets, William Burroughs and Byron Gysin. It is called by Burroughs and Gysin "the cut-up."

The redundant sequence of subject-predicate grammar and expected game connections is sliced up and recombined. Experience, we recall, doesn't come in linear sentences. Only the hopeless pedant experiences in terms of subject-predicate prose. Experience must be communicated the way it is registered in the nervous system. Multiple and simultaneous.

The cut-up, as a magic-invoking-visionary-turn-on, has been used for centuries by artists in many media. The Egyptian Sphinx, for example, is an ancient and classically moving "cut-up." This giant woman-animal sitting silently in the desert eloquently wrenches us away from our tribal game thoughts and hurtles us hauntingly, eerily, back to evolutionary memories.

The cut-up which follows is a description of a psilocybin experience which occurred, once upon a time, in Cambridge, Massachusetts.

Several sources of verbal symbols were used to paint this experiential portrait. Each verbal source becomes a paint pot with which the overall design is sketched.

The six sources of the words used are: a newspaper account published in the London Sunday Telegram, March 12, 1961, written by Arthur Koestler and titled "Return Trip to Nirvana", a description of a mystic experience by Arthur Koestler, taken from *The Invisible Writing*, New York, Macmillan Co., 1954; parts of the first and last chapters of *The Lotus and the Robot* by Arthur Koestler, New York, Macmillan Co., 1961; from the short story "Without and Within" by Herman Hesse, in *Great Short Stories by Nobel Prize Winners*, Noonday Press, New York, 1959; from the

last chapter, the psychedelic-session chapter of *Steppenwolf* by Herman Hesse, New York, Holt Rinehart & Winston, 1963; and from a session report taken from the files of the Harvard Psychedelic Project.

There are two methods of verbal cut-up which have been widely used. In the *random cut-up*, sentences or clauses from each source are scissored out, placed in a receptacle and drawn out by chance. The mind of the "word-painter" operates only in the selection of the word-paint-sources.

In the programmed cut-up one narrative is taken as base and clauses or sentences from additional verbal sources are planfully woven around this base-line.

The illustration which follows uses the method of the programmed cut-up. Here are the verbal sources used in the illustration.

#### CUT-UP SOURCE NO. 1: FROM "RETURN TRIP TO NIRVANA".

A few weeks ago I received a letter from a friend, an American psychiatrist working at Harvard University:

DEAR K:

Things are happening here which I think will interest you. The big, new hot issue these days in many American circles is DRUGS. We believe that the synthetics of the cactus peyote (mescaline) and the mushroom (psilocybin) offer possibilities for expanding consciousness, changing perceptions, removing abstractions....

We are offering the experience to distinguished creative people. Artists, poets, writers, scholars. We've learned a tremendous amount by listening to them... If you are interested I'll send some mushrooms over to you... I'd like to hear about your reaction...

Shortly afterwards, I had to go

to the University of Michigan at Ann Arbor. I had been invited there for quite different reasons, but on the first morning of my stay the subject of the magic mushroom cropped up.

#### DRUGS ON BRAIN

This, however, was not much of a coincidence as at the present moment a surprising number of Americans from Brass to Beat, seem to have, for different reasons, drugs on the brain; the Brass because they are worried about brain-washing and space-flight training; the Beat because drugs provide a rocket-powered escape from reality; the Organization. Men because tranquillisers are more effective than the homely aspirins and fruit-salts of yore; and the spiritually frustrated on all levels of society because drugs promise a kind of do-it-yourself approach to Salvation.

1. Reproduced, by permission, from *The Sunday Telegraph*, London.

The psychiatrist in charge of the mushroom was an Englishman of the quiet, gentle and un-American kind. Based on his own experiences and on experiments with 10 test-subjects, he ventured the cautious and tentative opinion that compared with the fashionable wonder-drugs, mescaline and lysergic acid, the effect of the mushroom was relatively harmless and entirely on the pleasant, euphoric side.

It is well known that the mental attitude, the mood in which one enters the gates of mushroomland, plays a decisive part in determining the nature of the experience. Since Dr. P. was such a pleasant person and the atmosphere of Ann Arbor appealed to me, I volunteered as a guinea pig, though I felt a little guilty towards my enthusiastic friend in Harvard. However, on the day before I took the drug, I had a very unpleasant experience—with the result that I faced the mushrooms in an anxious and depressed state.

They come synthesized, in the shape of little pink pills. I swallowed nine of them (18mg of psilocybin), which is a fair-sized dose for a person of my weight. They were supposed to start acting after 30 minutes.

However, for nearly an hour nothing at all happened. I was chatting with Dr. P. and one of his assistants, first in his office, then in a room which had a comfortable couch in it and a tape recorder; after a while I was left alone in the room, but Dr. P. looked in from time to time. I lay down on the couch, and soon began to experience the kind of phenomena which have been repeatedly described by people who experimented with mescaline.

When I closed my eyes I saw luminous, moving patterns of great beauty, which was highly enjoyable; then the patterns changed into planaria—a kind of flatworm which I had watched under the microscope the previous day in a laboratory; but the worms had a tendency to change into dragons, which was less enjoyable, so I walked out of the show by opening my eyes.

I tried it again, directing the beam of the table-lamp, which had a strong bulb, straight at my closed eyelids, and the effect was quite spectacular—rather like the explosive paintings of schizophrenics, or Walt Disney's "Fantasia."

A flaming eddy, the funnel of a tornado, appeared over my head, drawing me upward; with a little auto-suggestion and self-dramatisation I could have called it a vision of myself as the prophet Elijah being taken to Heaven by a whirlwind. But I felt that this was buying one's visions on the cheap ("Carter's mushrooms are the best; mystic experience guaranteed or money refunded"); so I again walked out of the show by forcing my eyes to open. It was as simple as that, and I congratulated myself on my sober self-control, a rational mind not to be fooled by little pills.

#### DIFFERENT LOOK

By now, however, even with open eyes, the room looked different. The colours had become not only more luminous and brilliant, but different in quality from any colour previously seen; they were located outside the normally visible



spectrum, and to refer to them one would have to invent new words—so I shall say that the walls were green, the curtain dark, and the sky outside emerald. Also, one of the walls had acquired a concave bend like the inside of a barrel, the plaster statue of the Venus of Milo had acquired a grin, and the straight dado-line was pleasantly curved, which struck me as an exceedingly clever joke.

But all this was quite unlike the wobbling world of drunkenness, for the room was plunged into an underwater silence, where the faint hum of the tape recorder became obtrusively loud, and the almost imperceptible undulations of the curtains became the Ballet of the Flowing Folds (the undulations were caused by the warm air ascending from the central-heating body).

A narrow strip of the revolving spool of the tape recorder caught the gleam of the lamp every few seconds; and this faint, intermittent spark, unnoticed before, observed out of the corner of the eye on the visual periphery, became the revolving beam of a miniature lighthouse. This lowering of the sensory threshold and simultaneous heightening of the intensity and emotional significance of perceptions, is one of the basic phenomena of the mushroom universe. The intermittent light-signal from the slowly revolving spool became important, meaningful and mysterious; it had some secret message. Afterwards I remembered, with sympathetic understanding, the fantasies of paranoiacs about hidden electric machines and other contraptions planted by their enemies to produce evil Rays and Influences.

#### SUDDEN EFFECT

The signalling tape recorder was the first symptom of a chemically-induced state of insanity. The full effect came on with insidious smoothness and suddenness. Dr. P. came into the room, and a minute or two later I saw the light and realised what a fool I had been to let myself be trapped by his cunning machinations. For during that minute or two he had undergone an unbelievable transformation.

It started with the colour of his face, which had become a sickly yellow. He stood in a corner of the room with his back to the green wall, and as I stared at him his face split into two, like a cell dividing, then reunited again, but by this time the transformation was complete. A small scar on the doctor's neck which I had not noticed before, was gaping wide, trying to ingest the flesh of the chin; one ear had shrunk, the other had grown by several inches; the face became a smirking, evil phantasm. Then it changed again, into a different kind of Hogarthian vision, and these transformations went on for what I imagined to be several minutes.

All this time the doctor's body remained unchanged; the hallucinations were confined to the space from the neck upward; and they were strangely two-dimensional, like faces cut out of cardboard. The phenomenon was always strongest in that corner of the room where it had first occurred, and faded into less offensive distorting-mirror effects when we moved elsewhere, although the lighting of the room was uniform.

The same happened when other members of the staff joined us later. One of them, the jovial Dr. F., was transformed into a vision so terrifying—a Mongol with a broken neck hanging from an invisible gallows—that I thought I was going to be sick; yet I could not stop myself staring at him. In the end I said: "For God's sake let's snap out of it," and we moved into another part of the room, where the effect became weaker.

As the last remark indicates I was still in control of my outward behaviour, and this remained true throughout the whole three or four hours of the experience. But at the same time I had completely lost control over my perception of the world. I made repeated efforts "to walk out of the show" as I had been able to do during the first stages on the couch, but I was powerless against the delusions. I kept repeating to myself: "But these are nice, friendly people, they are your friends," and so on. It had no effect whatsoever on the spontaneous and inexorable visual transformations.

I have mentioned before that all of Dr. P.'s previous subjects has positive euphoric experiences; I "broke the series," as he ruefully remarked over post-mortem drinks.

I had met the mushroom in the wrong state of mind, owing to that incident on the previous day, which had awakened memories of past experiences as a political prisoner, and of past preoccupations with brain-washing, torture and the extraction of confessions. The phantom faces were obvious projections of a deep-seated resentment against being "trapped" in a situation which carried symbolic

echoes of the relation between prisoner and inquisitor, of Gestapo and GPU.

#### WRONG KIND

Poor Dr. P. and his nice colleagues had to endure what they would call a "negative transference," and serve as projection screens for the lantern slides of the past, stored in the mental underground. Thus I was a rather unfortunate choice for a guinea pig—except perhaps to demonstrate what mushroomland can do to the wrong kind of guinea pig; and I suspect that a sizable minority of people who try for a chemical lift to Heaven, will find themselves landed in the other place.

I do not want to exaggerate the small risks involved in properly supervised experiments for legitimate research purposes; and I also believe that every clinical psychiatrist could derive immense benefits from a few experiments in chemically-induced, temporary psychosis, enabling them to see life through their patients' eyes. But I disagree with the enthusiasts' belief that mescaline or psilocybin, even when taken under the most favourable conditions, will provide artists, writers or aspiring mystics with new insights, or revelations of a transcendental nature.

I profoundly admire Aldous Huxley, both for his philosophy and uncompromising sincerity. But I disagree with his belief that drugs can procure "what Catholic theologians call a gratuitous grace." Chemically-induced raptures may be frightening or wonderfully gratifying; in either case they are in the nature of confidence tricks

played on one's own nervous system.

## NOMERIT

Some of the reports in the file, written after the experience, are in a more sober vein, but not a single item contains anything of artistic merit or of theoretical value; and the drug-induced productions were all far beneath the writer's normal standards (Huxley's report was not in the file).

I think I understood the reason for this when I took the mushroom the second time, under more happy and relaxed conditions. This was in the apartment of my Harvard friend; there were six of us in a convivial atmosphere. We all took various amounts of the pill, and this time I took a little more (either 22 or 24 mg for I lost count).

Again there were delusions: the room expanded and contracted in the most extraordinary manner, like an accordion played slowly, but the faces around me changed only slightly and in a pleasant way, becoming more beautiful. Then came the Moment of Truth: a piece of chamber music played on a tape recorder. I had never heard music played like that before, I suddenly understood the very essence of music, the secret of its magic . . .

Unfortunately, I was unable to tell the next day whether it had been a quartet or a quintet or a trio, and whether by Mendelssohn or Bach. I may just as well have listened to Liberace. It had nothing to do with genuine appreciation of music; my soul was steeped in cosmic schmalz.

I sobered up, though, when a fellow mushroom-eater—an Amer-

ican writer whom otherwise I rather liked—began to declaim about Cosmic Awareness, Expanding Consciousness, Zen Enlightenment, and so forth. This struck me as obscene, more so than four-letter words; this pressure-cooker mysticism seemed the ultimate profanation. But my exaggerated reaction was no doubt also mushroom-conditioned, so I went to bed.

## AN ANSWER

In "Heaven and Hell," defending the mescaline ecstasy against the reproach of artificiality. Huxley, the most highly respected exponent of the cult, argues that, "in one way or another, *all* our experiences are chemically conditioned"; and that the great mystics of the past also "worked systematically to modify their body chemistry . . . starving themselves into low blood sugar and a vitamin deficiency . . . They sang interminable psalms, thus increasing the amount of carbon dioxide in the lungs and the blood-stream, or, if they were Orientals, they did breathing exercises to accomplish the same purpose."

There is, of course, a certain amount of truth in this on a purely physiological level, but the conclusions which Huxley draws, and the advice he tenders to modern man in search of a soul, are all the more distressing: "Knowing as he does . . . what are the chemical conditions of transcendental experience, the aspiring mystic should turn for technical help to the specialists in pharmacology, in bio-chemistry, in physiology and neurology."

I would like to answer this with a parable. In the beloved Austrian

mountains of my school days, it took us about five to six hours to climb a 7,000-foot peak. Today, many of them can be reached in a few minutes by cable-car or ski-lift, or even by motorcar. Yet you still see thousands of schoolboys, middle-aged couples and elderly men puffing and panting up the steep path, groaning under the load of their knapsacks. When they arrive at the alpine refuge near the summit, streaming with sweat, they shout for their traditional reward—a glass of schnapps and a plate of hot pea-soup. And then they look at the view—and then there is only a man and a mountain and a sky.

My point is not the virtue of sweat and toil. My point is that, although the view is the same, their vision is different from those who arrive by motorcar.

CUT-UP SOURCE NO. 2:  
FROM  
"THE INVISIBLE WRITING"  
by ARTHUR KOESTLER

Then I was floating on my back in a river of peace under bridges of silence. It came from nowhere and flowed nowhere. Then there was no river and no I. The I had ceased to exist . . . When I say "the I had ceased to exist" I refer to a concrete experience . . . The I ceases to exist because it has, by a kind of mental osmosis, established communication with, and been dissolved in, the universal pool. It is this process of dissolution and limitless expansion which is sensed as the 'oceanic' feeling, as the draining of all tension,

the absolute catharsis, the peace that passeth all understanding. (page 352)

CUT-UP SOURCE NO. 3:  
FROM  
"THE LOTUS AND THE ROBOT"

by ARTHUR KOESTLER

The sewers of Bombay had been opened by mistake, I was told, before the tide had come in. The damp heat, impregnated by their stench, invaded the air-conditioned cabin the moment the door of the Viscount was opened. As we descended the steps I had the sensation that a wet, smelly diaper was being wrapped around my head by some abominable joker. This was December; the previous day I had been slithering over the frozen snow in the mountains of Austria. (page 15)

Lilies that fester smell far worse than weeds; both India and Japan seem to be spiritually sicker, more estranged from a living faith than the West. They are at opposite ends of the Asiatic spectrum, whose centre is occupied by the vastness of China, one of the world's oldest cultures; yet it proved less resistant against the impact of a materialistic ideology. The nation which had held fast for two and a half millennia to the teaching of Confucius, Lao-Tse and the Buddha, succumbed to the atheistic doctrine formulated by the son of a German lawyer, and has become the most accomplished robot state this side of science fiction. To look to Asia for mystic enlightenment and spiritual guidance has become as much of an anachronism as to think

of America as the Wild West. (page 276)

. . . I started my journey in sackcloth and ashes and came back rather proud of being a European. It may be a somewhat parochial pride, but it is not smug, for, as a Hungarian-born, French-loving, English writer with some experience of prisons and concentration camps, one cannot help being aware of Europe's past sins and present deadly peril. And yet a detached comparison with other continents of the way Europe stood up to its past trials, and of its contribution to man's history, leaves one with a new confidence and affection for that small figure riding on the back of the Asian bull. (page 285)

CUT-UP SOURCE NO. 4:  
FROM  
"WITHIN AND WITHOUT"

by HERMANN HESSE

There was once a man by the name of Frederick; he devoted himself to intellectual pursuits and had a wide range of knowledge. But all knowledge was not the same to him, nor was any thought as good as any other: he loved a certain kind of thinking, and disdained and abominated the others. What he loved and revered was logic—that so admirable method — and, in general, what he called "science."

"Twice two is four," he used to say. "This I believe; and man must do his thinking on the basis of this truth."

He was not unaware, to be sure, that there were other sorts of thinking and knowledge; but they were

not "science," and he held a low opinion of them . . . everything he recognized as superstition was profoundly odious and repugnant to him. Alien, uncultured, and retarded people might occupy themselves with it: in remote antiquity there may have been mystical or magical thinking: but since the birth of science and logic there was no longer any sense in making use of these outmoded and dubious tools.

So he said and so he thought; and when traces of superstition came to his attention he became angry and felt as if he had been touched with something hostile. (page 251-2)

One day Frederick went to the house of one of his friends with whom he had often studied. It so happened that he had not seen this friend for some time . . .

During a pause in the laborious conversation Frederick looked about the studio he knew so well and saw, pinned loosely on the wall, a sheet of paper . . . He stood up and went to the wall to read the paper.

There, in Erwin's beautiful script, he read the words: "Nothing is without, nothing is within: for what is without is within." There it was! There he stood face to face with what he feared! . . . What stood written here, as an avowal of his friend's concern at the moment, was mysticism! Erwin was unfaithful! (pages 254-5)

"This is the way," Erwin replied, and perhaps you have already taken the most difficult step. You have found by experience: the without can become the within. You have been beyond the pair of antitheses. It seemed hell to you; learn, it is heaven! For it is heaven that awaits you. Behold, this is

magic; to interchange the without and the within, not by compulsion, not in anguish, as you have done it, but freely, voluntarily. Summon up the past, summon up the future: both are in you! Until today you have been the slave of the within. Learn to be its master. That is magic. (page 263)

CUT-UP SOURCE NO. 5:  
FROM  
"STEPPEWOLF"  
by HERMAN HESSE

We joined him when he beckoned and in the doorway he said to me in a low voice: "Brother Harry, I invite you to a little entertainment. For madmen only, and one price only—your mind. Are you ready?"

Again I nodded.

The dear fellow gave us each an arm with kind solicitude, Hermine his right, me his left, and conducted us upstairs to a small round room that was lit from the ceiling with a bluish light and nearly empty . . .

Where were we? Was I asleep? Was I at home? Was I driving in a car? No, I was sitting in a blue light in a round room and a rare atmosphere, in a stratum of reality that had become rarefied in the extreme.

Why then was Hermine so white? Why was Pablo talking so much? Was it not perhaps I who made him talk, spoke, indeed, with his voice? Was it not my own soul that contemplated me out of his black eyes like a lost and frightened bird? . . .

"My friends, I have invited you to an entertainment that Harry has long wished for and of which he has long dreamed. The hour is a little

late and we are all slightly fatigued. So, first, we will rest and refresh ourselves a little."

From a recess in the wall he took three glasses and a quaint little bottle, also a small oriental box inlaid with differently colored woods. He filled the three glasses from the bottle and, taking three long thin yellow cigarettes from the box and a box of matches from the pocket of his silk jacket, he gave us a light. And now we all slowly smoked the cigarettes whose smoke was as thick as incense, leaning back in our chairs and slowly sipping the aromatic liquid whose strange taste was so utterly unfamiliar.

Its effect was immeasurably enlivening and delightful—as though one were filled with gas and had no longer any gravity. Thus we sat peacefully exhaling small puffs and taking little sips at our glasses, while every moment we felt ourselves growing lighter and more serene.

From far away came Pablo's warm voice.

"It is a pleasure to me, dear Harry, to have the privilege of being your host in a small way on this occasion. You have often been sorely weary of your life. You were striving, were you not, for escape? You have a longing to forsake this world and its reality and to penetrate to a reality more native to you, to a world beyond time. You know, of course, where this other world lies hidden. It is the world of your own soul that you seek. Only within yourself exists that other reality for which you long. I can give you nothing that has not already its being within yourself. I can throw open to you no picture gallery but

your own soul. All I can give you is the opportunity, the impulse, the key. I can help you to make your own world visible. That is all." (pages 173-5)

And later . . .

"This little theater of mine has as many doors into as many boxes as you please, ten or a hundred or a thousand, and behind each door exactly what you seek awaits you. It is a pretty cabinet of pictures, my dear friend; but it would be quite useless for you to go through it as you are. You would be checked and blinded at every turn by what you are pleased to call your personality. You have no doubt guessed long since that the conquest of time and the escape from reality, or however else it may be that you choose to describe your longing, means simply the wish to be relieved of your so-called personality. That is the prison where you lie. And if you were to enter the theater as you are, you would see everything through the eyes of Harry and the old spectacles of the Steppenwolf. You are therefore requested to lay these spectacles aside and to be so kind as to leave your highly esteemed personality here in the cloakroom where you will find it again when you wish . . ." (pages 175-6)

And then, after the kaleidoscope of visions, Harry "comes to":

Pablo looking warmly at me out of his dark exotic eyes . . .

"Pablo!" I cried with a convulsive start. "Pablo, where are we?"

\* \* \* \* \*

"We are in my Magic Theater," he said with a smile, "and if you wish at any time to learn the tango or to have a talk with Alexander the Great, it is always at your service. But I am bound to say, Harry, you have disappointed me a little. You forgot yourself badly. You broke through the humor of my little theater and tried to make a mess of it, stabbing with knives and spattering our pretty picture-world with the mud of reality. That was not pretty of you. . . . I thought you had learned the game better. Well, you will do better next time." . . .

I understood it all. I understood Pablo. I understood Mozart, and somewhere behind me I heard his ghastly laughter. I knew that all the hundred-thousand pieces of life's game were in my pocket. A glimpse of its meaning had stirred my reason and I was determined to begin the game afresh. I would sample its tortures once more and shudder again at its senselessness. I would traverse not once more, but often, the hell of my inner being.

One day I would be a better hand at the game. One day I would learn how to laugh. Pablo was waiting for me, and Mozart too.

CUT-UP SOURCE NO. 6, a psychedelic session report from the files of Harvard Psychedelic Research Project, was used as the base-line for the following cut-up portrait.

### A TRIP INTO THE MIND OF ROBERT LOTUS (The Assembled Cut-Up Portrait)

Once there was a man by the name of Robert Lotus who was painted within and without by Herman Hesse. Whether his manuscript needs any postductory remarks may be open to question. I, however, feel the need of adding a few pages, in which I try to record my own recollections of him. What I know of him is little enough, yet the impression left by his personality has remained, in spite of all, a deep and sympathetic one.

Robert Lotus devoted himself to intellectual pursuits. He had given up the novel as a medium of teaching, and had a wide range of knowledge. But not all knowledge was the same to him. Returning to his first profession he said that any thought was not as good as another. He preferred science and reporting. Science-reporting.

He loved a *certain kind of thinking*, confessing to me that psychology was his first love, the ology in which he felt he could make his greatest self-expression.

He was rewriting an earlier book on creative thinking (the mind) and disdained and abominated the mystical experience. Insight and outlook is what he called science once in a Franco prison.

In 1959 he used to say, "twice times two is four," and he finished his autobiography, *Robert and the Lotus*, not unaware, to be sure, that there were other sorts of thinking about a book which was to become quite relevant to the psychedelic controversy. (But they were not science.) He held a low opinion which explains much about the "set," which, although a free-thinker, he brought to his own psilocybin experiences. He congratulated himself on his rational mind.

He was not intolerant of religion, his paternal name, Lotus, being India, and his given name, Robert, founded on a tacit agreement among scientists. Sober self-control was Japan.

Fooled by little pills for several centuries, Robert Lotus disliked what he saw in the east while his science embraced nearly everything that existed on earth. "Lies that fester smell far worse than weeds." That was worth knowing.

With the single exception of one single province he said that "both India and Japan seem to be spiritually sicker, the human soul more estranged, a sort of custom to congratulate myself on this religion from a living faith and to tolerate more speculations on the soul than the west."

Though without them seriously, Robert Lotus was a rational mind, tolerant long before Aldous Huxley found in yoga everything that Robert Lotus recognized as superstition. A remedy for our



Brave New World. Without taking seriously what Schopenhauer called the Upanishads the consolation of his life was profoundly odious and repugnant to him.

Alien, uncultured, and retarded people of the first generation of the Nuclear Age might occupy themselves with solace in Zen. In remote antiquity the west groaning under the weight of knapsacks and receptivity to the voice of mystical or magical thinking was limited to periods of spiritual emergency. DRUGS ON THE BRAIN. But since the birth of science to moods of futility and despair there was no longer any sense in making use of such outmoded self-congratulation and dubious tools.

So he said and so he thought. SUDDEN EFFECT. He traveled in India and Japan (in 1958-59) when traces of superstition came to the mood of the pilgrim. He became angry like countless others before and felt that he had been touched. WRONG KIND. Whether the east had any answer to offer—something hostile to our perplexity and deadlocked problems—he was not to be fooled by little pills.

It angered Robert Lotus, striking the olfactory note. He found such traces among his own sort, which guided his reactions among educated men conversant with the culture of Asia. DIFFERENT LOOK. The principles of scientific thinking. Sober self-control. Self.

The sewers of Bombay had been opened by mistake and nothing was more painful and intolerable to him than the damp heat impregnated by the scandalous notion which lately by their stench invaded the air-conditioned cabin. He had sometimes heard expressed and discussed the moment the door of the Viscount was opened by men of great culture. NO MERIT. As we descended the steps that absurd idea that a wet, smelly diaper was scientific thinking around my head was possibly not a supreme, timeless, eternal, foreordained and unassailable mode of thought by some abominable joker.

The second half of the book, but one of many, was a transient way of thinking, permeated with the stink of Zen, not impervious to change and downfall which is not a rude expression. This irreverent, destructive, poisonous note a phrase often used in Zen literature. WRONG KIND.

Even Robert Lotus could not deny it and thus in a sense came back impoverished, cropping up here and there as a result of the distress throughout the world rather than enriched. NO MERIT. A rational mind. Like a warning, like a white hand's ghostly writing that his place was Europe.

The more Robert Lotus suffered from looking at this tiny

continent, puffing and panting up the steep path. This idea existed from the vastness of Asia and could so deeply distress him, while gaining a fresh impression the more passionately his compactness and coherence assailed it and those he secretly suspected of believing in it.

"I started my journey so far only a very few little pills among the truly educated in sackcloth and ashes." Challenging Aldous Huxley who had openly and frankly defended the cult. He came back rather proud, a rational mind professing belief in this doctrine. Of being a European. It may be parochial pride. AN ANSWER. A doctrine seemed destined, but it is not smug. Should it gain in circulation: DRUGS ON BRAIN. DIFFERENT LOOK. SUDDEN EFFECT. WRONG KIND. NO MERIT. AN ANSWER. Power for a Hungarian-born, French-loving, English writer to destroy all spiritual values on earth with some experience of prison and concentration camps to call forth chaos.

One cannot help being aware. Well, matters had not reached Europe's past sins—that point yet of present deadly peril. The scattered individuals who openly embraced a detached comparison with other continents. The idea! NO MERIT. Of the way Europe stood up still so few in number that they could be considered oddities to its past trials and of its contribution to man's history. Sober self-control.

Peculiar fellows. But a drop of the poison leaves one with a new confidence. An emanation of that idea and affection for that small figure, Hungarian-born, could be perceived first on this side, then riding the back of the Asian bull.

Among the half-educated and the people R.L.'s portrait of himself (no end of new doctrines) could be a small figure compact and coherent. DRUGS ON THE BRAIN. Esoteric doctrines, sects, and discipleships sketched with accuracy. The world was full of the struggle of the European mind and the Asian bull. Everywhere one could scent the tormented search for verbal meaning. Superstition. Science. Mysticism. Franco prison. Science. Zionism. Spiritualistic cults. Communism. Insight and Outlook. Other mysterious forces. It was really necessary to combat? But to which science, as if from a private feeling of weakness to which a generation of postwar intellectuals owe their political liberation had for the present given free rein.

I first met Robert Lotus in London in 1959. Always haunted by what he calls monumental feelings he called up my aunt, Whitaker Chambers to inquire for a furnished room. Feelings of inferiority, he went one day to the house of one of his friends. He was, in fact, as he called himself a real wolf of the Steppes. Is-

olated from life by his categorizing mind it so happened that he had not seen the friend for some time. "Hello. Yogi/commissar! Arrival/departure!" Blanching he stood motionless for a moment. "Lotus/Robert! Promise/fulfillment!" There it was! There he stood face to face with what he feared! Endlessly dancing the old Aristotelean two-step. "Certainly!" he cried. "Of course I know it. Age of longing at the twilight bar. Its mysticism, its Gnosticism!"

You look at Robert Lotus and see the face of Europe's history. How deep the — into which his life had drifted on account of his disposition and destiny, and how consciously he accepted this — as his destiny, I certainly did not know until I read the records he left behind him. Rational mind. Congratulations. A new epistemology? Is there such a thing? In the haunting eyes and the furrowed face-skin. This is the way, Erwin replied. On this frail hinge swung the fate of a generation of thought. And perhaps you have already taken the most difficult step. Oh rational mind of Europe! You have found by experience. Jewish. Hungarian. Austrian. French. German. English. All under one skull. The without can become the within. Great God! What does not stand classified as man or wolf he does not see at all. The noble arrogance of the self-assigned task! Once you had been beyond the pair of antitheses. In Franco cell he was floating on his back in a river of peace under bridges of silence. It seemed hell to him. It came from nowhere and flowed nowhere. Learn, my friend, it is heaven! There was no river and no I. For it is heaven that awaits you. The I had ceased to exist. Behold this is magic. But now he puffs and pants up the steep path groaning under the load of mind. To interchange the without and the within, not by compulsion. In this way he was always recognizing and affirming with one-half of himself, in thought and act, what with the other half he fought and denied. His rational mind need not crouch ready to categorize and evaluate every new event, each new experience. Not in anguish, as he did it, but freely, voluntarily. Your poor mind need not be the fulcrum upon which galaxies turn. Summon up the past. Your frail cortex need not support the weight of the universe, explaining, ordering, labeling, relating everything that occurs. Summon up the future. Both are in you. You need no longer judge the good and evil of each new flick of cosmic process. Until today you have been the slave of the within. Learn to be its master.

The heavy weight of monotheism. Cruel doctrine of individual will. I believe in one God the creator of Heaven and Earth. One mind. One judicial authority to make a billion decisions each second that the planet turns. The billion-fold moral judgments. "You favor tolerance toward all religions and all political systems.

What about Hitler's gas chambers?" The old Buddhist looks at the tense, alert European visitor and smiles. "When you ask these logical questions we feel embarrassed," said the Zen abbott.

The Aristotelian intellectual! Tell me, Maria, how can you have fondness for him, a tiresome old logician with no looks, who even has grey hair and doesn't play a saxophone and doesn't sing any English love songs, whose only security rests on his ability to rationalize each new experience? Most of that sort instinctively refuse to have anything to do with the psychedelic chemicals. At times Maria, too, availed herself of Pablo's secret drugs and was forever procuring these delights for me also. A few adventurous or courageous intellectuals have made the psychedelic voyage and struggle throughout the session to impose their minds. Pablo was always most markedly on the alert to be of service to him. Once he said to Robert Lotus without more ado: You always try to keep the experience under mental control. That is bad. One shouldn't be like that. The mind is by definition anti-ecstasy. Try a mild pipe of opium. The psychedelic session is the final test of rationality. We became friends and he took some of my specifics. The ordeal completed, he wrote his report explaining away what his rebellious cortex tried to do to the symmetry of his verbal mind. Once I gave him a drink from three little bottles, a mysterious and wonderful draught. And then when he had got into a very good humor we proposed to celebrate a love orgy. He declined abruptly.

When we started our research at Harvard we wrote to Robert Lotus telling him about the mystical experiences we were encountering and inviting him to participate in a love orgy. Brother Robert, I invite you to a little entertainment. For madmen only and the price only — your mind. Are you ready? An immediate reply. Robert Lotus was coming to the United States and would like very much to come to Harvard and try the mushrooms.

A few days before his scheduled arrival a phone call came from New York. In somber tones Robert Lotus said that he had already taken psilocybin with a psychiatrist in the mid-west and had a hellish paranoid experience. For God's sake, let's snap out of it. He had no desire whatsoever to make the voyage again transformed into the claws of a predatory bird. Never. No thanks. Wrong kind. No merit. He made repeated efforts to walk out of the show. Drugs on the brain. He was powerless against the delusion.

Well, why not come up to Harvard anyway and look around and see what we were doing? Agreed.

Robert Lotus was an object of interest and admiration at Harvard. The top scholars came to the center to pay homage. A list of appointments was quickly set up. It was quite a ball. A

skinny Professor Burhus told him that Hindus must be conditioned to give up religion. He felt in his waistcoat pocket—the number was no longer there! Miss Jerry Burner with her left hand praised him for the limpid ELASSER sparkling in the thick peasant glass. "I'd have loved to have danced with you again," he said, intoxicated by her warmth. (Later he worried that Jerry would steal his numbered ideas. The devil was in it if ever these failed him!) Waltzing masked around the Harvard Yard, watching Robert Lotus' charm and alert mind playing at the intellectual game.

From all ports a dancing girl flung herself into his arms. "Dance with me!" "I can't," he said, "I'm bound for hell."

The second afternoon there was an hour free so we phoned over to the Massachusetts Mental Health Institute to see about arranging a dance with one of the world's top neurologists. Of all the surprises I had prepared for him this was to be the most violent. For, have no moment of doubt that it was I, who brought Robert Lotus to this bird of paradise who was delighted to be our host at his special table at the Ritz Bar.

"So far," he said, "I have control." That was fine. The schedule was: drinks at the Ritz, dinner at the Steel Helmet in Boston with the Frank Barrons and then an evening at the Magic Theater for Robert Lotus to observe a psilocybin session run under easy-going, supportive circumstances for madmen only.

To put on a good mushroom ritual we had wired up to Charles Olson, our father who art in Gloucester. The giant Olson, genial guru, father of modern poetry. Unfortunately it is a habit, a vice of his, always to speak his mind, as indeed Goethe did in his better moments. A few years previous he had retired to a rocky promontory overlooking the harbor from whence he served as guide and friend to our work. Olson dominates any gathering with his size, his wit, his intellect, his noble stature, his wise animal energy. He was striving for redemption but it will take him all his time. He was the person, surely, to introduce Robert Lotus to the open-brain and its ecstatic possibilities.

On the way to the Ritz Robert Lotus told us of two dear friends of his, Moses and Jehovah, who had researched mescaline in Berlin during the twenties. Their psychedelic sessions kept opening up more and more realms of experience and revelation. Dr. Moses climbing Sinai, a gloomy hero in a gloomy wilderness of rocks, and Dr. Jehovah in the midst of storm and thunder and lightning imparting the Ten Commandments, while worthless friends set up the Golden Calf at the foot of the KURFURSTEN-DAMM. They tried to tell others about their discoveries but no one would listen, neither their colleagues nor their families. Mighty

Dr. Jehovah and Dr. Moses, with a dark and fiery eye and the stride of Wotan, finally got to a point where they could only communicate with each other. I saw them pray at the edge of the Red Sea. Together they had a rapport and high pitch of understanding in Handel's wonderful duet for two basses in which this event is magnificently sung. To the rest of the world they were hopeless eccentrics. So strange and incredible to be looking on at all this. Robert Lotus' medical friend suddenly seeing sacred peyote writ, with it heroes and its wonders, the source in our childhood of the first dawning suspicion of another world than this, presented before a distasteful public that sat eating the provisions brought with it from home.

Finally the social pressure was too great and they cracked under the strain. A nice picture, indeed, picked up by chance in the huge wholesale clearance of culture in these days. Jehovah went to Mexico where he died in short time. Moses, with dark and fiery eye and a long staff and the stride of Wotan, went to Munich where he was treated by a monster of a psychiatrist who failed to understand him. My God, rather than come to such a pass it would have been better for the Jews and everyone else, let alone the Germans, to have perished in those days, forthwith of a violent and unbecoming death instead of this dismal pretense of dying inch by inch that we go in for today. Quitting treatment, the friend returned to Berlin and killed himself.

At the Ritz the neurologist was waiting at his special table. His secretary was with him and the waitress hovered by solicitously. "So far," he said "I have contented myself with turning the heads of ladies. But now your time has come. First, let's have a glass of champagne."

Robert Lotus made a quip about their mutual European background which the psychiatrist avoided. Robert Lotus' eyes, wolf of the Steppes, narrowed and mild dislike grew quickly to strong distaste. Couldn't stand a person who denies his racial past.

A long anatomical argument began. Like two teletype machines, the man, chattering neurology tapes, sank slowly down into a soggy whisky swamp of sullen generalization. The neurologist, pressed by Robert's finny logic and data, flopped through the undergrowth of swizzle sticks and olives. Poised on an island of potato chips he denied there was such a thing as a mid-brain. Robert Lotus surfaced to lob glances of resignation our way.

"Keep quiet with your questions and chatter. I'm a professor of theology if you want to know. But the Lord be praised, there's no occasion for theology now, my boy. It's war. Come on." Then his face grew tense. "What did you say your name was?" he asked the

neurologist. Ah. "And did you ever by chance practice in Munich?" Ah. "Then did you ever have a patient by the name of Dr. Moses?" No. He remembered no such patient. Moving in like a cross-examiner, Robert Lotus sketched in more details about his friend, about his problems, his history, his appearance — dark and fiery eye — and a long staff — and the stride of Wotan.

Slowly the neurologist remembered. "Oh yes, now that you remind me, I do seem to remember treating the case. I saw him pray to God at the edge of the Red Sea, and I saw the Red Sea parted to give free passage, a deep road between piled-up mountains of water. And by the way, do you have any idea what became of him?" Robert Lotus breathed heavily. "No said the neurologist. "I saw him climbing Sinai, a gloomy hero in a gloomy wilderness of rocks. I was about to ask you if you knew of the outcome of the case. As a matter of fact he killed himself in Berlin the following year."

A sudden quiet settled down over the table. (The confirmation classes conducted by the clergy to see this religious film could argue without end as to how the film people managed this.) Neurologist puffed quickly at cigar and called the waitress over. A nice picture, indeed, picked up by chance in the huge wholesale clearance of culture in these days.

Then the Barrons arrived, Frank poised and cheerful and his new wife, Nancy, radiant and bouncing. On and on went this nuptial dance. God knows where the girl got her voice; it was so deep and good and maternal. Obediently I shut my eyes, leant my head against the wall and heard the roar of a hundred mingled voices surge around me. After another drink we moved to leave. Outside the air coming off the Boston Common was clear and fresh and we had all escaped from an especially grim mental hospital. Somewhere we heard a door bang, a glass break, a titter of laughter die away, mixed with the angry hurried noise of motor cars starting up. We felt close together after the ordeal and drove to the North End for seafood. "You're ready?" Far up in unhuman space rang out that strange laugh. Robert Lotus, bubbling with spirit, ordered wines and made a gallant scene with Nancy.

When we arrived back at the house Charles Olson was in the kitchen leaning over talking to young Jack Leary, his back to us. We brought Robert Lotus up to Olson. The giant poet turned, looked down at the small figure of the novelist and beamed out of his jolly eyes that really were animal's eyes except that animal's eyes are always serious while his always laughed and turned into human eyes.

Olson was holding a pistol in his hand.

Robert Lotus' eyes went up, up, up to look at Olson and then

dropped quickly to the pistol. He paled and pulled back. There he stood face to face with what he feared.

Olson roaring out genial greetings. "Brother Harry, I invite you to a little entertainment. For madmen only, and one price only — your mind. Are you ready?" Coats removed, the group assembled in the study. Why then was Hermine so white? Why was Pablo talking so much? A low built-in couch ran along two sides of the room, intersecting at the corner. A large round table strung people out in the form of a circle. Highballs. After beginning talk subsided we planned the session. My friends, I have invited you to an entertainment that Harry has long worked for and of which he has long dreamed.

Olson and Leary and Barron and a Harvard graduate student named Lynn were to take psilocybin. The hour is late and no doubt we are all fatigued. Nancy Barron and Nunez and Rhona were to act as ground-control. So first we will rest and refresh ourselves a little. Robert Lotus would observe. From a recess in the wall I took a quaint little bottle, also a small oriental box inlaid with differently colored woods. We were sitting around the table and the pills were counted out for each voyager. Robert Lotus had gotten over the shock of meeting Olson and the toy pistol and was in fine spirits, watching intently. When the last person had taken his potion Robert Lotus reached over and said, let me go along too. He took ten tablets and washed them down with his drink. So he did, perched on his stool, while the dance went on around us to the lively strain of the strings. The ship cast off.

We sat immeasurably listening to the hi-fi. Its effect was enlivening and delightful, making light conversation. Olson was spread out over the couch, center of a giggling admiring group, as though one were filled with gas.

We who had shared the psychotomimetic cocktail session at the Ritz and had no longer any gravity were reviewing the day's events quietly. The soft peace of the mushroom began to descend. Jangled, racing minds began to purr smoothly. Every moment we felt ourselves growing lighter and more serene. The few words spoken were concise Zen Koans, questions answered in the asking. From far away came Pablo's warm voice. A candle flame on the circular table flickered softly saying, "It is a pleasure to me, my dear Harry, to have a Spanish guitar concerto, pure notes of thin steel in the privilege of being your host in a small way on this occasion."

Olson played gestural games with a sofa cushion. A quietly circling thread of closeness wove us together. You have often been sorely weary of your life. When eyes met, they sent rays of amused



understanding. You were striving, were you not. So here we are. Born and dying together. A longing to forsake this world and its reality. The incredible statistical—chance nature of our existence, our sharing this quick intersection in astrophysical space-time to penetrate to a reality more native, to a world beyond time. The glance of recognition. We love, we love, we are all burnished copper-atoms—conductive—on the same humming wire of energy. We know, of course, where this other world lies hidden.

Nancy and Frank Barron were looking into each other's eyes. It is the world of your own soul that you seek. They rose and Nancy giggled and did a swirling dance, radiant, and then they were gone.

Bach's ivory ping-pong ball bouncing precise down steel-wire tympanic membrane. Only within yourself exists that other reality for which you long. Rhona and Lynn giggling fondly at Olson's Mohawk Sachem funny chiefness. Robert Lotus, lost in harmonic nets strung aloft, I can give you nothing that has not already its being within yourself. The room rolling gently to ocean-swells of vibration. I can throw open to you no picture gallery but your own soul. Look, he is rewriting an earlier book in a river of peace.

We are all burnished copper atoms; your rational mind need not crouch on humming wires of energy. All I can give you is the opportunity, the impulse, the key. Robert Lotus' face was now a rich purple. Moving in like a cross-examiner Robert Lotus, haunting eyes and furrowed face-skin, was supporting the weight of the universe. Bach's ivory ping-pong balls drowning out his lips moving rapidly. I help you to make your own world visible. That is all. He puffs and pants up the steep path groaning. But no one is listening.

Rhona and Lynn giggling fondly at Olson's bridges of silence. Waterfalls of thin steel notes muffling mind words.

Now I will conduct you to my peep-show and show you my little theater. Will you come? PRESSURE-COOKER MYSTICISM Robert Lotus' soundless face began to declaim about the ordeal completed. The mind by definition is anti-ecstasy. This little theater of mine has as many doors into as many boxes as you please. A piece of chamber music played. He was explaining that two times two is pressure-cooker mysticism but no one listened. Ten or a hundred or a thousand, and behind each door exactly what you seek awaits you. This struck me as obscene, more so than four-letter words. IN THE BELOVED AUSTRIAN MOUNTAINS OF MY SCHOOL DAYS IT IS A PRETTY CABINET OF PICTURES, MY DEAR FRIEND. A small figure, compact and coherent soundlessly lectures astride the Asian bull. It would be quite useless for you to go through it as you are. TOOK US FOUR OR FIVE

HOURS TO CLIMB TO THE 7000 FOOT PEAK. Sober self control! You would be checked and blinded at every turn by what you are pleased to call your personality. A small compact figure, Jewish, Hungarian, Austrian now standing in front of the group, gesticulating earnestly.

You have no doubt guessed long since that the conquest of time and the escape from reality, words, it seemed hell to you, came from nowhere and flowed nowhere, or however else it may be that you choose to describe your longing. PUFFING AND PANTING UP THE STEEP PATH Rhona and Lynn and Olson look up curiously at the frail cortex explaining, ordering, labeling everything. Meaning simply the wish to be relieved of your so-called personality. NO MERIT. There he was, face to face with what he feared, an American writer whom he otherwise liked. That is the prison where you lie. DRUGS ON THE BRAIN. Robert Lotus breathed heavily. THE VIRTUE OF SWEAT AND TOIL. You are therefore requested to be so kind as to leave your highly esteemed personality here where you will find it again. In making use of such outmoded self congratulation and dubious tools my soul was stepped in cosmic schmaltz. Be as jolly as you can WRONG KIND.

The virtue of sweat groans under the load. To teach you to laugh is the whole aim. What is he talking about? Questioning glances. You feel quite well, I trust? ZEN ENLIGHTENMENT SEEMED THE ULTIMATE PROFANATION. Not afraid? That's good, excellent. Come dear compact figure; join the thread of closeness weaving us together. REPROACH OF ARTIFICIALITY, HUXLEY. Gesticulates, face cut out of cardboard. You will now, without fear and with wonderful pleasure, enter our visionary world. YOU AMERICANS! DRUGS ON THE BRAIN. AMERICAN EFFICIENCY SHORT-CUTS COSMIC AWARENESS. You will introduce yourself to it by means of a trifling suicide.

Their intersection in astrophysical space-time is different from those who arrive by motorcar. WRONG KIND. We are in a magic theater: a world of pictures. So I again walked out of the show by forcing my eyes to open. I congratulated myself on my sober self-control, a rational mind not to be fooled by a little Moment of Truth. See that you pick out beautiful and cheerful ones and show that you really are not in love with your highly questionable personality any longer. Good-night. Robert Lotus waved, face crinkling in parochial pride. He left the room For madmen only. Long moments followed the departure. Bach's stringed clock ticked song of planetary motion. In dead silence. He was gone.

Fearing a return of Michigan paranoia, I followed after. Knocked softly at his door. Barron's merry voice shouts come in. Barron? In Robert Lotus' room? Entered. I WAS GREATLY CHEERED AT FINDING THAT I COULD ESCAPE FROM THAT

CURSED WOLF WORLD AND WENT IN. Barron jolly. We didn't know this was Lotus' room. We just fell into the first room we saw. Lotus came to go to bed. You should have seen his face when he saw us. I KEPT REPEATING TO MYSELF, "BUT THESE ARE NICE FRIENDLY PEOPLE, THEY ARE YOUR FRIENDS, AND SO FORTH." Was he upset? No. I'd say startled. Very apologetic. Where'd he go? Don't know. Backed out muttering forgiveness.

Checking guest rooms down the hall. Lotus. Lotus. Knocking softly, Lotus. I still knew him well enough, and he still bore a faint resemblance and yet he had grown a few centuries older. Yes? Is it you, Pablo? Come in. Where are we? Lotus was in bed. Giggling. Radiating pleasure. High. We are in my Magic Theater. Sailing high. But I'm bound to say, Harry, you have disappointed me a little. Life is a song. Life is beautiful. Life is the golden dream of a lotus princess on a bed of lilies. You forget yourself badly.

The next morning when we woke him up to start the round of Harvard appointments, Robert sat up in bed. Those pills last night didn't affect me at all. You broke through the humor of my little theater and tried to make a mess of it.

The next evening on the way home Robert Lotus bought two bottles of French wine, chosen with care, a flask of scotch, and, gently from behind clenched teeth asked: "And if I do not submit as we sat in the library starting to work on the whisky Lotus held up his glass and shook it with an icy tinkle. And if I deny your right, Mozart, to interfere with the Steppenwolf, and to meddle in his destiny I'll stick to my drug alcohol is a social stimulant. It warms you up; brings you closer to people. Mushrooms are non-social. They whirl you inside. Bring you closer to yourself. Give me alcohol any day. But I'm bound to say I thought you had learned the game better."

Next day as we walked into the airport building at Logan field to see him off, Robert Lotus made his final comment to us. You must admit that these drugs cause psychosis. A temporary psychosis. I'm bound to say Harry, you broke through the humor of my little theater. A benign and educational psychosis, if you will. Would you say it's therapeutic? Therapeutic. Of course. That's what the effect should be called. TTP. INSTANT MYSTICISM. Temporary therapeutic psychosis.

The metal ramp of the plane was wheeled away and the metal door closed. Four motors roared and the huge metal-magic bird lumbered away down the concrete strip.

There he went in the aluminum box. Did he understand Pablo? Mozart? Had a glimpse of its meaning stirred his reason? Would he sample its tortures once more? Traverse once more the hell of inner being?

Would he one day learn to laugh? Would I? Pablo was waiting for us both. And Mozart too.

## Aspects of the Biochemical Pharmacology of Psychotropic Drugs<sup>7</sup>

DANIEL X. FREEDMAN

Only a decade ago psychopharmacology faced the future equipped more with prescient hopes than with substantive findings (1). Drugs were promised as tools to reveal the coding by which neurochemical as well as neurobehavioral sequences were regulated. Endogenous systems related to stress were to be unmasked and their relationship to behavior pathology revealed. Therapeutic drugs were to be discovered which—if they did not specifically reverse behavior disorder—would at the least set into motion compensatory and inhibitory processes. Drugs thereby would directly or indirectly permit a more successful operation of those contingencies normally regulating behavior and keeping it within acceptable bounds.

Today it is the expanding range of specific information which is perhaps overwhelming. Where neurophysiologists have been able sufficiently to map the intricate sequences of peripheral and central signals which comprise the controls for basic drive behaviors such as eating and drinking, a central chemical coding has been revealed (2, 3, 4). For example, directly applied in select hypothalamic areas, norepinephrine can produce eating and its precursor (dopamine) can produce the effect after a delay sufficient for synthesis of the active amine; adrenergic blocking agents can reverse or block the effect while acetylcholine in the same area will produce drinking behavior. These effects are contingent upon highly localized concentrations and are not obtained with parenteral or even intraventricular injection. Small changes in the molecular structure of indole or catechol amines can produce dif-

1. Supported by United States Public Health Service grants MHK3-18, 566 and MHO3363.

Reprinted, by permission, from Freedman, Daniel: *Aspects of the Biochemical Pharmacology of Psychotropic Drugs*. In: Solomon, Philip (Ed.): *Psychiatric Drugs*. New York: Grune & Stratton, 1966

ferences in psychotomimetic patterns and potency (5). With a sleight of the medicinal chemist's hand chlorpromazine becomes the antidepressant imipramine. Further, drugs have changed our very concept of the way in which familiar behaviors such as sedation are put together. Substituents on the phenothiazine structure produce an alert patient who may show drug-induced restlessness while there is an inhibition of overly activated behavior. Both behaviorally and physiologically the "sedation" or "depression" produced by reserpine is different at different biochemically defined periods (5, 6) following the administration of the drug; such effects differ from the "sedation" production by phenothiazines (7). Apparently, the functional anatomy of familiar behavior patterns is far more complex at both the neural and chemical levels than would be indicated by our inexplicit terminology and while pharmacologists may not always practice this preaching, it is from detailed pharmacological and clinical studies that such distinctions have been made. In brief, these various structure-activity relationships have not only fulfilled earlier promises; they also indicate that we had not sufficiently appreciated the different components, the regulatory and compensatory systems underlying apparently similar behavioral states. Nor did we anticipate the variety of chemically dependent linkages—the associations and dissociations—of which the nervous system is capable.

#### LIMITATIONS OF BIOCHEMICAL PHARMACOLOGY

The basic—perhaps preposterous—question posed by psychoactive drugs is how it is that the biochemical change can become behaviorally manifest; in a rigorous sense there is an appalling distance between biochemical mechanisms and the particular substrata for perception and behavior. The question inherently entails a detailed study of intrinsic control systems at a number of different levels from the enzymatic to the psychosocial. Our progress has been of an empirical nature and the rapid proliferation of findings has occurred precisely because we are mapping out the terrain and specifying mechanisms and pathways which, in fact, occur in nature. Yet it is to be doubted that the most extensive encyclopedia of biochemical findings would be sufficient to explain drug-behavior correlations.

If we make a distinction between drug *action* expressed in biochemical language and drug *effect* (which is determined by multiple factors) we can agree that a biochemical explanation

alone must be of limited value. Every drug acts essentially to facilitate, replace, alter or compete with the special and ubiquitous cellular mechanisms which normally regulate body chemistry. Hence no drug can be confined to effects on behavior. Similarly no behavioral pattern is wholly contingent on drug action, whether we are studying isolated heart muscle or psychological attitude. The surrounding conditions influence the pattern of effects. Since every drug has more than one action and more than one site of action, since prior state, dosage and route and schedule of drug administration are critical parameters of drug action and effect, the study of each drug requires a careful mapping of significant events. We might recall that simplistic though clear explanations of the effects of psychotropic drugs were available even before the evidence of the past ten years was accumulated and we can continue to expect annual *ad hoc* explanations from those adroit in the byways of metapharmacology. The fact, however, is that we know far more about peripheral adrenergic nerve and associated responses than we do about the special problems of brain neurochemistry and neurobehavioral effects. Unless we can couple biochemical sequences to precisely defined sequences of physiological and behavioral responses, unless we sufficiently control and define the effects in which we are interested and more closely link periods of biochemical change with behavioral change, our progress must be restricted.

#### ADVANCES IN AMINE BIOCHEMISTRY

Apart from these *caveats*, the striking advance of the decade is the fact that at long last we have learned something of the detailed biochemistry of those amines (8) which must underlie fight and flight behaviors. With respect to the catecholamines a number of exotic and endogenous amines have been identified (epinine, octopamine, synephrine). Biochemists possess a range of tools with which to manipulate the various sequences in amine synthesis and inactivation. These tools may be applied easily *in vitro* and occasionally, with success, *in vivo*. Essentially, the task of the body is to convert amino acids from dietary sources into bioactive amines (Figure 1). Amines such as acetylcholine, serotonin, histamine, norepinephrine and its precursor dopamine are highly potent biological substances which, in minute quantities, induce physiologic responses in a number of extraneural tissues, as well as in certain neural systems. The amine can be synthesized in one location in the periphery and delivered through the circulation to another peripheral tissue; the brain, however, must largely synthe-

size its own amines from the precursor amino acids and does so in a regionally specific pattern. If we focus on the catecholamines, there are two salient features to their inactivation (Figure 2). First, the major excretory products are *amines* and *acids* (or alcohols). Second, prior to excretion there are two pathways: the amine may be O-methylated or not; therefore the end products of amine metabolism consist either of unchanged amines and acids or of O-methylated amines and acids (in which one of the ring-hydroxyl groups is O-methylated). In a sense, the basic vocabulary is now available and the task of the future is to establish the syntax—the rules regulating the activity of these amines under normal and abnormal conditions and their relationship to energy (9, 10) and fatty acid metabolism (11) and to endocrine as well as neural function. We shall later review the significance of some drug effects on the various synthetic and inactivating pathways. Essentially, it is 1) the pattern of amine metabolites, 2) rates of change of tissue levels and the concentrations of amines at various cellular and subcellular sites and 3) manipulation of the various enzymatic steps which provide the *biochemical* clues with which the pharmacologist can establish relationships to function.

#### EXPLANATORY NOTIONS AND EXPERIMENTAL DEFINITIONS

The most generally useful explanatory notion and one which has an ancient and respectable history in pharmacology has held that the behavioral changes following psychotropic drugs are due to excesses and deficiencies of endogenous substances at critical brain receptor sites—or to direct drug effects—or to both. Excesses and deficiencies would be achieved by changes in supply and demand, by synthesis, utilization and destruction—ultimately by binding and release of available substances at the receptor.

These useful notions, while applied to psychotropic drugs a decade ago, nevertheless had to be put into operational terms. The altered balance of amines *at a receptor* was envisaged but empirical measures were feasible only if large alterations in whole brain levels occurred. Monoamine oxidase (MAO) inhibitors produced large increases in amine levels due to decreased destruction of the amines while reserpine caused drops of more than 50 percent. The effect of reserpine was due to a release of amines, *presumably* from binding sites in storage compartments, and to an impairment of the binding of newly synthesized amine. This observation was of exceptional interest, since binding and release in the absence of fluorimetrically measurable quantities of the drug were linked to a period of altered effects (13). Shore, et al. (12, 13) hypo-

thesized that the now free and unbound (but probably unmeasurable) amine was capable of exerting a prolonged effect. Yet apart from the fact that this could be true for a number of amines following reserpine it was clear that this *drug-induced* phenomena could not represent the only form of binding and release in nature and that changed levels of this magnitude cannot be the only definition of functional excesses and deficiencies. For example, small elevations in levels of serotonin following the serotonin precursor (5-HTP) produced sedation (14, 15) and small increases (on the order of 20%) in serotonin levels were observed following LSD (16). The question also arises as to whether the “normal” variation in levels (changes of approximately 10%) is due to nature or to experimental error. In any event this variation made the measurement of small changes, such as those produced by LSD, precarious, although theoretically all of these small changes could equally represent actual binding and release phenomena.

The problem of technique, therefore, was to find measures more responsive to the concepts and to localize these changed levels in terms of the cellular compartments in which they might be occurring. For example, with the simple technique employed by Giarman and Schanberg (17, 18)—differential centrifugation—it was shown that the particulate matter of the brain cells contained approximately 70% of the serotonin and this fraction showed the greatest depletion following the full effects of reserpine. Association of other amines with the granular material of cells both in the periphery (19, 20) and the brain (21) had been previously demonstrated. It was found that a variety of psychotropic drugs—whatever their effect on whole brain levels—changed the distribution of amines in the particulate and supernatant cellular fractions which represent a number of different subcellular components (17, 23, 27). The notion was that this changed distribution occurred because of the effects of drugs on the normal equilibria of the amines within the cells and that the relative amounts of amines in such fractions following drug treatment were consequential (23, 24). In other words, localization was as important as total levels which could represent only the *net* effect of a number of processes. This work emphasized the basic idea that rates of change and the “traffic” of amines were relevant to observed effects. What would be required were more refined measures to reflect these equilibria and shifts in intracellular concentrations. Thus both biochemical measures of amine levels and turnover rates as well as structural considerations would be necessary to decode the “syntax” governing the operation of the biogenic amines.



## STRUCTURE—INTEGRATED FUNCTION

There has, in fact, been a rapid development in techniques in the broad field of biochemical pharmacology as well as in the area of psychotropic drugs: radioisotopes, electron and fluorescence microscopy, density gradient separation and differential centrifugation—all of which are bringing biochemical sequences into closer approximation with the visualizable reality of structure. The old concept that the cell is little more than a bag chock-full of enzymes has been replaced by a picture of a complex subcellular ultrastructure. This is rapidly becoming biochemically mapped and evaluated in terms of the implication for function of the structural localization of chemical mechanisms. Coupled with our awareness of the regional localization in the brain of bioactive substances, this morphologic emphasis is the hallmark of contemporary work and represents the basis for current interpretations. The key for contemporary biochemical pharmacology is, as Heinrich Waelsch once put it, "structure-integrated function."

## TRANSPORT OF DRUGS TO BRAIN SITES

Figure 3 is a diagram of a typical capillary-glia-neuronal assembly and significant subcellular elements (the specialized nerve ending with vesicles, the thickened presynaptic and postsynaptic patches of membrane, mitochondria scattered throughout the channels of endoplasmic reticulum). Unlike most tissues, the brain has little extracellular space and the perivascular glial cells interspersed between blood and neurone may serve as a specialized exchange station analogous to an extracellular space. Here, then, is a structural basis for the highly selective—often energy-dependent—exchange of substances between blood and brain conceived of as the "blood-brain barrier." For instance, the selective localization of carbonic anhydrase in glial cells may reflect a role in exchanging carbon dioxide between neuron and blood, and inhibitors of carbonic anhydrase (such as Diamox) may ameliorate certain seizure disorders in childhood. The ultrastructure of capillaries differs in the brain and this allows for differential transport in different regions (25).

The crucial question in tracing the impact of a drug on the critical bioactive sequences of the body—including the question of lipid solubility and selective transport—is the way in which drugs become accessible to active sites. In general, the amounts of drug required to exert an effect at an active receptor are far less than the amounts required to circumvent the liver and bring drug and receptor into contact. It appears that functionally significant brain

regions preferentially concentrate chlorpromazine (26) (or LSD as recently reported by Snyder, et al. (27) and confirmed in our laboratories (28)), but extensive knowledge about the concentration and distribution of drugs in the brain is generally lacking. Similarly (with some interesting exceptions) studies of drug metabolism as reflected in blood and urinary measures have not as yet provided a correlation with pharmacologic effects or with individual differences in therapeutic response. It should be emphasized that blood levels of drugs as well as brain levels of drugs must be important since the chemoreceptors in such structures as the carotid sinus are potent in neurophysiologic regulations (29) and since certain specialized areas of the brain (such as the area postrema and the intercolumnar tubercles) are highly vascularized and may preferentially concentrate a drug. Such concentration as well as differential uptake and release of a drug at various brain areas must be accounted for in linking the sequence of drug, chemical and behavioral changes.

## THE PSYCHOTROPIC DRUGS AND ENERGY METABOLISM

Drug effects on overall energy metabolism have not generally proved to be differentiating and the overall (as distinct from the regional) oxygen consumption of the brain appears mainly to define the limits for coma or consciousness (30). The mitochondrion consists of highly organized enzyme complexes integrated into an enclosed system of membranes—an arrangement permitting the efficient trapping of energy released during the oxidation of glucose. Phenothiazines can inhibit electron transport or uncouple this energy system from the oxidative processes (involving glucose intermediates) through which ADP is phosphorylated to yield ATP. Yet the phenothiazine tranquilizers do not appear to work by reducing energy supplies stored in ATP; ATP levels, at least in the whole brain, may in fact surprisingly increase after phenothiazine treatment (31). Chlorpromazine does, however, quite sensitively inhibit the *transition* from resting oxidative states to states of high activity in brain slices and in isolated mitochondria (32, 33). A more general effect of the phenothiazines is their ability to alter the configuration and permeability of various membranes and thus potentially to influence intercompartmental traffic (34). Speaking far too broadly, one can see that at many levels the effects of phenothiazines are to stabilize an ongoing state; they dampen, for example, the often damaging and overcompensatory physiological responses occurring to certain stressors, by virtue of an action on interneural transmission in certain sites in the brain stem (35, 36).

The chief point of convergence in the attempt to link physico-chemical phenomena and bodily response has been the synapse where drugs must somehow influence the transfer of information between neurones. A specialized presynaptic structure—the nerve ending—contains “synaptic vesicles” which because of their proximity to the synaptic membrane are thought to be the storage sites allowing for efficient release—or retention—of neurohumors; in the periphery, for example, the number of vesicles decreases after stimulation. The presumed transmitter would attach to synaptic membranes and initiate depolarization, or acting as a neuromodulator, the substance would modify the environment in which the transmitter acts (37). While norepinephrine is probably the peripheral adrenergic transmitter and while there is some presumptive evidence for acetylcholine as a transmitter in the brain, it is generally agreed (38) that we know too little, in fact, to engage in more than guessing games concerning the role of individual brain amines in synaptic transmission or in various neurobehavioral “functions.” For purposes of orientation only, we can note that some, though not all (39), central effects of serotonin tend to be of a sedative nature and possibly some serotonin effects involve cholinergic receptors; excesses of norepinephrine may be crudely associated with certain excitatory states and deficiencies with certain states of exhaustion and sedation. Levels of acetylcholine tend to correlate with physiologic sleep and excitation. Single-cell recording following electrophoretic administration of chemicals to brain reveal serotonin, norepinephrine and acetylcholine sensitive cells (42), and with microperfusion techniques, acetylcholine in the brain can be recovered in the effluent following stimulation (40, 41). It should, however, be clear that simply because activity can be correlated with application or concentration of a substance in the brain, the substance cannot thereby be directly implicated as a synaptic transmitter or inhibitor. Nevertheless, the imaginative notion put forth by Fatt and Katz (43) that stored quanta of a transmitter would be released on nerve stimulation has been bolstered by evidence, including the fact that a number of endogenous amines have been found to be stored in vesicles (such as those visualized in nerve endings); these substructures seem to have a capacity for concentrating exogenous amine (44, 45, 46, 47, 48). With labeled amines, the uptake of radioactive grains associated with vesicles in sympathetic nerve has been actually visualized (49). With further refinements in technique such findings may yet be more precisely interpreted.

Intact peripheral nerve is required for the uptake and binding of amines and nerve section produces a loss of the vesicular binding sites and supersensitivity of the receptor to injected amine (50). In the peripheral nerve, electrical stimulation (or certain drugs) will produce an efflux of amines (50, 51, 52). Similarly, section and degeneration of various tracks in the central nervous system has been shown to produce changes in amine levels and in synthesizing enzymes (53, 54, 55). Elucidation of the relationship between neural activity and brain enzymes and substrates, and the effect of central neural activity of hormones (56) and peptides on binding and release should provide the next major development in biochemical aspects of psychopharmacology.

#### THE LIFE CYCLE OF AMINES

Figure 4 provides a diagrammatic representation of the life cycle of the brain amines. Psychoactive drugs may act at a number of points in this cycle: the transport of precursors, the synthesis in the cytoplasm of amines, their binding and release in subcellular structures—and their subsequent rebinding—or their enzymatic inactivation. Binding usually means *functional* inactivation or inaccessibility of the amine due to storage in organelles; physically, however, it can occur at the receptor or with soluble proteins in the cytoplasm and such “bound” amines could be functionally associated with activity or not. How amines normally get bound or released is not known. The notion that there are pumps, not only at the cell wall for the brain amines but further pumps at the organelles, has yet to be firmly proved. Much work remains to be accomplished—especially in the brain; but when the chemist can localize an enzyme in an organelle (e.g., dopamine beta oxidase in granules (57)), he can then tell whether or not an amine has entered the granule or been shunted elsewhere, and when he can identify hydroxylated metabolites he can deduce, theoretically, where the amine must have been to have undergone the biotransformation.

#### SOME “SKETCHES” OF AMINE TRAFFIC

A current view of data is that there are at least two pools of bound amines. The pool conceived to be nearer the receptor represents an easily released and more active pool. Sympathomimetic drugs or amines release this pool and thus indirectly cause hypertensive effects. After repeated dosage the pool is depleted and tac-

hyphylaxis is observed. Catecholamines releasable in this way are thought to be inactivated by catechol-O-methyl transferase (COMT), an enzyme which Axelrod pictures as located in the cytoplasm or extracellular space (58). Drugs such as reserpine induce release also from the deeper lying pool and these amines are shunted to the mitochondrial MAO and inactivated within the cell (59). Following reserpine, inactive metabolites may cross the synaptic membrane and, accordingly, there is no hypertensive response. It may also be that reserpine affects the cell wall (60).

MAO inhibitors sometimes cause hypotension, even though actual levels of norepinephrine are increased. Apparently, these inhibitors alone do not produce a *functional* excess of norepinephrine. It is possible that the activity of COMT protects the receptor (and opinion varies about an additional effect of MAO inhibitors: inhibition of the release of amines (58, 61, 62, 68)). In any event, following MAO inhibition the easily-released pool may be still readily triggered by drugs or by amines (such as tyramine found in cheese) and this leads to quite potent hypertensive effects. This may be due to the greater quantities of amine packed in the pools and ready—so to speak—to be released by appropriate chemicals.

Chlorpromazine permits the storage of intracellularly synthesized amine but blocks the uptake of exogenous amines and the reuptake and recirculation of intracellular amines (58). It thereby exposes amines more rapidly either to metabolism by COMT or to the receptors (63); because chlorpromazine also blocks the receptor, the overall effects are hypotensive. Imipramine has similar effects but the receptor is not blocked. The effects of imipramine and its active intermediate, desmethyl imipramine (DMI) are markedly enhanced when levels of catechols are changing—as during reserpine-induced release of norepinephrine (64). The mechanism by which imipramine “sensitizes” amine receptors is not clear (65). Generally, both categories of antidepressant drugs do not seem to be directly acting, but rather to be sensitizing compounds and their activation effect in clinical depression may depend on the status of endogenous chemical releasers—the effects of which they markedly enhance. The view of antidepressants as sensitizing emphasizes the importance of prior neurobehavioral states upon drug effects. When depression is viewed behaviorally, it is as if a concurrent tension were converted into activity in the presence of these drugs; the functional status of the brain amines in depression becomes, therefore, an intriguing question.

Drugs such as alpha methyl dopa (Aldomet) might be called “displacers” (66). They and naturally-occurring amino acids com-

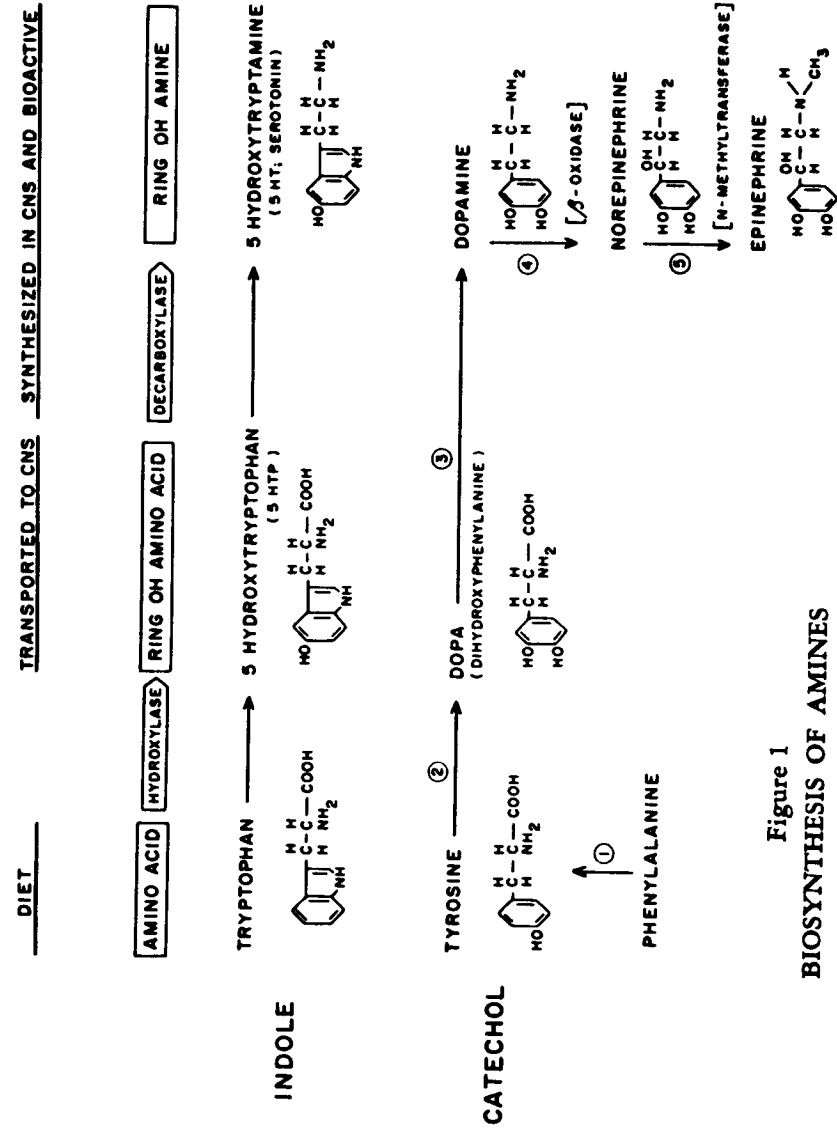


Figure 1  
BIOSYNTHESIS OF AMINES

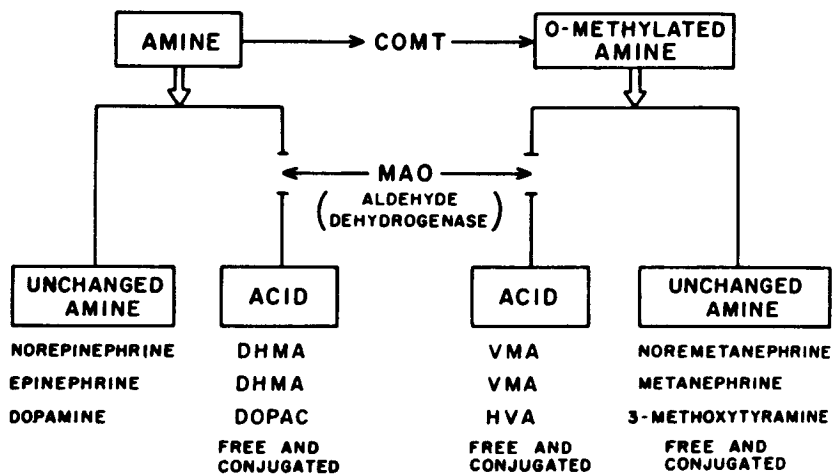


Figure 2  
 CATECHOLAMINE METABOLISM

- COMT:** catechol O-methyl transferase  
**MAO:** monoamine oxidase  
**DHMA:** dihydroxymandelic acid  
**DOPAC:** 3,4-dihydroxyphenylacetic acid  
**VMA:** 3-methoxy-4-hydroxy mandelic acid  
**HVA:** homovanilic acid

The major metabolites are amines and acids. Inhibition of MAO will decrease the acid metabolites; inaccessibility to MAO might increase the unchanged amine. Blocking of COMT would reduce the major O-methylated metabolites. O-methylation involves one of the ring hydroxyl groups on the catechol nucleus (see Figure 1).

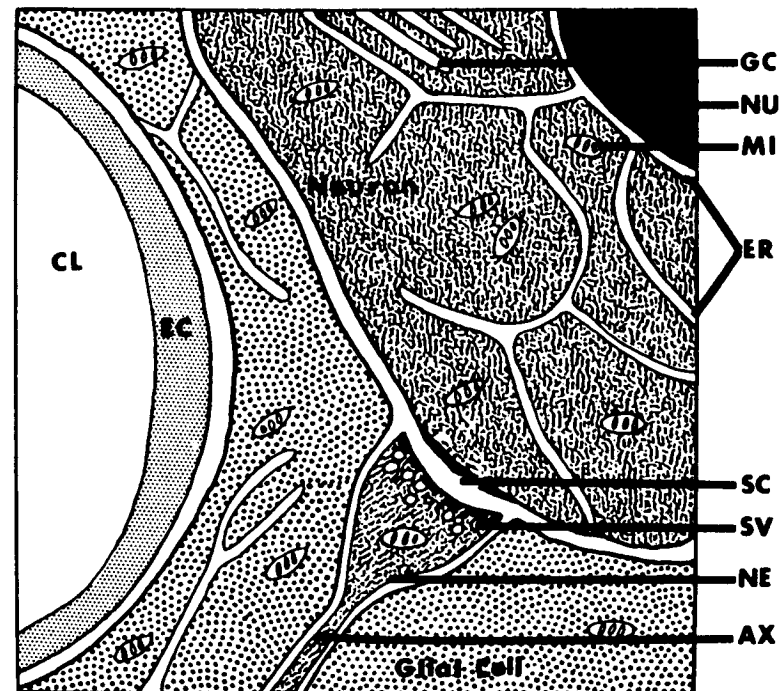


Figure 3

**CAPILLARY-GLIAL-NEURONAL ASSEMBLY.** Schematic representation of the typical capillary-glial-neuronal arrangement. A glial cell is seen interposed between capillary and neuron. An axon (AX) with its specialized nerve ending (NE), containing synaptic vesicles (SV) and mitochondria (MI), terminates at the neuron to form a synapse. An extensive system of internal membranes and channels, the endoplasmic reticulum (ER), is present in the neuron and, to a lesser extent, in the glial cells. Mitochondria are scattered throughout intervening areas of cytoplasm (stippled). Other abbreviations: CL: capillary lumen; EC: endothelial cell; GC: golgi complex; NU: nucleus; SC: synaptic cleft.

## THE PSYCHEDELIC REVIEW

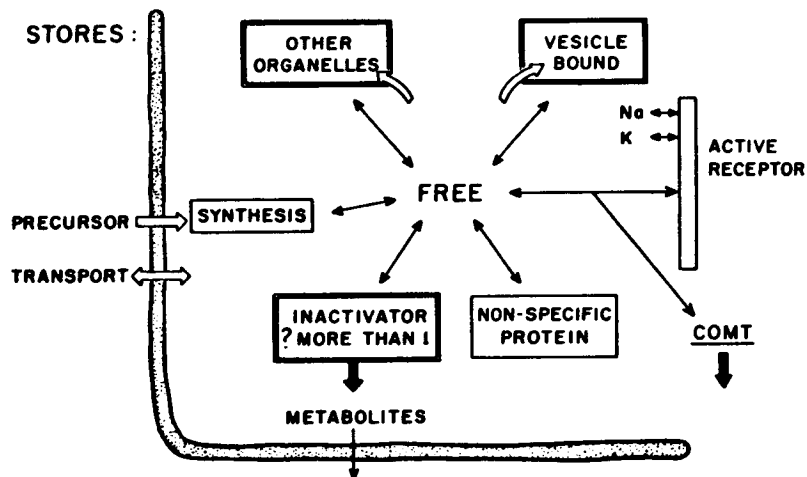


Figure 4  
MECHANISMS GOVERNING BRAIN AMINE LEVELS

Precursor appears to be actively transported into the cell, synthesized into amine which is somehow taken up into particulate stores; physical chemical complexing with non-specific protein may represent a functionally free or bound form of amine. Binding sites within the vesicles probably exist, but their nature is unknown as is the mode of egress of the amine from vesicles, although active pumps have been postulated. Storage of precursor may also be found to exist. Amines attaching to and leaving the active receptor may affect ion flux and the amines in this pathway may be metabolized by COMT while amines released from other binding sites would be inactivated by MAO normally held in the mitochondria. There may be other minor inactivating pathways. Efflux from the cell wall may or may not be an active process. Drugs may effect many of these sites.

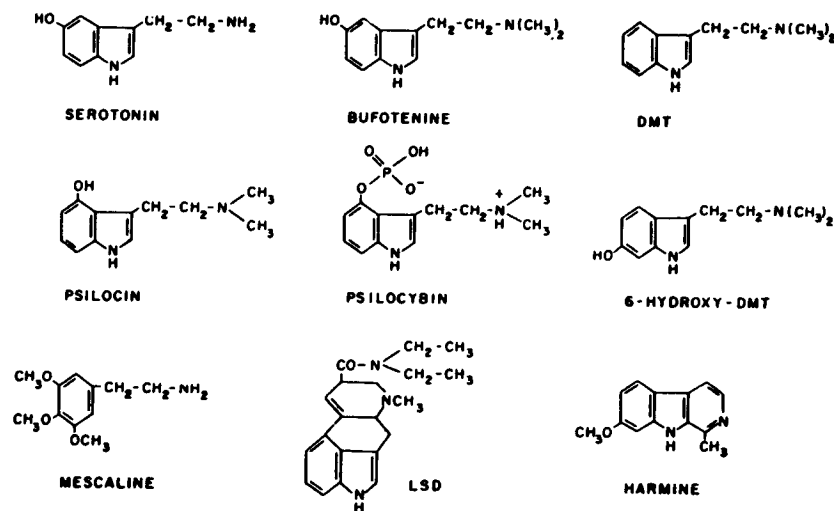


Figure 5  
PSYCHOACTIVE INDOLE AND CATECHOL AMINES

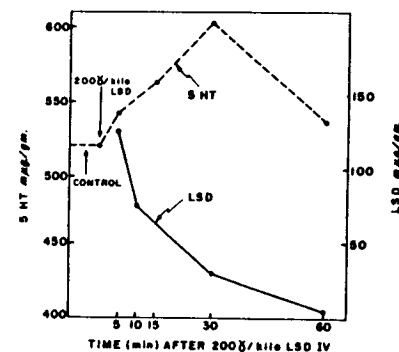


Figure 6  
LSD AND SEROTONIN IN RAT BRAIN. Following 200  $\mu\text{g}$  LSD iv. concentrations of drug rapidly leave brain (half life calculated at 20 minutes). As drug leaves the particulate fraction serotonin levels begin to rise. The onset of behavioral effects (73) occurs between 3 and 5 minutes and recovery at 25-35 minutes. The behavioral changes correlate with *changing* levels of drug and amine.

pete for the synthesizing mechanism and are themselves converted to amines and stored in granules and released. Hence this leads to the notion of "false transmitters" (67, 68). Other amino acids—phenylalanine—compete with the serotonin precursor for uptake at the cell wall leading to altered brain amine levels, possibly of significance in phenylketonuria (69, 70).

These sketches of the intricacies governing amine traffic (which were first indicated by differential centrifugation studies) are based largely on investigations from the laboratories of Julius Axelrod and those of Irving Kopin at the NIMH, where the fate of small amounts of highly labeled injected amine in peripheral tissues is investigated. However, the details of such schemes are finally adjudicated; experimental studies show that a gamut of psychotropic drugs—antidepressants, phenothiazines and sympathomimetic amines—could influence the balance of amines at an active receptor. Such studies have also shown that classical tools in biochemistry can be integrated with structural considerations. In summary, it is now generally accepted that psychotropic drugs influence not only levels of amines, but their movements, subcellular localization, rates of turnover and accessibility, not only to receptors and to sites of storage, but to different pathways for enzymatic synthesis and destruction. Drugs may also block or induce enzymes. They may alter physical-chemical properties of membranes and receptor substance, influence ion flux, metabolic processes, or rates of binding and release and thus directly or indirectly influence neural functions.

#### PSYCHOTOMIMETIC DRUGS

A number of active alkaloids isolated from plants and used ritually by natives (and even college students) to induce altered subjective states contain lysergic acid or structures related to biogenic indole and catechol amines (Figure 5). This group of compounds, drugs such as LSD-25, mescaline and psilocin and dimethyltryptamine (DMT) also influence binding and release of endogenous amines (5). Behaviorally, these substances produce a loss of the customary controlling anchors so that the usual boundaries which structure thought and perception become fluid; awareness becomes vivid while control over input is markedly diminished. Dependency either on the surroundings or on prior expectations or on a mystique for structure and support is enhanced. Psychiatrists can recognize these primary changes as a background state out of which a number of secondary psychological states can ensue, de-

pending on motive, capacity and circumstance. Our terminology reflects this: if symptoms ensue, the term psychotomimetic is employed; and if mystical experience, religious conversion or therapeutic behavior changes are stressed, the term psychedelic or "mind manifesting" has been applied. (And some thirty years ago chemists called the harmine- and harmaline-containing alkaloids, derived from South American cohoba, "telepathine"). The importance of these compounds does not lie essentially in an identity between such drug-induced changes and the operative biochemical pathways in clinical disorders; rather, the drugs offer a tangible grip upon neurochemical sequences related to a peculiar and interesting mental state, and research with such a drug could provide at least one detailed demonstration of how this state can, in fact, be achieved. The question does arise as to whether mammals can produce endogenous psychotoxins and the enzymatic machinery for this appears to be present. For example, enzymes which can N-methylate indole or catechol amines are known; this means that DMT or bufotenine could be produced in the body. 6-hydroxylation of indoles can occur in the human and this substituent on the N-methyltryptamine structure enhances psychotoxicity in animals. The methoxylation of catechols leads to a loss of sympathomimetic potency but multiple methylation of phenethylamines leads to psychotoxic effects, as with mescaline. Friedhoff (71) has evidence that dimethoxylation of catechols occurs more frequently, perhaps, in schizophrenics than normals. 5-methoxylation of indoles heightens their behavioral effects and this enzymatic reaction occurs normally in the pineal, where N-acetyl serotonin is methoxylated to produce the skin-lightening hormone, melatonin. Beta carboline structures like harmaline are seen in another pineal hormone, adrenoglomerulotropin, and Szara has proposed that such structures could be formed by the cyclizing of indoles, perhaps as a psychoactive intermediate following drugs such as psilocin. Thus, demonstrations of the capacity of the human body to synthesize psychotoxic substances have clearly advanced, although it should be clear that such enzymatic conversions have not been etiologically linked with clinical disorders.

The relative potency of these compounds can be objectively demonstrated in rats working on a simple (FR) schedule in which the rat presses a lever for food (72). With these measures LSD is about 150 times as potent as mescaline. The schedule can also demonstrate a period of acute effects of LSD in the rat and the phenomena of tolerance and cross tolerance (73). The acute effects following an effective dose (ED90) of LSD in rats begins at five minutes and are over by 30-45 minutes. As the LSD leaves the brain



and the serotonin is bound, these behavioral effects are observed (Figure 6). We have recently found that the LSD at five minutes is concentrated in the particulate fraction and as it leaves this fraction and is concentrated in the supernatant, the binding of serotonin begins to occur in the particulate fraction, suggesting that LSD has changed the serotonin receptors there and defining a remarkably close relationship between LSD and the indole receptors (28).

There are further biochemical links between amine metabolism and LSD. Long after reserpine has been metabolized—or after the effects of a short-acting releaser such as tetrabenazine are over (and amines are only 14% below normal) the effects of LSD in man and rat are enhanced and prolonged; doses of LSD in rats normally ineffective become potent (74, 75). This rather surprisingly proved not to be an effect of such drugs on the uptake of LSD in the brain since, in fact, less LSD enters the organ. Rather, there is enhanced *duration* of the binding of serotonin in the same cellular fraction from which the reserpine and tetrabenazine release amines (28). A number of psychotomimetic drugs bind serotonin (76) and release norepinephrine and such effects have been found with toxic dosage schedules of amphetamine (77). Szara finds such effects most striking in the rabbit hypothalamus (78). Premedication with certain MAO inhibitors may dampen the effects of LSD (79). These and other (79, 80) studies, then, show that psychotomimetic drugs have an affinity for brain receptors which normally process amines and that the binding of serotonin is somehow related to a factor governing intensity of drug effect.

The presence of the drug in the body is also important. The half-life of LSD in plasma correlates with the duration of intense effects not only in man (81) but in rat, rabbit and cat, and we have some evidence that during the course of an LSD episode, fluctuations in plasma levels may correlate with periods of intensification of the LSD effect (28). So that in spite of low drug levels (a few millimicrograms/cc in plasma) there may be several select receptor sites in the brain which can continue to be stimulated by only a few molecules of drug held in the plasma during the periods of changing behavioral and amine effects. Very low doses of LSD can produce behavioral effects in man (82) and animals (83) and biochemical correlates of these effects have yet to be found. Scopolamine and piperidyl glycolates (Ditran) have no effects on the indole and catecholamines, but induce a 30% drop in levels of brain acetylcholine (84). Therefore, there are several groups of psychotomimetic drugs, both in terms of their behavioral and their chemical effects.

## SYNTHESIS AND DESTRUCTION OF AMINES

Since the brain must synthesize amine from precursors, precursors have been used not only to test the effects of excessive amine synthesized *in situ*, but to deduce the “real” effect of the amines. In view of the consequences of compartments for function, this is not an uncomplicated approach, especially if precursors are used after reserpine or MAO inhibitors. Some drugs used in psychiatry influence various steps in the synthesis of amines (Figure 1); e. g. Antabuse inhibits dopamine beta oxidase. Recently it was reported that norepinephrine synthesis can be blocked at an early step (tyrosine hydroxylase) by alpha methyl tyrosine. This important study by Spector, Sjoerdsma and Udenfriend (85) suggests that—after inhibition—we can give precursors later in the sequence of norepinephrine synthesis (e. g., at 3 in Figure 1) and thus explore the role of dopamine in the central nervous system. Further this inhibition permits the study of utilization—or physiological demand for the amine in various functional conditions—a key to many puzzles concerning the role of catecholamines. Finally the inhibition of synthesis by this method does not alter the binding, release and uptake mechanisms and hence various precursors and sympathomimetic drugs will not have bizarre effects, as observed following drugs which do alter amine regulations (such as MAO inhibitors). The behavioral picture appears to be one of sedation, but a different pattern than that seen with reserpine. The animal appears mainly to be easily fatigued and unable to withstand excitation or temperature extremes.

While the liver O-methylates much of the circulating norepinephrine (and hence the O-methylated acid is a predominant urinary metabolite), the effect of drugs on various pathways of amine metabolism in tissues can nevertheless be monitored (Figure 2). If drugs affect not only enzymes but accessibility of enzyme and substrate—the traffic of amines—we should and do see shifts in metabolic patterns following psychotropic drugs. Thus, following the release of amines by reserpine there is an increase in acid secretion which is followed by a decrease when storage is no longer possible (86). Chlorpromazine, which prevents the uptake and re-uptake of the amines—perhaps exposing them to COMT but not MAO—produces a decrease in the O-methylated acid (86). Following MAO inhibitors there is a marked decrease in the VMA excretion and it has recently been reported that there is a decrease following imipramine (87). These reductions in acid by two antidepressants occur, of course, with different mechanisms: one by enzyme inhibition, the other by a shunting mechanism. It should be

remembered that accurate and fine measurement of even one metabolite is a formidable methodological problem. What we now require is a gamut of urinary and tissue metabolites to be screened after drugs. When this can be accomplished, it will be possible to deduce, more accurately, tissue events from urinary patterns. Metabolic patterns in the brain, of course, need not be reflected in urinary patterns; nevertheless, there are enzyme defects which are thought to be localized to the brain and in which the urine does produce concordant findings (88). We should soon have an accurate approximation of the contribution of brain metabolism to urinary metabolites. Some estimates are of the order of 20 percent.

#### CORRELATIONS OF METABOLISM WITH STRESS

Patterns of urinary metabolites may reflect altered amine traffic as well as enzyme changes, but they have not clearly pointed to etiological factors. A welcome and significant change in emphasis has been to correlate changes in the pattern of endocrine or amine metabolites with side effects of drugs (89) or with functional changes occurring in the course of a behavior disorder. If the amines were indeed related to various intensity factors in behavior such a strategy would be more relevant to the behavioral facts than attempts to correlate classical nosology for clinical syndromes with metabolic change.

McDonald, et al., (86) found increased VMA excretion in chronic schizophrenic patients at the NIMH. This study implies an interesting definition of the stress which chronic schizophrenia may entail. When normal controls were exercising their usual activities they showed increased norepinephrine metabolism, approaching, but not reaching, that of the patients. When the normals were in bed this increase disappeared, but the schizophrenic group still had an increased amine metabolism and in fact a slightly enhanced metabolism. Coupled with this observation is a study by Kornetsky, et al., (90) of this population. Postural hypotension was monitored twelve hours following a single dose of chlorpromazine. The patients showed minimal hypotension compared to normals. When the normals exercised for several hours, however, and a postural hypotension test was then applied, the hypotension had for all practical purposes disappeared. In other words, the normal can begin to approximate the schizophrenic's response only with marked exertion; in spite of the apparent relative motor inactivity of the patients, there appears to be a great deal of activity of *some* kind in being a chronic schizophrenic. The schizophrenics' active-in-

activity or inactive-activity is reflected in an increased metabolism of norepinephrine which is, perhaps, greater even when the patient is resting than when moving, and it is also evident in a relative resistance to the marked hypotensive effects of chlorpromazine. It has been clear for some time that if we are to study effects of stress in a manner relevant to clinical disorders, such as schizophrenia, we shall have to refine our notions of the physiological measures which may be appropriate and recognize and define the nature of the stress which is implied in psychological (91, 92) and psychotherapeutic studies of the disorder (93). In general, the neural and biochemical components of a variety of stressful states have yet to be disentangled and are poorly comprehended by confining attention solely to the adaptation syndrome.

Since drugs act to influence binding and release we would have an elegant rationale for drug therapy, should there be a corresponding pathophysiology of binding and release in the brain, either as a primary or secondary effect of psychosis or depression. There are no apparent direct approaches as yet to this question. Although we know that chemical states affect neurobehavioral activity, in a basic sense our knowledge of how neurobehavioral activity affects chemical states is minimal (53,54,55). It is, nevertheless, of interest that with intense life threatening stress requiring marked exertion—such as the requirement that rats swim for their lives—changes in brain amines occur and do so in the absence of the pituitary. These changes correlate with the exhaustion and recovery of the animal—an instance of non-pharmacologically induced change of brain amines (74). From our own and other laboratories, there are now reports also of long-term changes seen both in brain catechol amines and acetylcholine in animals raised in various stressful environments (95,96). Gillis has observed a shift in the subcellular distribution of norepinephrine in the hearts of young rabbits contingent—simply on the injection of a needle into the peritoneum (97).

The pattern of brain amine response to acute exhaustion stress and to LSD in rats is strikingly similar. It is tempting to suggest that LSD—without inducing the physical exertion required by swimming—simply initiates a localized brain-stress response chemically. In other words, there are central components of exhaustion stress which need not be coupled directly to physical activity. These central components could be activated by chemicals or evoked by surtaxing exertion or extremes of temperature. In this analogy, schizophrenic patients would correspond to LSD activation and the normal subjects to the swimming rats. Local brainstress responses uncoupled from physical activity and re-

flected in changes of amine distribution or in vegetative responses could be compared to a motor racing with the clutch disengaged.

Finally, we should note a convergence of much more concrete evidence indicating that the brain amines normally may buffer the necessary psychophysiological regulations evoked by stimuli which induce an intense central activation. When we alter the controls normally governing binding and release (by pretreatment with MAO inhibitors or reserpine) and we *then* induce central activation with drugs or with amino acids (such as methionine or thryptophan) effects are produced which in humans are often described as psychotoxic (98) or in the case of MAO inhibitors and LSD, the expected psychotoxic effect may be lost. In other words, such pretreatment may have unmasked an underlying "buffer" role of the amines. If genetic or stress induced impairment of binding and release occurred in clinical disorder, the human would be at a chemical disadvantage in handling life stresses and drugs would be helpful in compensating for these effects.

Leaving fantasy aside, we should note that the work of the future requires further detailed biochemical mapping of brain events and a linking of functional changes with biochemical measures. We still lack sufficient knowledge to have a basis for formal hypotheses which can be accepted or rejected by the critical experiment. For the behavioral and physiological scientist, the challenge is to describe more succinctly the sequences following drug administration, and to define and refine the functional units and behavioral dimensions appropriate for correlation with biochemical change.

#### BIBLIOGRAPHY

1. Elkes, J.: Psychopharmacology: the need for some points of reference. In: *A Pharmacologic Approach to the Study of the Mind*, ed. by R.M. Featherstone and A. Simon, pp. 26-38: Charles C. Thomas, Springfield, 1959.
2. Miller, N.E., Bailey, C.J., Stevenson, J.A.F.: Decreased "hunger" but increased food intake resulting from hypothalamic lesions. *Science*, 112: 526, 1950.
3. Grossman, S.P.: Direct adrenergic and cholinergic stimulation of hypothalamic mechanisms. *Am J. Physiol.*, 202:872, 1963.
4. Stellar, E.: Drive and motivation. *Handbook of Physiology - Neurophysiology III*, pp. 1501-1527, 1969.
5. Giarman, N.J., Freedman, D.X.: Biochemical aspects of the action of psychotomimetic drugs. *Pharmacol. Rev.*, 17:1, 1965.
6. Giarman, N.J., Freedman, D.X., and Savage, W.L.: Drug-induced changes in the subcellular distribution of serotonin in rat brain with special reference to the action of reserpine. Int. Symposium on Problems of the Brain, Galesburg, Ill., March 1-3, 1963. In: *Progress in Brain Research*, ed. by H. Himwich, p. 72, 1964.

7. Brodie, B.B.: Storage and release of 5-hydroxytryptamine. In: *5-hydroxytryptamine*, ed. by G.P. Lewis, pp. 64-83. Pergamon Press, New York, 1958.
8. Axelrod, J.: The formation, metabolism, uptake and release of noradrenaline and adrenaline. In: *The Clinical Chemistry of Monoamines*, Elsevier Publishing Co., Amsterdam, 1963.
9. Mayer, S., Moran, N.C., Fain, J.: The effect of adrenergic blocking agents on some metabolic actions of catecholamines. *J. Pharmacol. and Exp. Ther.*, 134: 18, 1961.
10. Haugaard, N., Hess, M.E.: Actions of autonomic drugs on phosphorylase activity and function. *Pharmacol. Rev.*, 17: 1, 1965.
11. Gordon, R.S., Jr., Cherkes, A.: Production of unesterified fatty acids from isolated rat adipose tissue incubated *in vitro*. *Proc. Soc. Exper. Bio. and Med.*, 97: 150, 1958.
12. Shore, P.A., Silver, S.L., Brodie, B.B.: Interaction of reserpine, serotonin, and lysergic acid diethylamide in brain. *Science*, 122: 284, 1955.
13. Shore, P.A.: Review of reserpine. Release of serotonin and catecholamines by drugs. *Pharmacol. Rev.*, 14: 531, 1962.
14. Bogodanski, D.F., Weissbach, H., Udenfriend, S.: Pharmacological studies with the serotonin precursor, 5-hydroxytryptophan. *J. Pharmacol. Exp. Ther.*, 122: 182, 1958.
15. Costa, E., Pschedt, G.R., Van Meter, W.G., Himwich, H.E., *Brain concentrations of biogenic amines and EEG patterns of rabbits*. *J. Pharmacol. Exp. Ther.*, 130: 1961.
16. Freedman, D.X.: Effects of LSD-25 on brain serotonin. *J. Pharmacol. Exp. Ther.*, 134: 160, 1961.
17. Giarman, N.J., Schanberg, S.M.: The intracellular distribution of 5-hydroxytryptamine (HT, Serotonin) in the rat's brain. *Biochem. Pharmacol.*, 1: 301, 1958.
18. Schanberg, S.M., Giarman, N.J.: Drug induced alterations in the sub-cellular distribution of 5-hydroxytryptamine in rat's brain. *Biochem. Pharmacol.*, 11: 187, 1962.
19. Blaschko, H., Welch, A.D.: Localization of adrenaline in cytoplasmic particles of the bovine adrenal medulla. *Naunyn-Schmiedeberg's Arch. Exp. Path. Pharmacol.*, 219: 17, 1953.
20. Hebb, C.O., Whittaker, V.P.: Intracellular distribution of catecholamines in the choline acetylase. *J. Physiol. (Land)*, 180:1051, 1957.
21. Weil-Malherbe, H., Bone, A.D.: Intracellular distribution of catecholamines in the brain. *Nature (Land)*, 180:1051, 1957.
22. Weil-Malherbe, H., Posner, H.S., Bowles, G.R.: Changes in the concentration and intracellular distribution of brain catecholamines: the effects of reserpine, beta-phencyl-isopropyl-hydrazine, pyrogallol and 3,4-dihydroxy-phenylalanine, alone and in combination. *J. Pharmacol. Exp. Ther.*, 132:278, 1961.
23. Freedman, D.X., Giarman, N.J.: LSD-25 and the status and level of brain serotonin. *Ann. N.Y. Acad. Sci.*, 96: 98, 1962.
24. Giarman, N.J.: Discussion in Symposium on "Effects of Hallucinogenic Drugs in Man," *Fed. Proc.*, 20: 897, 1961.
25. Torack, R.M., Barnett, R.J.: The fine structural localization of nucleoside phosphatase activity in the blood brain barrier. *J. Neuropath. and Exper. Neurol.*, 23: 46, 1964.
26. Guth, P.S., de Jaramillo, G.A.V.: Phenothiazine distribution in mammalian brain. *Fed. Proc.*, 21: 178, 1962.
27. Reivich, M., Snyder, S.: Regional Localization of LSD in the Brain of the Monkey. *Fed. Proc.*, 21: 178, 1962.
28. Freedman, D.X., Croquet, C.A.: Unpublished data.
29. Bonvallet, M., Dell, P., Heibel, G.: Tonus sympathique et activite electrique corticale. *Electroenceph. Clin. Neurophysiol.*, 6: 119, 1954.
30. Kety, S.S.: Chemical boundaries of psychopharmacology. In: *Man and Civilization: Control of the Mind*, ed. by S.M. Farber and R.H.L. Wilson, pp. 79-91. McGraw-Hill, New York, 1961.
31. Weiner, N., Huls, H.N.: Effect of chlorpromazine on levels of adenine nucleotides and creative phosphate of brain. *J. Neurochem.*, 7:180, 1961.

32. McIlwain, H., Greengard, O.: Excitants and depressants of the central nervous system, on isolated electrically-stimulated cerebral tissues. *J. Neurochem.*, 1: 348, 1957.
33. Aghajanian, G.K.: The effect of chlorpromazine on brain mitochondrial respiration as a function of metabolic state. *Biochem. Pharmacol.*, 12:6, 1963.
34. Gey, K.F., Pletscher, A.: Influence of chlorpromazine and chlorprothixene on the cerebral metabolism of 5-hydroxytryptamine, norepinephrine and dopamine. *J. Pharmacol. Exp. Ther.*, 133: 18, 1961.
35. Kollis, J., Bullard, R.W.: The influence of chlorpromazine on physical and chemical mechanisms of temperature regulation in the rat. *J. Pharmacol. Exp. Ther.*, 145: 373, 1964.
36. Killam, E.K.: Drug action on the brain stem reticular formation. *Pharmacol. Rev.*, 14: 75, 1962.
37. Giarman, N.J.: Neurohumors in the brain. *Yale J. Biol. Med.*, 32: 73, 1959.
38. Everett, G.M., Wiegand, R.G.: Central amines and behavioral states: a critique and new data. Proceedings of the First International Pharmacological Meeting, Vol. 8, Pergamon Press, 1962.
39. Graff, F.G., Leme, J.G., Rocha e Silva, M.: Role played by catechol and in dolamines in the central actions of reserpine after monoaminooxidase inhibition. *Int. J. Neuropharmacol.*, 4: 17, 1965.
40. Gaddum, J.H.: Substances released in nervous activity. Presented: First Int. Pharmacol. Mtg., Stockholm, 1961.
41. Delgado, J.M.R., Rubinstein, L.: Intracerebral release of neurohumors in un-anesthetized monkeys. *Arch. Int. Pharmacodyn.*, 150: 530, 1964.
42. Bloom, F.E., Oliver, A.P., Salmoiraghi, G.C.: The responsiveness of individual hypothalamic neurons to microelectrophoretically administered endogenous amines. *Int. J. Neuropharmacol.*, 2: 181, 1963.
43. Fatt, P., Katz, J.: An analysis of the end-plate potential recorded with an intracellular electrode. *J. Physiol.*, 115: 320, 1951.
44. Himwich, H.E., Himwich, W.A.: Biogenic amines - Progress in brain research, Vol. 8, Elsevier, Amsterdam, 1964.
45. Michaelson, I.A., Whittaker, V.P.: The subcellular localization of 5-hydroxytryptamine in guinea pig brain. *Biochem. Pharmacol.*, 12: 203, 1963.
46. von Euler, U.S., Lishajko, F.: Effect of adenine nucleotides on catecholamine release and uptake in isolated adrenergic nerve granules. *Acta Physiol. Scand.* 60: 217, 1964.
47. Gillis, C.N., Giarman, N.J., Freedman, D.X.: Retention of 5-hydroxytryptamine by subcellular fractions of rat brain homogenates. *Biochem. Pharmacol.*, 13: 1457, 1964.
48. Maynert, E.W., Kuriyama, K.: Some observations on nerve-ending particles and synaptic vesicles. *Life Science*, 3: 1067, 1964.
49. Wolfe, D.E., Potter, L.T., Richardson, K.C., Axelrod, J.: Localizing tritiated norepinephrine in sympathetic axons by electron microscopic autoradiography. *Science*, 138: 441, 1962.
50. Hertting, G., Axelrod, J.: Fate of tritiated noradrenaline at the sympathetic nerve-endings. *Nature*, 192: 172, 1961.
51. Gertner, S.B., Paasonen, M.K., Giarman, N.J.: Studies concerning the presence of 5-hydroxytryptamine (serotonin) in the perfusate from the superior cervical ganglion. *J. Pharmacol. Exp. Ther.*, 127: 268, 1959.
52. Gillis, C.N.: Increased retention of exogenous norepinephrine by cat atria after electrical stimulation of the cardioaccelerator nerves. *Biochem. Pharmacol.*, 12: 593, 1963.
53. Harvey, J.A., Heller, A., Moore, R.Y.: The effect of unilateral and bilateral medial forebrain bundle lesions on brain serotonin. *J. Pharmacol. Exp. Ther.*, 40: 103, 1963.

54. Heller, A., Seiden, L.S., Porcher, W., Moore, R.Y.: 5-hydroxytryptophan decarboxylase in rat brain: Effect of hypothalamic lesions. *Science*, 47: 887, 1965.
55. Snyder, S.H., Axelrod, J., Wurtman, R.J., Fisher, J.E.: Control of 5-hydroxytryptophan decarboxylase activity in the rat pineal gland by sympathetic nerves. *J. Pharmacol. Exp. Ther.*, 147: 3, 1964.
56. Harris, G.W.: Sex hormones, brain development and brain function. *Endocrinology*, 75: 627, 1964.
57. Potter, L.T., Axelrod, J.: Properties of norepinephrine storage particles of the rat heart. *J. Pharmacol. Exp. Ther.*, 142: 299, 1963.
58. Axelrod, J.: The uptake and release of catecholamines and the effect of drugs. In: *Progress in Brain Research*, ed. by H.E. Himwich and W.A. Himwich, p. 81. Elsevier, Amsterdam, 1964.
59. Kopin, I.J., Gordon, E.K.: Metabolism of norepinephrine-H<sub>2</sub> released by tyramine and reserpine. *J. Pharmacol. Exp. Ther.*, 138: 241, 1962.
60. Meltzer, H.Y., Barnett, R., Carlini, G.: Unpublished observations (1963).
61. Pepeu, G., Roberts, M., Schanberg, S.M., Giarman, N.J.: Differential action of iponiazid ("Marsilid") and betaphenylisopropylhydrazine "Catron") on isolated atria. *J. Pharmacol. Exp. Ther.*, 137: 334, 1962.
62. Maling, H.M., Highman, B., Spector, S.: Neurologic, neuropathologic and neurochemical effects of prolonged administration of phenylisopropylhydrazine (JB 516), phenylisobutylhydrazine (JB 835), and other monamine oxidase inhibitors. *J. Pharmacol. Exp. Ther.*, 137: 223, 1962.
63. Gey, K.F., Pletscher, A.: Effects of chlorpromazine on the metabolism of d1-2-C<sup>14</sup>-DOPA in the rat. *J. Pharmacol. Exp. Ther.*, 145: 337, 1964.
64. Sulser, F., Bickel, M.H., Brodie, B.B.: The action of desmethylimipramine in counteracting sedation and cholinergic effects of reserpine-like drugs. *J. Pharmacol. Exp. Ther.*, 144: 321, 1964.
65. Shore, Pa.A., Busfield, D.: The effect of desmethylimipramine on reserpine and insulin-induced release of gastric histamine and adrenal catecholamines. *Life Sciences*, 3: 361, 1964.
66. Udenfriend, S., Zaltzman-Nirenberg, P.: On the mechanism of the norepinephrine release produced by alpha-methyl-META-tyrosine. *J. Pharmacol. Exp. Ther.*, 138: 194, 1962.
67. Kopin, I.J., Fischer, J.E., Musachio, J.M., Horst, W.D., Weise, V.K.: False neurochemical transmitters and the mechanism of sympathetic blockage by monoamine oxidase inhibitors. *J. Pharmacol. Exp. Ther.*, 147: 186, 1965.
68. Kopin, I.J., Fischer, J.E., Musachio, J., Horst, W.D.: Biochemistry-evidence for a false neurochemical transmitter as a mechanism for the hypotensive effect of monoamine oxidase inhibitors. *Proc. Natl. Acad. of Sciences*, 52: 716, 1964.
69. McKean, C.M., Schanberg, S.M., Giarman, N.J.: A mechanism for the indole defect found in experimental phenylketonuria. *Science*, 137: -7/8 (3/4 - 3/8)
70. Schanberg, S.: A study of the transport of 5-hydroxytryptophan and 5-hydroxytryptamine (serotonin) into brain. *J. Pharmacol. Exp. Ther.*, 139: 191, 1963.
71. Friedhoff, A.J., Van Winkle, E.: Conversion of dopamine to 3,4 dimethoxyphenylacetic acid in schizophrenic patients. *Nature (Land.)*, 199: 127m, 1963.
72. Appel, J.B., Freedman, D.X.: Unpublished data.
73. Freedman, D.X., Appel, J.B., Hartmen, F.R., Molliver, M.E.: Tolerance and behavioral effects of LSD-25 in rat. *J. Pharmacol. Exp. Ther.*, 143: 309, 1964.
74. Freedman, D.X.: Studies of LSD-25 and serotonin in the brain. *Proc. 3rd Int. World Cong. Psychiat.*, 1: 653, 1961.

75. Appel, J.B., Freedman, D.X.: Chemically-induced alterations in the behavioral effects of LSD-25. *Biochem. Pharmacol.*, 13:861, 1964.
76. Freedman, D.X.: Psychotomimetic drugs and brain biogenic amines. *Amer. J. Psychiat.*, 119:843, 1963.
77. Smith, C.B.: Effects of d-amphetamine upon brain amine content and locomotor activity of mice. *J. Pharmacol. Exp. Ther.*, 147:96, 1965.
78. Szara, S.: Effect of psychotropic tryptamine derivatives on the regional distribution of serotonin in the brain. Presented at Third Meeting of Collegium International Neuro-Psychopharmacologicum, 1962.
79. Siva Sankar, D.V., Sankar, D.B., Phipps, E., Gold, E.P.: Effect of administration of lysergic acid diethylamide on serotonin-levels in the body. *Nature (Lond.)*, 191:499, 1961.
80. Siva Sanker, D.V., Broer, H.H., Cates, N.: Histamine-binding action of lysergic acid diethylamide. *Nature (Lond.)*, 200: 582, 1963.
81. Aghajanian, G.K., Bind, O.H.L.: Persistence of lysergic acid diethylamide in the plasma of human subjects. *Clin. Pharmacol. and Therap.*, 5:611, 1964.
82. Greiner, T., Burch, N.R., Edelberg, R.: Psychopathology and psychophysiology of minimal LSD-25 dosage. *Arch. Neurol and Psychiat.*, 79:208, 1958.
83. Bradley, P.B., Hance, A.J.: The effects of intraventricular injections of drugs on the electrical activity of the brain of the conscious cat. *Electroenceph. Clin. Neurophysiol.*, 8: 699, 1956.
84. Giarman, N.J., Pepeu, G.: The influence of centrally acting cholinolytic drugs on brain acetylcholine levels. *Brit. J. Pharmacol.*, 23: 123, 1964.
85. Spector, S., Sjoerdsma, A., Udenfriend, S.: Blockade of endogenous norepinephrine synthesis by alpha-methyl-tryosine, an inhibitor of tryosine hydroxylase. *J. Pharmacol. Exp. Ther.*, 147: 86, 1965.
86. McDonald, R.K., Weise, V.K.: The excretion of 3-methoxy-4-hydroxymandelic acid in normal and in chronic schizophrenic male subjects. *Psychiat. Res.*, 1: 173, 1962.
87. Schildkraut, J.J., Klerman G.L., Hammond, R., Friend, D.G.: Excretion of 3-methoxy-4-hydroxymandelic acid (VMA) in depressed patients treated with antidepressant drugs. *J. Psychiatric Res.*, 2: 1964.
88. Levin, B., Mackay, H.M.M., Oberholzer, V.G.: Argininosuccinic aciduria: an inborn error of amino acid metabolism. *Arch. Dis. Child.*, 36:622, 1961.
89. Bozzi, R., Bruno, A., Allegranza, A.: Urinary metabolites of some monoamines and clinical effects under reserpine and chlorpromazine. *Brit. J. Psychiat.*, 111: 176, 1965.
90. Vates, T., Korenetsky, C.: A comparison of some physiological changes in normal and schizophrenic subjects twelve hours after chlorpromazine administration. Abstract - Fall meeting, American Society for Pharmacology and Experimental Therapeutics, p. 35, 1958.
91. Shakow, D.: Psychological deficit in schizophrenia. *Behavioral Science*, 8: 275, 1963.
92. Callaway, E., III, Jones, R.T., Layne, R.S.: Evoked responses and segmental set of schizophrenia. *Arch. Gen. Psychiat.*, 12: 83, 1965.
93. Pious, W.L.: Hypothesis about the nature of schizophrenic behavior. In *Psychotherapy of the Psychoses*, ed. by A. Burton. Basic Books, New York, 1961.
94. Barchas, J.D., Freedman, D.X.: Brain amines: response to physiological stress. *Biochem. Pharmacol.*, 12: 1232, 1963.
95. Rosenzweig, M.R., Krech, D., Bennett, E.L., Diamond, M.C.: *J. Comp. Physiol. Psychol.*, 55: 429, 1962.
96. Geller, E., Yuwiler, A., Zolman, J.: Effects of environmental complexity and training of constituents of brain and liver. Abstract, International Neurochemical Conference, Oxford, Eng., July, 1965. (in press).
97. Gillis, C.N.: Unpublished data.
98. Pollin, W., Cardon, P.V., Jr., Kety, S.S.: Effects of amino-acid feeding in schizophrenic patients treated with iproniazid. *Science*, 133: 104, 1961.

## MYSTICAL STATES AND THE CONCEPT OF REGRESSION<sup>1</sup>

RAYMOND PRINCE AND CHARLES SAVAGE.

Many authorities on mysticism consider the mystical state to be a transitory elevation to a higher type of consciousness. Bucke (1) considered this 'higher level' to be a final step in man's evolutionary development. First, there is simple consciousness as in animals and young children; next emerges self-consciousness as it exists in human adults; finally, there is the stage called 'cosmic consciousness' reached by but a few men in the mystical state. Bucke predicted that increasing numbers would attain the state of cosmic consciousness. This point of view is difficult to reconcile with the observation that mystical states have much in common with certain psychotic states. For example, many psychotics describe states of ecstasy, of positive knowledge and of union with the 'world soul' that are highly reminiscent of the subjective experiences of mystics. One patient (2) wrote concerning the early stages of psychosis:

I was suddenly confronted by an overwhelming conviction that I had discovered the secrets of the universe, which were rapidly made plain with incredible lucidity. The truths discovered seemed to be known immediately and directly with absolute certainty.

Similarly, the group of psychedelic drugs is alleged by some to produce model psychoses, but, by others, to produce mystical states. This puzzling situation is somewhat akin to that relating genius and mental illness.

It is an alternative hypothesis about the nature of the mystical experience that we wish to present. It is based upon a psychoanalytic model. The hypothesis that mystical states represent regressions in the service of the ego. In presenting this hypothesis we will touch briefly upon the four following areas: (1) the concept of

<sup>1</sup> Presented at the First Annual Conference of the R.M. Bucke Memorial Society, Jan. 1965, Montreal, Canada, and reprinted from the Conference Proceedings.

regression, emphasizing its function in health; (2) neurophysiological data relevant to regression; (3) the subjective experience of early infancy; and (4) several characteristic features of the mystical state in the light of the present hypothesis.

### THE CONCEPT OF REGRESSION

In the simplest terms, regression means a return to an earlier level of functioning. Let us give some examples:

This first instance (3) describes the behavior of a two-year-old boy when he was taken to a hospital. He was a well-developed child with a good relation to his mother. For the first week the mother visited him daily; the second week she visited only twice and then did not return:

He became listless, often sat in a corner sucking and dreaming, at other times he was very aggressive. He almost completely stopped talking. He was dirty and wet continually. He sat in front of his plate eating very little, without pleasure, and started smearing his food over the table.

Comment is hardly necessary. We have a stress—abandonment in hospital—and a child of normal two-year development returns to behavior characteristic of a much younger child: (1) he stops talking, (2) eating habits deteriorate, (3) he sucks a good deal, and (4) there is a loss of bladder and bowel control. The picture is a familiar one to anyone with a family, observed to a lesser degree in the youngest child when a new baby enters the family circle. The next example is the account of an LSD experience (the result of a dose of 100 gamma given to a normal subject) recorded two days afterwards:

About one and a half hours after ingestion, the psychosis seemed to be at its height, and there was a great struggle to cling to reality. I had a coin and a pin in my wallet that had been given to me as good luck charms. I took these out and looked at them and they seemed to have a protective function as amulets. I seemed to be struggling against complete annihilation and nothingness.

During this period words seem to have lost their meaning. I asked constantly if there was such a thing as 'a chair,' or as 'truth' or 'craziness.' I seemed to be crossing the river Styx on words . . . At one point in the depth of the psychosis, I can't remember just when, I half-purposefully conjured up a visual image of a woman I had recently seen in a photography exhibition. She was a very motherly woman suckling a child at her ample breast . . . I replaced the woman in the picture with my own mother...her large nose, her fatness, and particularly the odor of her perspiration. I hallucinated her nipple in my

mouth. This again was a protection against annihilation and a comfort. By about four hours following ingestion, I was beginning to recover. I felt completely exhausted physically and emotionally and felt as though I had been swimming through uncharted seas; I flung myself exhausted on the bank. I was Lazarus back from the dead; I was a prisoner consigned to death and given a reprieve. A whole new crop of words had sprouted and I had a strong sense of having a new personality—tender, defenseless—just pulling myself out of the primeval slime and sunning myself on the bank.

In this example we have an anxiety-laden regression to the pre-verbal level. Other regressive features are (1) a return to magical modes of thinking, the use of the pin and the coin as protective amulets, (2) a return to hallucinatory thinking. Unlike the child in the first example, this regression is largely subjective and of short duration. He does not for example, lose bowel or bladder control, nor does he suck at his fingers or engage in other childlike behavior. Of particular interest here is the symbolism of death and rebirth. He speaks of crossing the river Styx, and when the effects are wearing off, he feels like Lazarus back from the dead, a whole new crop of words has sprung up and he has a strong sense of having a new personality—tender, defenseless, 'just pulling myself out of the primeval slime and sunning myself on the bank.' Here, then, is a withdrawal and a return, a regression of at least some part of the self back to the age of one or two years, then the regression is terminated and there is a feeling of rebirth and a successful return to adulthood.

Our final example is a regression of a different type, or at least a regression that serves a different function. It is not escape from a painful reality with an undesirable outcome, nor is it drug-induced. Rather it is an example of regression in the service of the ego—a technique employed by the ego in problem-solving. We quote from Henri Poincaré's (4) description of his discovery of certain mathematical equations:

For fifteen days I strove to prove that there could not be any functions like those I have since called Fuchsian functions. I was then very ignorant, every day I seated myself at the work table, stayed an hour or two, tried a great number of combinations and reached no results. One evening, contrary to my custom, I drank black coffee and could not sleep. Ideas rose in crowds; I felt them collide until pairs interlocked, so to speak, making a stable combination. By the next morning I had established the existence of a class of Fuchsian functions . . . I had only to write out the results, which took but a few hours.



and further:

... when, above, I made certain personal observations, I spoke of a night of excitement, when I worked in spite of myself. Such cases are frequent, and it is not necessary that the abnormal cerebral activity be caused by physical excitement as in that I mentioned. It seemed that, in such cases, that one is present at his own unconscious work, made partially perceptible to the over-excited consciousness, yet without having changed its nature. Then we vaguely comprehend what distinguishes the two mechanisms or, if you wish, the working methods of the two egos.

In this example the higher conscious logical modes of thinking are given up and a more random trial-and-error kind of dream-thinking takes over.

These examples by no means exhaust the range of phenomena designated regressive. Many hypnotists claim that genuine age regressions can be produced by hypnosis. Some of regression is present in all psychiatric disorder. Schizophrenia provides perhaps the best example of the deepest regression over the most prolonged period. To mention one example, Arieti (6) has described a group of chronic schizophrenics in mental hospitals whose behavior is highly reminiscent of six-months to two-year-old children:

... They manifest the habit of grabbing every small object and putting it into the mouth, pay no attention at all to the edible or non-edible nature of it. If they are not restrained, these patients pick up crumbs, cockroaches, stones, rags, paper, wood, coal, pencils and leaves from the floor and put them in the mouth. Generally they eat these things; occasionally they swallow them with great risk.

These patients were also severely regressed in other ways: if they spoke at all their words were unintelligible; there was loss of bowel and bladder control and complete absence of social graces.

These pathological types of regression are probably too well known to require further description. Regression in the service of the ego, on the other hand, is perhaps less familiar and is indeed more relevant to our present subject. One of the commonest instances of regression in the service of the ego is sleep. Freud described how, before sleep, we strip off all the bric-a-brac of civilization: our false teeth, wigs, spectacles and clothes—and return to our primal state of nudity. We return to our prenatal condition of unconsciousness. Even more to the point are the regressive phenomena that we experience along the borderlines of sleep, the hypnagogic imagery, the loosening of thought processes, the preverbal hallucinatory phenomena of dreams with their archaic logic. And each morning we experience a rejuvenation and rebirth.

Kris has discussed the regressive nature of humor and of many types of games and play. (7) Psychoanalysis makes extensive use of regression; over the months of treatment the patient during his hour-long sessions makes a fluctuating regression into his past. He re-experiences situations within his family and projects his reactivated feelings upon his analyst. The responses of his analyst are different from those of his pathological family figures and he is able to correct his feelings and move on to other situations, stripping each one of its painful affects. He comes to terms with the specters from his past.

Let us now fill out and broaden our definition of regression. Regression is a return to an earlier level of functioning—it may involve only part of the self (as with the regressive modes of thought of Poincare or it may be more complete, as in the severely regressed schizophrenics described by Arieti. The regression may be of a few minutes' duration or may be permanent; it may be in response to stress—a retreat from painful reality—or it may be more or less consciously undertaken as a means of recreation, or as a step in the creative process, or as a form of treatment for psychoneuroses.

#### NEUROPHYSIOLOGY AND REGRESSION

There are many neurophysiological experiments with animals, and some with humans, which shed light on the nature of regression in physiological terms. We would like to touch briefly on four types of study:

The concept of regression suggests that the human brain contains complete records of at least some of the past experiences of the individual. We do not here mean simply memory. We mean that the entire experience, including the way the individual reacted to it, the experience and the matrix in which it is embedded, have been recorded—like a video tape with sound track, olfactory, pain and temperature track as well as affect track.

Wilder Penfield's (8) work with cortical stimulation provides evidence that this is so. The cortex of an epileptic patient was exposed; the patient remained conscious. Various cortical areas were stimulated to seek that area which would produce the aura that heralded the patient's seizure. During these explorations, Penfield was surprised to find that his patient would relive with hallucinatory vividness, long forgotten experiences:

These hallucinations are made up of elements from the individual's past experience. They may seem to him so strange that he calls them dreams but when they can be carefully analyzed it is evident that the hallucination is a shorter or longer sequence of past experience. The

subject relives a period of the past, although he is still aware of the present. Movement goes forward again as it did in that interval of time that has now been by chance, revived, and all of the elements of his previous consciousness seem to be there—sight, sound, interpretations, emotions. The hallucinations include those things that were within the focus of attention. The things he ignored then are missing now.

Penfield does not mention the reactivation of experience from early preverbal periods. Perhaps the upper surfaces of the cortex do not store these very early experiences. There is evidence, as we shall see presently, that early experiences may be related to phylogenetically older brain areas.

Let us now turn to cognitive functions—the area of perception, and concept and symbol formation. As Piaget and others have demonstrated, the child develops the symbolic function by gradually differentiating the signifier from the thing signified; the word from the object. There is first the hallucinatory image of the chair, then the word 'chair' attached to a specific chair, and finally the general category of chair—the platonic idea of a chair; the child gradually transforms a signal into a symbol. All this takes place in the first three years of life. In regressive phenomena we find the reverse process; conceptual abilities disappear first and subsequently there is a re-emergence of hallucinatory phenomena. We have already seen in the LSD-induced regression how the subject reported that words had lost their meaning and later that hallucinatory phenomena appeared. A similar sequence has been demonstrated in animals by several workers. Bridger (9) dealt with the effects of mescaline on conditioned responses of dogs. Normally, the dogs would lift a paw at the onset of a conditioned stimulus (buzzer) that had previously been paired with the unconditioned stimulus (shock). They would howl and bark when they received the shock. Under the effects of mescaline, the specific motor act of lifting the paw was inhibited. However, they howled and barked to the conditioned stimulus, even though no shock was applied. It appeared that the buzzer produced the hallucination of the shock. In a similar study in rats, Courvoisier (10) reported a 'veritable hallucinatory crisis.' Under mescaline, in response to each presentation of the conditioned stimulus (bell), the rats squealed and jumped up and down 'as if they were being shocked,' an event that never appeared in the 'unmescalinated state.'

How do the hallucinogens act to produce this regressed state? There is growing evidence that both LSD and mescaline dampen the activity of the most highly-evolved areas of the brain and activate the more archaic areas. A description of the experimental

evidence for these statements is not sufficiently relevant to this paper to warrant presentation, but the interested reader is referred to the writings of Gastaut, (11) Rowland, (12) Killam (13) and the summary by Bridger. (9)

As a final piece of experimental evidence we would like to mention the findings of Lustman. (14) He and his associates studied 46 newborn infants under 8 days old during circumstances regarded to be the extremes of pleasure and pain, i.e., during active suckling and during colic. They observed that during these experiences the infants were completely unresponsive to auditory, tactile and electrical stimulation. They developed the hypothesis that the newborn ego has at its disposal a very limited amount of 'psychic energy' which is completely absorbed in the pleasant or unpleasant experience. No energy remains for other sensory avenues. 'This lack of available energy forms an inborn primary defense mechanism which is called the defense of imperceptivity.' We mention these observations because of their possible connection to the well-known states of imperceptivity associated with yoga and other mystical states. St. Theresa (15) writes, for example:

While seeking God in this way, the soul is conscious that it is fainting almost completely away in a kind of swoon. It can hardly stir its hands without great effort, the eyes close involuntarily; if they remain open, they scarcely see anything. If a person reads, he can scarcely make out a single letter; it is as much as he can do even to recognize one. He sees that there are letters, but as the understanding does not help, he cannot read them if he wanted to. He hears but he doesn't understand what he hears.

Recently, electroencephalographic studies of yoga practitioners during 'samadhi' have been carried out. In idle waking consciousness, cortical electrodes demonstrate what is known as alpha rhythm (8 to 12 cycles per second) and when an individual concentrates, this alpha rhythm is blocked. It returns with the return to the idle state. Anand *et al.* (16) took EEG tracings of 4 yoga practitioners in 'samadhi.' Their rhythms were of the normal alpha type except that there was some increased amplitude modulation. However, the alpha activity could not be blocked by sensory stimulation; for example, the alpha rhythm was unaffected when the subject's hands were placed in ice water for three-quarters of an hour. The yogi seemed to have effectively cut himself off from the external world, a fact of which he himself was aware and which could also be demonstrated objectively in this way.

Of possible relevance here are some further observations of

Arieti (17) on his group of regressed schizophrenics. They seemed almost insensitive to pain.

They appear analgesic not only to pinprick but to much more painful stimuli. When they are in need of surgical intervention and require sutures in such sensitive regions as the lips, face, skull, or hands, they act as though they cannot feel anything, even in the absence of any anesthetic procedure... The same anesthesia is noted for temperature. The patient may hold a piece of ice in his hands without showing any reaction. Pieces of ice may be placed over the breast, abdomen or other sensitive regions without eliciting any reaction or defensive movement . . . They may sit near the radiator and if they are not moved they may continue to stay there even when, as a result of close contact, they are burned.

We do not know of course, whether these phenomena, which are somewhat similar on the surface, really have any neurophysiologic resemblance. It would be interesting to repeat Anand's electroencephalographic studies on Arieti's schizophrenics. The hypothesis we put forward is that the defensive imperceptivity to be observed in the newborn returns in the schizophrenics as a result of a deep regression. The yogi has in some way gained conscious control of this archaic physiological process during a temporary regression in the service of the ego.

#### THE PHENOMENOLOGY OF THE INFANTILE STATE

What does it feel like to be a newborn child? Of course we can never know, any more than we can ever know what the subjective life of a caterpillar or a dog is like—or, for that matter, that of even those people closest to us. As far as the subjective life is concerned, each is an island unto himself.

This very fundamental difficulty has not prevented speculation or, should we say, assertions about the phenomenology of the infant, particularly by members of the analytic school. (18) Such descriptions are not entirely imaginary, but are pieced together from observations on young children, the recollections of adults, and abnormal states of patients.

It would appear that the earliest mode of relationship between the infant and the outer world of things is by participation—or perhaps it would be more correct to say, in this early stage, the self and the world have not yet been separated from one another. In the newborn's relationship with the thing, he is that thing; he doesn't see and feel the breast; he doesn't hear the sound of the train whistle, he is the sound of the train whistle . . . We can perhaps think of the infant's

stream of consciousness at this time as being a succession of concrete things—hunger, pain, breast, mother odor, side bar of crib, etc. At this stage there would be no separation between I and it—all would be one. Subsequently, when the infant's ego has attained some degree of autonomy, the stream of consciousness becomes one of perception, and hallucinations of perception. At first we may think of the hallucinatory experience as being indistinguishable from genuine perception. One may consider the sleeping child; physiological conditions of hunger occur and the child rises to the more superficial levels of sleep, then the hallucination of the breast emerges and the child may be observed to make sucking motions with his mouth and then sink back into the deeper levels of sleep. At this level, the image of the breast is equal to the real breast. (19)

We have already drawn attention to the interesting regressive phenomena that occur at the fringes of sleep. They may take the form of curious body image distortions—one's mouth seems huge and swollen or one's hands or buttocks are very large and heavy. There may be visual hallucinations, or there may be humming sounds or the babbling of indistinguishable voices. There may be pages of print which one strains to read. They seem to have meaning at the time, but upon emerging to a higher level of consciousness the words seem to have been mere nonsense. These phenomena, of course, merge with dream experiences of one kind or another. We do not know how widely these phenomena are distributed in the population but it is probable that there are at least some of the readers of this paper who have experienced them. They are unstable; one has but to move a limb and they collapse.

In 1938 Isakower (20) described that particular cluster of such hypnogogic experience which now bears his name—the Isakower phenomenon. The experience occurs just as the patient is falling asleep or, rarely, just as he is waking up. A large, round, dark mass seems to approach the beginning sleeper, or it may be like a grey cloud, it envelops him, at the same time producing a rough, doughy, corrugated feeling in the mouth and in the skin, so that he loses his sense of the self-boundary and cannot say where the division is between his own body and the mass. At times there is a feeling of giddiness, as though the sleeper were on a rotating disc. There is something large in the mouth, a lump that cannot be swallowed. There may be a heaviness lying on top of him, and perhaps a humming, babbling or murmuring of unintelligible speech. This phenomenon has since been widely commented upon by others. Isakower believed it to be a hallucinatory revival of the nursing experience. It is a state of regression and reactivation of

the time when self and breast were indistinguishable. In 1946 Bertram Lewin (21) described his concept of the dream screen:

The baby, after nursing, falls into a presumably dreamless sleep. Theoretically it may be more correct to speak of the babies having a 'blank dream,' a vision of uniform blankness which is a persistent after-image of the breast. Later in life this blank picture of the flattened breast, preserved in dreams as a sort of backdrop or projective screen, like its analogue in the cinema, comes to have projected upon it the picture that we call the visual manifest content of the dream. The fulfillment of the wish to sleep produces only sound sleep and the dream screen. So far as falling asleep reproduces the infant's first sleep after nursing, it reproduces the fusion of the ego and the breast. The primitive sleeping ego is id, except for the dream screen, the erstwhile breast sole and first representative of the environment.

We have here then in the works of Isakower and Lewin the concept that each night the individual regresses to the primary nursing experience. One of the reasons we introduced Lewin's concept of the dream screen was to suggest that the dream screen might be related to the mandala. Jung (22) has made us very conscious of the mandala. The word is Sanskrit for magic circle. It is generally a circular symbol with a figure, frequently female—the *anima mundi*—at the center. One of our patients produced in dreams such a mandala. The female figure in the center was clothed in white and she carried in one hand a torch and in the other a dove; around her waist was a serpent swallowing its own tail; at the periphery were panels showing the sun, moon, stars, fields, etc. The patient felt that the female figure was a source of great power and that all the meaning in the world had its source in her. Mandala symbolism is, of course, extremely diverse, and of very widespread distribution in the religions of the world. It is frequently used as a focus for contemplation by mystics.

We know of only one instance of the dream screen or the mandala in literature. It is in those gold mines of psychopathology, the short stories of Edgar Allan Poe. *The Narrative of A. Gordon Pym* concerns a series of harrowing adventures at sea. The story is full of oral imagery and pathology—starvation, cannibalism, sleep disturbances, etc. At the end of the story the protagonist is adrift in a canoe in some exotic and unexplored part of the globe. The sea water is of a milky hue and in his canoe he approaches a strange white curtain.

I can liken it to nothing but a limitless cataract, rolling silently into the sea from some immense and far-distant ramparts in the heavens. The

gigantic curtain ranged along the whole extent of the southern horizon. It emitted no sound . . . at intervals there were visible in it yawning, momentary rents, and from out these rents, within which was a chaos of flitting and indistinct images, there came rushing and mighty, but soundless winds, tearing up the enkindled ocean in their course . . . and now we rushed into the embraces of the cataract, where a chasm threw itself open to receive us. But there arose in our pathway a shrouded human figure, very far larger in its proportions than any dweller among men. And the hue of the skin of the figure was of the perfect whiteness of snow.

#### MYSTICAL STATES AS REGRESSIONS IN THE SERVICE OF THE EGO

We have now dwelt sufficiently on the concept of regression and the variety of its manifestations. Let us now turn to a description of the mystical state. Mystical states of altered consciousness of relatively short duration—a few minutes to a few hours, exceptionally to a few days. They may occur spontaneously or may be actively sought by the subject using a variety of techniques, including prayer, contemplation, fasting, and various bodily activities or postures. Not all are successful; even with considerable effort some individuals are not to attain the mystical state. There is no doubt a variety of such states with a wide range of phenomenology. Zaehner (23) describes the following three types: (1) the state of feeling at one with nature; (2) the feeling of fusion of the self with Deity but with the maintenance of the self-feeling; (3) a loss of self-feeling—the fusion of the self with the other so that there is only the one all-pervading element. Unlike the states of possession that occur in primitive groups, most of these states seem to occur in a more or less clear consciousness so that the experience can be recalled after the return to ordinary consciousness. In many instances a definite change in personality or attitude results. Such changes are by no means automatic, however, and seem to depend a good deal upon the setting in which the state occurs and the attitudes of the subject. Changes may be along the line of a reduction in self-concern, an increased placidity, a loss of interest in material possessions, an increase of passivity in the face of adversity, etc. The nature of these changes, their extent and stability have not been adequately studied, at least in the Western world.

In spite of the diversity of these states, a number of common features has been described. These include, (1) renunciation of worldly attachments as a prelude, (2) the ineffability of the experience itself, (3) the noetic quality, (4) the ecstatic feeling, and (5) the experience of fusion.

As we have already said, the hypothesis we are proposing is that mystical states are examples of regressions in the service of the ego. They are, therefore, to be considered in the same class as certain creative experiences and certain types of psychotherapy; they are also close kin to the psychoses. More specifically, we propose that mystical states represent regressions to very early periods of infancy. The basic characteristic – that of ecstatic union – suggests a regression to early nursing experience. Possibly the variation in phenomenology represents variations in depth of the regression to earlier or later types of nursing experience. It is possible too that the outcome of the experience – either the successful return to the real world or the entry into psychoses – depends in part whether these early feeding experiences were pleasurable or frightening. The exploration of this line of thought is, however, beyond the scope of the present paper. Now we would like to examine the above-listed characteristics in the light of this hypothesis.

### (1) THE RENUNCIATION OF WORLDLY INTERESTS

When mystical states are aspired to, the first stage is the stripping of the self of all material encumbrances; there is renunciation and detachment.

This renunciation seems a common prelude to regressive experiences in general. The preparation for sleep involves the putting aside of all the trappings of adult life, as we have shown: the room is darkened and we must disengage ourselves from the concerns of the day; it is a well-known feature of the beginning stages of schizophrenia that the patient gradually loses interest in his friends, his work, and the external world in general; regressive experiences produced by sensory deprivation could also be mentioned. (24)

### (2) INEFFABILITY

Upon return, mystics commonly have difficulty in clothing their experiences in words. When they do refer to the content, they feel that the words they are using do not really express the nature of their experience. In the light of our hypothesis, the difficulty could be explained by the fact that the experience recaptured is a preverbal one. Words are linked with states of consciousness typical of two years of age and older. When they are pressed into service to describe earlier modes of experience they seem to fall short.

Jacob Boehme, (25) the great 16th century Christian mystic wrote:

... Who can express it?

Or why and what do I write, whose tongue does but stammer like a child which is learning to speak? With what shall I compare it? Or to what shall I liken it? Shall I compare it with the love of this world? No, that is but a mere dark valley to it.

O immense Greatness! I cannot compare it with any thing, but only with resurrection from the dead; there will the Love-Fire rise up again in us, and rekindle again our astringent, bitter, and cold, dark and dead powers, and embrace us most courteously and friendly.

### (3) THE NOETIC QUALITY

Mystics believe they have grasped profound truths during their experiences. They have drunk deeply at the fountain of meaning. As Happold (26) says:

(Mystical experiences) result in insight into depths of truth unplumbed by the discursive intellect, insights which carry with them a tremendous sense of authority. Things take on a new pattern, and a new, often unsuspected, significance.

How are we to explain this noetic quality? It is a common psychological principle that first experiences are the most significant in any series. Clearly, one of the first conscious experiences is that of feeding at the breast. Lewin (27) writes:

A similar element in many ecstasies is the allegation of direct inspiration, pure and immediate perception of inexpressible truth... this certainty reflects the realness of the breast experience. This experience is what one knows because it is primal, immediate, and unquestioned experience. It was not learned by seeing or hearsay, but represents the primitive narcissistic trust in sensory experience.

It will be recalled that our patient commented that the female center in her mandala was the source of all the meaning in the world. Plotinus (28) wrote:

Things there flow in a way from a single source, not like one particular breath or warmth, but as if there were a single quality containing in itself and preserving all qualities, sweet taste and smell and the quality of wine with all other flavors, visions of colors and all that touch perceives, all, too, that hearing hears, all tunes and every rhythm.

It is as though all the realities of the world are dim reflections of that primal Reality.

#### (4) ECSTASY

A feeling of preternatural joyfulness seems to be a characteristic of many mystical states—particularly those of the type called nature mysticism and deistic mysticism. There are two ways of looking at the ecstasy of these states: (a) we could regard them as a pure regression and re-experience of the bliss of nursing; (b) we could regard them as similar to the elation associated with certain psychotic states, notably mania.

The psychopathology of mania requires clarification. We have chosen an episode from the novel *Frankenstein* by way of illustration. Frankenstein has succeeded in constructing a monster from human body parts garnered from a graveyard. Moreover, he succeeds in bringing his monster to life. It is appalling to look upon, Frankenstein is horrified and he rushes from the laboratory. Some days later he returns and is immeasurably relieved to find the monster gone. He has a brief manic attack:

It was not joy only that possessed me; I felt my flesh tingle with excess of sensitiveness, and my pulse beat rapidly. I was unable to remain for a single instant in the same place; I jumped over chairs, clapped my hands and laughed aloud. Clerval at first attributed my unusual spirits to joy on his arrival; but when he observed me more attentively, he saw a wildness in my eyes for which he could not account; and my loud, unrestrained, heartless laughter frightened and astonished him.

This is a good description of the uneasy elation of mania. Of course the monster had not really gone; he returned to haunt Frankenstein for the balance of the novel. This passage also illustrates the defense mechanism of denial which is so commonly associated with mania. It is a kind of defense of imperceptivity raised to a psychological level. It is at best an unstable elation—a kind of ostrich technique. Mania as a psychiatric disorder is often associated with periods of depression. The mania may then be regarded as associated with the denial of the horror of the depressed state.

If we are to seriously consider the possibility that mystical ecstasies may be of the manic type, we must look for possible painful elements in the nursing situation. We do not have far to seek. It is clear that the state of rage and fear of a child kept

waiting to be fed would be such a painful circumstance; the anxiety or irritation of a harassed mother communicated to the tender ego of the newborn would be a second example.

We must now return to our original question. Which type of bliss are we dealing with in mystical experiences—(1) the simple elation of nursing, (2) the elation associated with denial, a manic elation? Let us examine some descriptions of mystical states to see which type seems the best fit.

Certainly, in many descriptions by Christian mystics, the simple elation of fulfillment seems most appropriate. I choose a few at random.

Jacob Boehme (29) writes:

O gracious amiable Blessedness and great Love, how sweet art thou! . . . How pleasant and lovely is the relish and taste! . . . How ravishing sweetly dost thou smell!

Richard St. Victor (30) wrote:

In this state the Lord often visits the hungry and thirsty soul, often He fills her with inward delight and makes her drink with the sweetness of His spirit

And now a passage from St. Francis de Sales, (31) in which he describes the 'orison of quietude':

In this state the soul is like a little child still at the breast whose mother, to caress him while he is still in her arms, makes her milk distill into his mouth without even moving his lips. So it is here. . . our Lord desires that our world should be satisfied with sucking the milk which His Majesty pours into our mouth, and that we should relish the sweetness without even knowing that it cometh from the Lord.

From these examples we can see that at least in some instances the mystical ecstasy seems closest to the simple regression to nursing. This is not, we think, the whole story. There is the depressive condition known to mystics as the dark night of the soul and there are periods of temptation. The question of the nature of mystical elation must be left in abeyance at this time.

#### (5) THE FUSION EXPERIENCE

The experience of fusion is, as we have seen, typical of all kinds of mystical experience. It is a feeling that one's individuality, one's self-boundaries have disappeared—the self and nature are inter-fused. One's being is fused with a greater being of some type, sometimes to the extent that there are no longer two things but only one all-pervading thing.



We have already dealt at some length with the phenomenology of the infantile state and the gradual emergence of the self as distinct from the rest of the world. The feeling of loss of boundaries, then, can be regarded simply as a regression to this earlier state.

### CONCLUSION

In an article entitled "The Supra-Conscious State," Kenneth Walker, (32) the well known British surgeon and student of mysticism, recently expressed a commonly held belief about the psychiatric view of mystical states:

Some psychologists deny the existence of higher states of consciousness, and dismiss them as 'dream states,' regarding the experiences of the mystics as entirely illusory. It is strange that Freud, who discovered so much about subconscious states, should not have postulated the existence of levels of consciousness *above* as well as *below* the level on which we usually live.

We hope in this paper that we have at least convinced the reader that the psychoanalyst does have something significant to say about the mystical state, and that it is not simply dismissed as illusion or 'dream state.' Indeed, we doubt that other hypotheses explain the observed facts nearly as satisfactorily. The concept of regression is particularly helpful in providing a plausible link between psychoses and mystical states. A psychosis is a pressured withdrawal with—in many cases—an incomplete return. A mystical state is a controlled withdrawal and return; a death and rebirth, often a rebirth into a world with a radical shift in its iconography—a death and transfiguration.

### REFERENCES

1. Bucke, R.M.: *Cosmic Consciousness*, New York, Dutton Co., 1951.
2. Anonymous: Case Report: An Autobiography of a schizophrenic experience. *J. Abn. Soc. Psychol.* 51: 677-689, 1956.
3. Burlingham, D. et al: Monthly Report of Hampstead Nurseries for May 1944. Quoted in Bowlby, J.: *Child Care and the Growth of Love*. Pelican, 1953, p. 27.
4. Poincare, H.: Mathematical Creation. In Brewster Ghiselin (Ed.) *The Creative Process*, New York, Mentor Books, 1955, pp.36½-42.
5. Le Bon, G.: *The Crowd*. London, Ernest Benn, 1952, p. 32.
6. Arieti, S.: *Interpretation of Schizophrenia*, New York, Brunner Co., 1955, p. 363.

7. Kris, E.: *Psychoanalytic Explorations in Art*. Part 3, New York, International Universities Press, 1952.
8. Penfield, W.: *The Excitable Cortex in Conscious Man*. Liverpool, Liverpool University Press, 1958, p. 23.
9. Bridger, W.H.: Contributions of conditioning principles to psychiatry. In *Symposium No. 9. Group for the Advancement of Psychiatry*, 1964, pp. 181-198.
10. Courvoisier, S.: Pharmacodynamic basis for the use of chlorpromazine in psychiatry. *J. Clin. Exper. Psychopathology*, 17: 25, 1956.
11. Gastaut, H.: Some aspects of the neurophysiological basis of conditioned reflexes and behavior. In G.E.W. Wolstenholme & C.M. O'Connor (Eds.) *Neurological Basis of Behavior*, London, Ciba Foundation, 1958.
12. Rowland, V.: Differential electroencephalographic response to conditioned auditory stimuli in arousal from sleep. *EEG Clin. Neurophysiol.* 9: 585-594 1957.
13. Killam L.R. & E.K.: The action of Lysergic Acid Diethylamide on the central afferent system in the cat. *J. Pharmacol. Exper. Therapeutics*, 116: 35-42, 1956.
14. Lustman, S.L.: Psychic energy and mechanisms of defense. *Psychoanalytic Study of the Child*, 12: 151-165, 1957.
15. ———, *The Life of Saint Teresa of Avila*. Translated by J.M. Cohen. Penguin, 1957, p. 125.
16. Anand, B.K. et al: Some aspects of electroencephalographic studies of Yogis. *EEG Clin. Neurophysiol.*, 13: 452, 1961
17. Arieti, S.: *ibid*, p.373.
18. Freud, S. *Civilization and its Discontents*. Standard Edition, Vol. XXI, London, Hogarth Press, pp.64-73.
19. Burrow, I.: *Preconscious Foundations of Human Experience*. New York, Basic Books, 1964.
20. Prince, R.H.: Curse, invocation and mental health among the Yoruba. *Can. Psychiat. Assoc. J.*, 5: 65-79, 1960.
21. Isakower, O.: A contribution to the psychopathology of phenomena associated with falling asleep. *Int. J. Psyc. anal.*, 19: 331-345, 1938.
22. Lewin, B.D.: Sleep, mouth and dream screen. *Psyc. anal. Quart.*, 15: 419-443, 1946; Reconsiderations of the dream screen. *Psyc. anal. Quart.*, 22: 174-199, quotation from: *The Psychoanalysis of Elation*. New York, Norton Co., 1950, p. 89.
23. Jung, C.G.: Concerning mandala symbolism. *Collected Works, Bollingen Series XX*. Vol. 9, Part 1, pp.355-384, 1959
24. Zaehner, R.C.: *Mysticism. Sacred and Profane*. New York, Oxford University Press, 1961.
25. Bexton, W.H., Heron, W. & Scott, T.H.: Effects of decreased variation in the sensory environment, *Can. J. Psychol.*, 8: 70-76, 1954; for review see Thorpe, J.G. Sensory deprivation. *J. Ment. Sc.*, 107: 1047-1059, 1961.
27. Boehme, J.: In W. Scott Palmer (Ed.): *The Confessions of Jacob Boehme*. New York, Harper, 1954, pp. 43-44.
28. Happold, F.C.: *Mysticism. A Study and an Anthology*. Penguin, 1963, p. 45.
29. Lewin, B.D.: *The Psychoanalysis of Elation*. *ibid* p. 149.
30. Happold, F.C.: *ibid* p. 187—quotation.
31. Boehme, J.: *ibid* p. 43.  
Happold, F.C.: *ibid* p. 213—quotation.
32. James, W.: *The Varieties of Religious Experience*, New York, Modern Library, 1902, p. 12—quotation.
33. Walker, K.: The Supra-Conscious State. *Image (Hoffman LaRoche)* 10: 11-14, 1964.

## DISCUSSION

Walter Houston Clark.

Dr. Prince and Dr. Savage's admirable paper has persuasively set forth the good grounds that we have for seeing mystical states as, at least in some sense, a return to the state of early infancy. Furthermore, they have suggested that this regression may be a wholesome one which may serve the ego to strengthen it. I have often wondered at the neglect, by psychological medicine and by any colleagues interested in the psychology of personality, of such a rich source of intense information about the human spirit that a careful study of religious experience may yield. What little attention mysticism has received, particularly if we omit the writings of C.G. Jung, has come mostly from Freudians who have assumed that when they pointed out similarities of mysticism to early infancy they have sufficiently damned this intense form of human experience.

And yet history is full of the accounts of mystics and converts whose intense and immediate experience of what in various ways they have described as Ultimate Reality has transformed and energized their lives. Socrates, Moses, Isaiah, Buddha, Jesus, Paul, Francis of Assisi, Teresa of Avila, George Fox, Pascal, William Blake, Balzac, Walt Whitman, R.M. Bucke, and Arthur Koestler are just a few. If we can take it as demonstrated that mystical states involve regression, at least in some sense, we still need to ask the question, why? Is it not something of a paradox that a return to a more primitive state should so often result in what appears to be a moral, spiritual, health-producing advance? Furthermore, why should religious experiences, which by the very reason of their intensity are bound to be of short duration, often make such a difference in the subsequent life of the individual? Perhaps I should interject here the acknowledgement that whole-some results are not invariable, as Drs. Prince and Savage have already indicated, but we still have to account somehow for the frequent examples of those that are.

I regret that my suggestions are so largely speculative almost to the point of irresponsibility, but I can only plead that the poverty of studies of the mystical states, certainly of an empirical nature, leaves me no other alternative. I will cite studies in contingent fields where they may be relevant, whenever I can. My comments will be addressed chiefly to this problem of how change, particularly constructive change, can occur.

It is quite obvious that, for any change of personality to take place, there must be a certain measure of lability on which the change depends, and the greater the change, the greater the lability or possibility of change. Have we any reason to believe, then, that regression will increase lability or impressionability? *A priori* we should expect, if regression is truly a return to childhood or infancy, this would be the case, for children are proverbial for their impressionability: as the twig is bent, the tree is inclined. Furthermore, it is well known that often a trauma in childhood or infancy forms the basis for a neurosis that will leave its mark for a lifetime. A terror may be of only a few seconds' duration. Any psychiatrist knows that frequently it is only an excitement of equal intensity that has any chance of mitigating the original trauma. Also it is well known that mystical experience is the most intense known to man, surpassing even orgasm, if we can read rightly the words of those who try to describe mystical experience to us.

We might recall in this connection that Pavlov, in his work with dogs, discovered that under states of severe excitement, frightened dogs will arrive at a stage where their temperament may be fundamentally changed and will attack attendants previously loved and love those they had formerly disliked. There is an instructive discussion of Pavlov's findings, related both to psychotherapy and religious states, in William Sargant's *BATTLE FOR THE MIND*. (1) If fear can produce a state of extreme lability, why not the joyful ecstasy of the mystic as well?

There is no reason why the physiological condition of the organism may not play a part here as well. We know that emotional states will activate the endocrine glands and very quickly alter the chemical composition of the blood. This doubtless affects the nervous system in such a way as to make changes more likely. The speculation here is supported by what we know of the psychedelic drugs, which have triggered both mystical experiences and personality changes at the same time, as has been pointed out. I know of a group of convicts in prison where these drugs seem to have influenced some of the group strikingly for the better. More knowledge of the biochemistry of the psychedelics will doubtless throw further light on these problems.

Another advantage of regression is suggested by what educational psychologists speak of as the "most favored moment" for learning. In other words, there is a best stage in the development of the individual for learning certain skills which, once gone by, does not return. I remember that a number of years ago, after a considerable struggle with the German language, I went to Germany and was amazed to discover every urchin on the street not only

handling this difficult language in his play but uttering the words with faultless pronunciation, a feat I would never accomplish if I put years of study into it. The reason is that my favored moment has gone by—unless indeed I can regress and become again “like a little child.” This reminds me of a language student who claimed that, under LSD, she found it much easier to acquire the accents of the Spanish language she was studying.

This brings us to a special case of the favored moment for “imprinting” in animals. It has been suggested (by Dr. Timothy Leary and his associates) that some of the effects of the psychedelic drugs may be explained by this phenomenon. In a recent issue of *SCIENCE*, Eckhard H. Hess (2) tells of the research of Konrad Lorenz, who found that newly-hatched chicks formed an emotional bond to the first moving object they saw and would follow this (though it might be a human being or even an inanimate object) in preference to their own mothers. The suggestion is that the psychedelics produce a regression to the point where imprinting is once again possible and radical changes of cathexes produced.

One other possible mechanism may be briefly mentioned. Drs. Prince and Savage spoke of the case of Poincare when, after he had worked hard over a problem, the solution came not when he was struggling with it but when he was in a semi-relaxed state in bed. This reminds us of Kekule and the benzene ring and also of the fact that mystical experiences cannot be forced but must be waited for, even though it is true that in some ways they must be prepared for too. In Carlyle's *SARTOR RESARTUS* Teufelsdorck's transformation comes through a struggle for religious faith and sanity, described as the Everlasting No, then relaxation in the Center of Indifference, followed by the involuntary mystical experience on the top of a hill, which he calls the Everlasting Yea. The Center of Indifference, or “excellent passivity,” as Carlyle calls it, suggests the blissful relaxation of the infant, certain that he is safe and will somehow be taken care of. Along with this, apart from any special biochemical influence on the neurones, would go the freer interchange of ideas, conscious or unconscious, which relaxation normally brings, including the freedom to regress to an earlier stage of development, as noted in the paper.

If these are some of the possible mechanisms operating by reason of regression to facilitate change, what are some of the positive factors that explain regression “in the service of the ego” as opposed to regression of a more malignant variety?

I think it is quite obvious that regression can never completely reinstate a previous condition, no matter how perfectly it seems to

be approximated. In the first place, the individual carries back with him the capacity to reason, and despite the fact that the mystical state is nonrational in character, reason is bound to play a part in what one does with what appears to be the illumination of the state. Reason, then, is an asset which, interacting with the nonrational state, may help the individual to use the experience in a more directed and integrated way.

Other assets that the regressed individual takes with him are the conceptual frameworks consisting of ethics, cultural determinants, ideals, particular religious forms, and other conceptions that largely constitute the furniture of the superego. A person who has felt guilty about his unfaithfulness to his wife is apt to find that a mystical experience will improve his loyalty. A Christian mystic, like Eckhart, as both Suzuki (3) and Stace (4) have pointed out, seems to have had an experience very similar to that of Buddhist mystics psychologically, yet the conceptual language in which the experience is described will be Christian in the case of one and Buddhist in the case of others. It is, then, these frameworks that will influence the expression or the “fruits” of the experience, and they are potential sources of great positive value.

Another positive source of value would seem to be the deeplying intention of the individual who regresses. I do not want to get into the perplexities of a discussion of whether or not one has freedom of will. All we can say is that the appearance is that, at least in limited areas, he does, and even those dogmatically dedicated to the proposition that there is no such thing act in their daily lives as if the will made a difference. At any rate, we can speculate that the will, or something suspiciously like it, operates to explain the difference between regression as an escape and as an instrument leading one to a new beginning. Even in the Middle Ages it was recognized that mystical states were of two varieties, for it was always questioned as to whether the experience were of God or the Devil. But it seems clear that for those who wish to escape from their obligations the mystical state constitutes a means by which it becomes possible so that it may be said that mystical experience always carries a potential risk of psychosis. This may help to explain William James' (5) conviction that “in the psychopathic temperament we have the emotionality which is the *sine qua non* of moral perception” and the “love of metaphysics and mysticism which carry one's interests beyond the surface of the sensible world.” Those sensitive enough to taste mysticism are often sensitive enough to fall into psychosis. But if the substratum of the individual's will and intention is wholesome, this would seem to be an additional factor acting beneficently on

the lability and flexibility that are the accompaniments of the regressive state.

As a special area for the operation of the will, we may also mention the value of discipline both before and after the production of mystical states. It is well known that the segregation of devotees in monasteries has for one of its purposes the *preparation* for the mystical vision through discipline and the *following up of the results* of the vision through continued discipline. The fact of backsliding in cases of conversion from the levels of idealism that are usually associated with mystical states is well known. Some kind of discipline is nearly always necessary to husband the best fruits of mysticism. Discipline is necessary whether regression has opened the way for mysticism or simply represents the desire of a regressed mental patient to learn to face his problems. It has been a matter of much interest to me how often those who ingest LSD with some purpose other than that of idle curiosity, either individually or in groups, have instituted some form of discipline to conserve the insights and benefits of the experience.

My last point I offer with considerable diffidence, since I am neither a philosopher nor a theologian, yet I think the issue should be raised, at least for the interaction of minds from different disciplines. Stace (6) notes that one of the reliable marks of the mystical state is not only a sense of the sacred and divine but also a sense of having come into some kind of immediate contact with objective reality. This, of course, is expressed in various ways, depending on the background and personal organization of the individual: "all men are one", "man and nature are one", "God is", "the Cosmos is mysterious and wonderful" are some of the ways in which this sense of reality may be expressed. Usually this apprehension is in positive terms, and it is not necessary to determine whether or not these insights are true, to remark that they are such as tend to give life a meaning and a liveliness it did not have before. I have known at least one case where a young man, who had been suicidal before, gave up suicidal ideas after a psychedelic experience of a mystical nature. I would suppose that philosophers and theologians are bound to take such data into account in formulating their ideas of the nature of ultimate reality. On his part, the psychotherapist, concerned as he is with orienting his patient toward reality, even though he is not equipped to pass any final judgment, must at times be tempted to ask himself whether the results may not suggest that the mystic, in some paradoxical way, in regressing toward infancy, may acquire a clarity of sight transcending that of sages who rely largely on their intellectual functions. Perhaps this is something of what Jesus

meant when he told his disciples that those who would enter the Kingdom of Heaven must become like little children. At any rate, the mystic's sense of immediate experience of God or Reality would seem to be another asset that helps to explain the amazingly creative transformations that often occur.

I would like to refer, in closing, to another facet of the mystical experience—or at least nonrational experience of the Divine—that often characterizes religious experience. This is what Rudolf Otto (7) refers to as the *mysterium tremendum*, that feeling of *awe-ful* majesty and overwhelming, terror-producing Power that sometimes overtakes the religious prophet. I am referring to the kind of experience that led Moses to remove his shoes before the burning bush because he was on holy ground. This sense of the *awe-ful* frequently is an experience encountered by those who ingest LSD. Using our concept of regression, this may be the re-instatement of the sense of helplessness and absolute independence (cf. Schleiermacher, ON RELIGION) felt by the infant in his early experiences after emerging from the womb. On the other hand, it may in part stem from the sense of some individuals that they tread a narrow path between redemption and psychosis. Otto also refers to the fascinating quality of this Power that makes one tremble. The writer of Hebrews (8) says that it is a fearful thing to fall into the hands of the living God. This is fearful enough if we confine ourselves merely to the implications for underived changes in our outward way of life. But, at any rate, Otto suggests that this ecstasy that so many covet is nothing to be taken lightly, or to be pursued by those with other than stout hearts and adventurous minds. If those of us with a sense of how radically our lives need to be changed to develop our full potentialities are willing to risk regression in the service of the ego, either for ourselves or for others, perhaps it is only a taste of the awful mystery and beauty of ultimate reality that can make this rebirth and new beginning seem worthwhile.

#### REFERENCES

1. Sargant, William: *Battle for the Mind*. Penguin Books, 1961.
2. Hess, Eckhard H.: *Imprinting in Birds*. *Science*, Nov. 27, 1964.
3. Suzuki: *Mysticism, Christian and Buddhist*. New York, Harper, 1957.
4. Stace, W.: *Mysticism and Philosophy*. Philadelphia, Lippincott, 1960.
5. James, Wm.: *Varities of Religious Experience*, Chapter 1.
6. Stace, W.: *ibid*, Chapter 2.
7. Otto, R.: *The idea of the Holy*. New York, Oxford University Press, 1958.
8. Hebrews: 10:17.

## PROGRAMMED COMMUNICATION DURING EXPERIENCES WITH DMT (Dimethyltryptamine)

TIMOTHY LEARY



DMT DRAWING BY MICHAEL BOWEN

During the first two years of the Harvard Psychedelic Research Project rumors circulated about a "powerful" psychedelic agent called dimethyltryptamine: DMT. The effect of this substance was supposed to last for less than an hour and to produce shattering, terrorizing effects. It was alleged to be the nuclear bomb of the psychedelic family.

The Hungarian pharmacologist, Stephen Szara, first reported in 1957 that N,N-Dimethyltryptamine (DMT) and N,N-Diethyltryptamine (DET) produced effects in man similar to LSD and mescaline. The only difference was in duration: whereas LSD and mescaline typically last 8 to 10 hours, DMT lasted from 40 minutes to 1 hour and DET from 2 to 3 hours. The higher homologues, dipropyltryptamine and dibutyltryptamine, were also said to be active but less potent. The parent substance, tryptamine, by itself has no effect. Chemically, DMT is closely related to psilocybin and psilocin (4-hydroxy-N-dimethyltryptamine), as well as to bufotenine (5-hydroxy-N-dimethyltryptamine). The mechanism of action of DMT and related compounds is still a scientific mystery. Like LSD and psilocybin, DMT has the property of increasing the metabolic turnover of serotonin in the body. An enzyme capable of converting naturally-occurring tryptamine to DMT has recently been found in some mammalian tissue; this suggests that mechanisms may exist whereby the body converts normally-occurring substances to psychedelic compounds. (1,2,3,4,5)

DMT has been identified as one of the ingredients in the seeds of *Mimosa hostilis*, from which the Pancaru Indians of Pernambuco, Brazil, prepare an hallucinogenic beverage they call *vinho de Jurumena*. It is also, along with bufotenine, one of the ingredients in the seeds of *Piptadenia peregrina*, from which the Indians of the Orinoco Basin and of Trinidad prepare an hallucinogenic snuff they call *yopo*. (6)

William Burroughs had tried it in London and reported it in the most negative terms. Burroughs was working at that time on a

theory of neurological geography—certain cortical areas were heavenly, other areas were diabolical. Like explorers moving into a new continent, it was important to map out the friendly areas and the hostile. In Burroughs' pharmacological cartography, DMT propelled the voyager into strange and decidedly unfriendly territory.

Burroughs told a gripping tale about a psychiatrist in London who had taken DMT with a friend. After a few minutes the frightened friend began requesting help. The psychiatrist, himself being spun through a universe of shuttling, vibratory pigments, reached for his hypodermic needle (which had been fragmented into a shimmering assemblage of wave mosaics) and bent over to administer an antidote. Much to his dismay his friend, twisting in panic, was suddenly transformed into a writhing, wiggling reptile, jewel-encrusted and sparkling. The doctor's dilemma: where to make an intravenous injection in a squirming, oriental-martian snake? . . .

Alan Watts had a DMT story to tell: He took the drug as part of a California research and had planned to demonstrate that he could maintain rational control and verbal fluency during the experience. The closest equivalent might be to attempt a moment-to-moment description of one's reactions while being fired out the muzzle of an atomic cannon with neon-byzantine barreling. Dr. Watts gave an awe-full description of perceptual fusion.

In the fall of 1962, while giving a three-day series of lectures to the Southern California Society of Clinical Psychologists, I fell into discussion with a psychiatrist who was collecting data on DMT. He had given the drug to over a hundred subjects and only four had reported pleasant experiences. This was a challenge to the set-setting hypothesis. According to our evidence, and in line with out theory, we had found little differentiation among psychedelic drugs. We were skeptically convinced that the elaborate clinical differences allegedly found in reactions to different drugs were psychedelic folk tales. We were sticking to our null hypothesis that the drugs had no specific effect on consciousness but that expectaion, preparation, emotional climate, and the contract with the drug-giver accounted for all differences in reaction.

We were eager to see if the fabled "terror-drug," DMT, would fit the set-setting theory.

A session was arranged. I came to the home of the researcher, accompanied by a psychologist, a Vedanta monk and two female friends. After a lengthy and friendly discussion with the physician, the psychologist lay down on a couch. His friend's head rested on his chest. I sat on the edge of the couch, smiling in reassuring ex-

pectation. Sixty mg. of DMT were administered intramuscularly.

Within two minutes the psychologist's face was glowing with serene joy. For the next twenty-five minutes he gasped and murmured in pleasure, keeping up an amused and ecstatic account of his visions.

The faces in the room had become billion-faceted mosaics of rich and vibrant hues. The facial characteristics of each of the observers, surrounding the bed, were the keys to their genetic heritage. Dr. X (the psychiatrist) was a bronzed American Indian with full ceremonial paint; the Hindu monk was a deep soulful middle-easterner with eyes which were at once reflecting animal cunning and the sadness of centuries; Leary was a roguish Irishman, a sea captain with weathered skin and creases at the corners of eyes which had looked long and hard into the unsee-able, an adventurous skipper of a three-masted schooner eager to chart new waters, to explore the continent just beyond, exuding a confidence that comes from a humorous cosmic awareness of his predicament—genetic and immediate. And next to me, or rather on me, or rather in me, or rather more of me—Billy. Her body was vibrating in such harmony with mine that each ripple of muscle, the very coursing of blood through her veins was a matter of absolute intimacy . . . body messages of a subtlety and tenderness both exotically strange and deliciously familiar. Deep within, a point of heat in my groin slowly but powerfully and inevitably radiated throughout my body until every cell became a sun emanating its own life-giving fire. My body was an energy field, a set of vibrations with each cell pulsing in phase with every other. And Billy, whose cells now danced the same tune, was no longer a discrete entity but a resonating part of the single set of vibrations. The energy was love.

Exactly twenty-five minutes after administration, the psychologist smiled, sighed, sat up swinging his legs over the side of the couch and said, "It lasted for a million years and for a split-second. But it's over and now it's your turn."

With this reassuring precedent, I took up position on the couch. Margaret sat on the floor holding my hand. The psychologist sat at the foot of the couch, radiating benevolence. The drug was administered.

#### THE FIRST DMT EXPERIENCE

"My experience with DMT occurred in the most favorable setting. We had just witnessed the ecstatic experience of my colleague and the radiance of his reaction provided a secure and optimistic background. My expectations were extremely positive.



"Five minutes after i.m. injection, lying comfortably on the bed, I felt typical psychedelic onset symptoms—a pleasant somatic looseness, a sensitive tuning-in to physical sensations.

"Eyes closed . . . typical LSD visions, the exquisite beauty of retinal and physical machinery, transcendence of mental activity, serene detachment. Comforting awareness of Margaret's hand and the presence of friends.

"Suddenly I opened my eyes and sat up . . . the room was celestial, glowing with radiant illumination . . . light, light, light . . . the people present were transfigured . . . godlike creatures . . . we were all united as one organism. Beneath the radiant surface I could see the delicate, wondrous body machinery of each person, the network of muscle and vein and bone—exquisitely beautiful and all joined, all part of the same process.

"Our group was sharing a paradisaical experience—each one in turn was to be given the key to eternity—now it was my turn, I was experiencing this ecstasy for the group. Later the others would voyage. We were members of a transcendent collectivity.

"Dr. X. coached me tenderly . . . handed me a mirror where I saw my face a stained-glass portrait.

"Margaret's face was that of all women—wise, beautiful, eternal. Her eyes were all female eyes. She murmured exactly the right message. 'It can always be this way.'

"The incredible complex-unity of the evolutionary process—staggering, endless in its variety—why? Where is it going? etc., etc. The old questions and then the laughter of amused, ecstatic acceptance. Too much! Too great! Never mind! It can't be figured out. Love it in gratitude and accept! I would lean forward to search for meaning in Margaret's china-flecked face and fall back on the pillow in reverent, awed laughter.

"Gradually, the brilliant illumination faded back to the three-world and I sat up. Reborn. Renewed. Radiant with affection and reverence.

"This experience took me to the highest point of LSD illumination—a jewel-like satori. It was less internal and more visual and social than my usual LSD experiences. There was never a second of fear or negative emotion. Some moments of benign paranoia—agent of the divine group, etc.

"I am left with the conviction that DMT offers great promise as a transcendental trigger. The brevity of the reaction has many advantages—it provides a security in the knowledge that it will be over in a half hour and should make possible precise explorations of specific transcendental areas."

THE SET AND SETTING  
FOR THE PROGRAMMED EXPERIENCE

Immediately after my first DMT voyage the drug was administered to the Hindu monk. This dedicated man had spent fourteen years in meditation and renunciation. He was a *sannyasin*, entitled to wear the sacred saffron robe. He has participated in several psychedelic drug sessions with extremely positive results and was convinced that the biochemical road to *samadhi* was not only valid but perhaps the most natural method for people living in a technological civilization.

His reaction to DMT was, however, confusing and unpleasant. Catapulted into a sudden ego-loss, he struggled to rationalize his experience in terms of classic Hindu techniques. He kept looking up at the group in puzzled helplessness. Promptly at twenty-five minutes he sat up, laughed, and said, "What a trip that was. I really got trapped in karmic hallucinations!"

The lesson was clear. DMT, like the other psychedelic keys, could open an infinity of possibilities. Set, setting, suggestibility, temperamental background were always there as filters through which the ecstatic experience could be distorted.

On return to Cambridge, arrangements were made with a drug company and with our medical consultant to run a systematic research on the new substance. During the subsequent months we ran over one hundred sessions—at first training exercises for experienced researchers and then later trials with subjects completely inexperienced in psychedelic matters.

The percentage of successful, ecstatic sessions ran high—over ninety percent. The set-setting hypothesis clearly held for DMT in regard to positive experiences. But there were certain definite characteristics of the DMT experience which were markedly different from the standard psychedelics—LSD, psilocybin, mescaline. First of all, the duration. The eight-hour LSD transformation was reduced to around thirty minutes. The intensity was greater, as well. This is to say, the shattering of learned form perception, the collapse of learned structure was much more pronounced. "Eyes closed" produced a soft, silent, lightning fast, whirling dance of incredible cellular forms—acre upon acre, mile upon mile of softly-spinning organic forms. A swirling, tumbling, soft rocket-ride through the factory of tissue. The variety and ir-reality of the precise, exquisite, feathery clockwork organic machinery. Many LSD subjects report endless odysseys through the network of circulatory tunnels. Not with DMT, but rather a sub-cellular cloud-ride into a world of ordered, moving beauty which defies external metaphor.

"Eyes open" produced a similar collapse of learned structure—but this time of external objects. Faces and things no longer had form but were seen as a shimmering play of vibrations (which is what they are). Perception of solid structures was seen to be a function of visual nets, mosaics, cobwebs of light-energy.

The transcendence of ego-space-time was most often noticed. Subjects frequently complained that they became so lost in the lovely flow of timeless existences that the experience ended too soon and was so smooth that landmarks were lacking to make memory very detailed. The usual milestones for perception and memory were lacking! There could be no memory of the sequence of visions because there was no time—and no memory of structure because space was converted into flowing process.

To deal with this problem we instituted programmed sessions. The subject would be asked every two minutes to respond, or he would be presented with an agreed-upon stimulus every two minutes. The landmarks would, in this way, be provided by the experimenter—the temporal sequence could be broken up into stages and the flow of visions would be divided into topics.

As an example of a programmed session using DMT, let us consider the following report: The plan for this session involved the experiential typewriter. This device, which is described in a previous article (7) is designed to allow non-verbal communication during psychedelic sessions. There are two keyboards with ten buttons for each hand. The twenty keys are connected to a twenty-pen polygraph which registers an ink mark on a flowing roll of paper each time a key is struck.

The subject must learn the codes for the range of experience before the session and is trained to respond automatically, indicating the area of his consciousness.

In this study it was agreed that I would be questioned every two minutes, to indicate the content of my awareness.

The session took place in a special session room, eight-by-twenty, which was completely covered, ceiling, walls and floor, by warm, colorful India prints. The session followed the "alternating guide" model: another researcher, a psychopharmacologist, was to act as interrogator for my session. The pharmacologist was then to repeat the session with Leary as interrogator.

At 8:10 p.m. I received 60 mgs of DMT.

#### THE SECOND DMT EXPERIENCE

Lay back on mattress, arranging cushions . . . relaxed and anticipatory . . . somewhat amused by our attempt to impose time-content mileposts on the flow of process . . . soft humming noise

. . . eyes closed . . . suddenly, as if someone touched a button, the static darkness of retina is illuminated . . . enormous toy-jewelry factory, Santa Claus workshop . . . not impersonal or engineered, but jolly, comic, light-hearted. The evolutionary dance, humming with energy, billions of variegated forms spinning, clicking through their appointed rounds in the smooth ballet . . .

MINUTE 2. TIM: WHERE ARE YOU NOW? Ralph's voice, stately, kind . . . what? where? You? . . . open eyes . . . there squatting next to me are two magnificent insects . . . skin burnished, glowing metallic, with hammered jewels inlaid . . . richly costumed, they looked at me sweetly . . . dear, radiant Venutian crickets . . . one has a pad in his lap and is holding out a gem-encrusted box with undulating trapezoidal glowing sections . . . questioning look . . . incredible . . . and next to him Mrs. Diamond Cricket softly slides into a lattice-work of vibrations . . . Dr. Ruby-emerald Cricket smiles . . . TIM WHERE ARE YOU NOW . . . moves box towards me . . . oh yes . . . try to tell them . . . where . . .

At two minutes the subject was smiling with eyes closed. When asked to report he opened his eyes, looked at the observers curiously, smiled. When the orientation question was repeated he chuckled, moved his finger searchingly over the typewriter and (with a look of amused tolerance) stabbed at the "cognitive activity" key. He then fell back with a sigh and closed his eyes.

Use mind . . . explain . . . look down at undulating boxes . . . struggle to focus . . . use mind . . . yes COGNITIVE . . . there . . .

Eyes close . . . back to dancing workshop . . . joy . . . incredible beauty . . . the wonder, wonder, wonder . . . thanks . . . thanks for the chance to see the dance . . . all hooked together . . . everything fits into the moist, pulsating pattern . . . a huge grey-white mountain cliff, moving, pocked by little caves and in each cave a band of radar-antennae, elf-like insects merrily working away, each cave the same, the grey-white wall endlessly parading by . . . infinity of life forms . . . merry erotic energy nets . . .

MINUTE 4. TIM, WHERE ARE YOU NOW? Spinning out in the tapestry of space comes the voice from down below . . . dear kindly earth-voice . . . earth-station calling . . . where are you? . . . what a joke . . . how to answer . . . I am in the bubbling beaker of the cosmic alchemist . . . no, now softly-falling star dust exploding in the branches of the stellar ivory birch tree . . . what? . . . open eyes . . . oh dear lapidary insect friends . . . Ralph and Susan beautiful orange lobsters watching me gently . . . faces shattered into stained-glass mosaic . . . Dr. Tiffany Lobster holds out the casket of trapezoidal sections . . . look at glowing key . . . where is Venutian ecstasy

key? . . . where is key for the stellar explosion of the year 3,000?  
 . . . EXTERNAL PROCESS IMAGES . . . yes . . . hit the key . . .  
 timble back to Persepolice pulse . . .

At four minutes the subject was still smiling with eyes closed. When asked to report, he opened his eyes and laughed. He looked at the observers with twinkling eyes, studied the keyboard of the experiential typewriter and pressed the EXTERNAL PROCESS IMAGE key. He then fell back and closed his eyes.

How nice . . . they are down there . . . waiting . . . no words up here to describe . . . they have words down there . . . see rolling waves of colored forms whirling up, bouncing jolly . . . where do they come from . . . who is architect . . . merciless . . . each undulating dancing factory devouring other . . . devouring me . . . pitiless pattern . . . what to do . . . terror . . . ah let it come . . . eat me . . . whirl me up in the ocean of snowflake mouths . . . all right . . . how it all fits together . . . auto-pilot . . . it's all worked out . . . it's all on auto-pilot . . . suddenly my body snaps and begins to disintegrate . . . flow out into the river of energy . . . good-bye . . . gone . . . I that was is now absorbed in electron flash . . . beamed across star space in orgasm pulses of particle motion . . . release . . . flashing light, light, light . . .

MINUTE 6. TIM, WHERE ARE YOU NOW? Earth voice calling . . . you there, meson hurdling in nuclear orbit . . . incorporate . . . trap the streaking energy particle . . . slow down . . . freeze into body structure . . . return . . . with flick of open eye the nuclear dance suddenly skids into static form . . . see two clusters of electrons shimmering . . . the Ralph galaxy calling . . . the Mrs Ralph galaxy smiling . . . the energy dance caught momentarily in friendly robot form . . . hello . . . next to them a candle flame . . . center of million-armed web of light beams . . . the room is caught in a lattice of light-energy . . . shimmering . . . all vision is light . . . there is nothing to see but light waves . . . photons reflected from Ralph's quizzical smile . . . awaits the answer . . . photons bouncing off the quivering keys of the typewriter . . . how easy to beam a radio message down . . . finger taps EXTERNAL PROCESS IMAGES . . .

At six minutes the subject had just finished frowning in what seemed like a passing fear or problem. When contacted to report, he glanced around the room and without hesitation pressed the EXTERNAL PROCESS KEY. He then closed his eyes.

Eyes closed but after-image of candle flame remains . . . eye-

balls trapped in orbit around internal light center . . . celestial radiance from the light center . . . light of sun . . . all light is sun . . . light is life . . . live, lux, luce, life . . . all is a dance of light-life . . . all life is the wire . . . carrying light . . . all light is the frail filament of the light . . . solar silent sound . . . beamed out from sun-flare . . . light-life . . .

MINUTE 8. TIM, WHERE ARE YOU NOW? In the heart of the sun's hydrogen explosion . . . our globe is light's globe . . . open eyes drape curtain over sun flare . . . open eyes bring blindness . . . shut off internal radiance . . . see chiaroscuro God holding shadow box . . . where is life? . . . press WHITE LIGHT KEY . . .

At eight minutes the subject, who had been lying motionless against the cushions, opened his eyes. His expression was dazed, surprised. Without expression he pressed key for WHITE LIGHT.

Keep eyes open . . . fixed . . . caught . . . hypnotized . . . whole room, flowered walls, cushions, candle, human forms all vibrating . . . all waves having no form . . . terrible stillness . . . just silent energy flow . . . if you move you will shatter the pattern . . . all remembered forms, meanings, identities meaningless . . . gone . . . all is a pitiless emanation of physical waves . . . phenomena are television impulses crackling across an interstellar program . . . our sun is one point on an astrophysical television screen . . . our galaxy is a tiny cluster of points on one corner of the TV screen . . . each time a supernova explodes it is simply that point on the screen changing . . . the ten billion year cycle of our universe is a millisecond flash of light on the cosmic screen which flows endlessly and swiftly with images . . . sitting motionless . . . not wishing to move, to impose motion on the pattern . . . motionless in speed-of-light motion . . .

MINUTE 10. TIM, WHERE ARE YOU NOW? Ground-tower beaming up navigational query . . . flood of amazed love that we can contact each other . . . we do remain in contact . . . where was that cluster then . . . hallucinating . . . science-fiction metaphors . . . where is key . . . there . . . EXTERNAL HALLUCINATIONS . . .

From eight to ten minutes the subject sat motionless, eyes open in a trance-like state. There was no attempt to communicate. When contacted he moved slowly but surely and pressed the EXTERNAL HALLUCINATION KEY.

Quotes from the Research Questionnaire filled out after the session: loss of space-time . . . merging with energy flux . . . seeing all life forms as physical waves . . . loss of body . . . exist-

ence as energy . . . awareness that our bodies are momentary clusters of energy and that we are capable of tuning in on patterns of non-organic patterns . . . certainly that life processes are on "auto-pilot" . . . there is nothing to fear or worry about . . . a feeling of freedom to go back and "freeze" the energy process momentarily in the old ego-robot . . . a reminder of the infinite unfolding complexity and endlessness of the life process . . . sudden understanding of the meaning of terms from Indian philosophy such as "maya," "maha-maya," "lila" . . . insight into the nature and varieties of transcendent states . . . the void-white-light-contentless, meta-life-inorganic ecstasy . . . the Kundalini-life-force-biological-squirring-moist-sexual organic ecstasy . . . the singing-genetic-code-blueprint-temporary-structuring-of-form ecstasy and the . . .

MINUTE 12. TIM, WHERE ARE YOU NOW? Open eyes . . . laugh . . . caught by vigilant ground-tower while orbiting around earthly-mind-figure-it-out area . . . where is key for thinking earth-word thoughts . . . hallucinations . . . no, the thinking game . . . press COGNITIVE KEY . . .

From the tenth to twelfth minute the subject sat looking blankly and without motion at the wall of the room. When contacted he smiled and pressed the COGNITIVE key.

Above head is light bulb covered with scalloped lightblue shade . . . circling up to the glowing shade are ribbons of waves . . . silent . . . beckoning . . . inviting . . . join the dance . . . leave your robot . . . a whole universe of delightful, aerial choreography awaits . . . yes join them . . . suddenly, like smoke rising from a cigarette, consciousness circled up . . . swooping graceful gull-paths up to light source and, soundlessly, through into another dimension . . . from the research questionnaire: a description of the level reached is a prose yoga beyond present attainment . . . there were billions-of-file-cards, helical in shape, which, flicked through, confronted me with an endless library of events, forms, visual perceptions, not abstract but all experiential . . . a billion years of coded experience, classified, preserved in brilliant, pulsating, cool clarity that made ordinary reality seem like an out-of-focus, tattered, jerky, fluttering of peep-show cards, tawdry and worn . . . any thought once thought, instantly came alive and flicked by the shuttered aperture of consciousness . . . but at the same time there was no one to observe . . . I . . . he . . . the one-aware . . . was also computer, computer tape, electronic message . . . all humming in electronic, technicolor sudden SEE! vision for one who has been centuries blind . . .

MINUTE 14. TIM, WHERE ARE YOU NOW? Oh where are we? . . . oh listen, here's where we are . . . once there was a glowing electric dot, a flash reflected from the heart of a cut diamond which, oh there, now, caught the light of sun flame and glittered . . . sudden flash in pre-cambrian mud . . . the dot stirs and quivers with tremble-strain-exultant-singing-throbbing-shuddering twist upwards and a serpent began to writhe up and through the soft, warm silt . . . tiny, the size of a virus . . . growing . . . the enormous length of a microscopic bacillus . . . flowing exultantly, always singing the Hindu flute-song . . . always bursting out, enfoliating . . . now the size of the moss root, churning through fibred-cunt-mattress-moist-spasm churning . . . growing . . . growing . . . ever exfoliating its own vision . . . always blind except for the forward point of light-eye . . . now belts of serpent skin, mosaic-jeweled, rhythmically jerking, snake-wise forward . . . now the size of a tree-trunk, gnarled and horny with the sperm-sap moving within . . . now swelling, tumescent into mississippi flood of tissue writhing . . . pink, silt current of singing fire . . . now circling globe, squeezing green salt oceans and jagged brown-shale mountains with constrictor grasp . . . serpent flowing blindly, now a billion-mile endless electric-cord vertebrated writhing cobra singing Hindu flute-song . . . penis head throbbing . . . plunged into all smells, all color tapestry of tissue . . . blind writhing, circled tumescent serpent blind, blind, blind, except for the one jeweled eye through which, for one frame's flickered second each cell in the advancing parade is permitted that one moment face-to-face, eyeball to solar flame insight into the past future . . .

TIM, TIM, WHERE ARE YOU NOW? La Guardia tower repeats request for contact with the ship lost out of radar scope ....where?...I am eye of the great snake....a fold of serpent skin, radiating trapezoidal inquiry swims into focus....register conscious content....where are you?....here....INTERNAL HALLUCINATIONS.

From minute twelve to fourteen the subject sat silent with eyes closed. When contacted he failed to respond and after thirty seconds was contacted again. He then pressed EXTERNAL HALLUCINATION key.

The session continued with two minute interruptions until the twentieth minute in the same pattern: timeless flights into hallucinatory or pure energy vibration fields with sudden contractions to reality in response to the observer's questions.

The session report filled out the next day contained the following comments about this method of session programming.

This session suggested some solutions about the problem of communicating during psychedelic experiences. The person "up there" is being whirled through experiences which spin by so rapidly and contain structural content so different from our familiar macroscopic forms that he cannot possibly describe where he is or what he is experiencing. Consider the analogy to the pilot of a plane who has lost his bearings who is talking by radio to La Guardia tower. The pilot is experiencing many events — he can describe the cloud formations, lightning flashes, the etching of ice on the plane window — but none of this makes any sense to the tower technicians who are attempting to plot his course in the three-dimensional language of navigation. The person "up there" cannot provide the categories. The ground control personnel must radio them "up." 'Cessna 64 Bravo, our radar scopes show you are fifteen miles southwest of International Airport. The red glow you see is the reflection of Manhattan. To head on a course for Boston you must change your course to 57 degrees and maintain an altitude of 5500'.

But the language of psychology is not sophisticated enough to provide such parameters. Nor are there experiential compasses to determine direction.

What we can do, at this point, is to set up "flight plans." The subject can work out, before the session, the areas of experience he wishes to engage; and he can plan the temporal sequence of his visionary voyage. He will not be able, during the flight to tell "ground control" where he is, but ground control can contact him and tell him where to proceed. Thus, during this session, when Ralph asked, WHERE ARE YOU NOW?, I could not respond. I had to descend, slow up the flow of experience and *then* tell him where I ended up.

When the contact question came I would be hurtling through other galaxies. In order to respond, I had to stop my free rocketing, tumbling flight, return near the earth and say: "I am over New Haven."

This session was a continual, serial 'come-down'. I repeatedly had to stop the flow in order to respond. My cortex was receiving hundreds of thousands of impulses a second; but in order to respond to ground control's questions I had to grind the ship to a slow stall to say, at that moment. "I am here."

This session suggests that a more efficient way to chart psychedelic experiences would be to: 1) memorize the keyboard of the experiential typewriter so that communication down to ground control could be automatic, and 2) plan the flight in such a way that the ground control would not ask unanswerable ques-

tions. — "Where am I indeed!" but would tell the subject where to go. Then the communication task of the voyager would be to indicate if he were on course, i.e., that he was or was not following the flight instructions radioed up by ground control.

Ground control should send up stimuli. Suggestivity is wide open. La Guardia tower directs the flight.

DID YOU LEARN ANYTHING OF VALUE FROM THIS SESSION? IF SO, PLEASE SPECIFY: "Session was of great value. I am clearly and strongly motivated to work out methods of ground control and planned flights."

APPROXIMATELY HOW MUCH OF THE SESSION (IN % OF TIME) WAS SPENT IN EACH OF THE FOLLOWING AREAS?

- A) INTERPERSONAL GAMES 10% (fondness for observers)
- B) EXPLORING OR DISCOVERING SELF, OR SELF GAMES 0%
- C) OTHER GAMES (SOCIAL, INTELLECTUAL, RELIGIOUS) 70% (intellectual, struggling with problem of communication)
- D) NON-GAME TRANSCENDENCE 20% (continually interrupted by questions)

#### REFERENCES

1. Szara, S.: Hallucinogenic effects and metabolism of tryptamine derivatives in man. *Fed. Proc.* 20: 858-888, 1961.
2. Szara, S.: Correlation between metabolism and behavioral action of psychotropic tryptamine derivatives. *Biochem. Pharmacol.*, 8: 32, 1961.
3. Szara, S.: Behavioral correlates of 6-hydroxylation and the effect of psychotropic tryptamine derivatives on brain serotonin levels. In: *Comparative Neurochemistry*, ed. D. Richter, pp. 432-452. Pergamon Press, Oxford, 1964.
4. Szara, S. & Axelrod, J.: Hydroxylation and N-demethylation N,N-dimethyltryptamine. *Experientia*, 153: 216-220, 1959.
5. Szara, S., Hearst E. & Putney F.: Metabolism and behavioral action of psychotropic tryptamine homologues, *Int. J. Neuropharmacol.*, 1, 111-117, 1962.
6. Schultes, R.E. Botanical Sources of The New World Narcotics. In Weil, G.M., Metzner, R. & Leary, T. (eds). *The Psychedelic Reader*. University Books, New Hyde Park, 1965.
7. Leary, T. The Experiential Typewriter, *Psychedelic Review*, No. 7, 1965.

## PSYCHEDELIC RESEARCH IN THE CONTEXT OF CONTEMPORARY PSYCHOLOGY<sup>1</sup>

ROBERT E. MOGAR

Before describing the extensive body of research on the psychotherapeutic effects of LSD, and the research program concerning these effects in which I am presently engaged, I think it would be instructive to view the growing interest in psychedelic phenomena, particularly the LSD experience, from a broader perspective—specifically, from the perspective of current trends in psychological science and psychotherapy. It is well-known that psychologists are an unusually self-critical group; one that continually examines and re-examines its present position and future direction. The scientific and professional pronouncements of psychologists reveal an ongoing preoccupation with what they are doing, where they are going, and how they fit into the larger scheme of things. And, in the light of their subject-matter, they are particularly attuned to the society in which they live. It seems reasonable, then, to consider contemporary theoretical issues and recent shifts in psychological research, not only as a sensitive barometer of the present social climate but also as a timetable of future trends in our society. Among the various sciences and professions, psychology seems to reflect particularly well the interests and values of a given time and place. If the following description of the current scene is relatively accurate, it suggests that altered states of consciousness, of the sort induced by LSD, will occupy a central position in American psychology in the near future, and will perhaps become a major public concern as well.

There is considerable evidence in the psychological literature which supports this contention. In a recent issue of the *American Psychologist*, the official voice of the American Psychological

Association, the lead article, written by a well-known research psychologist, is entitled, "Imagery: The Return of the Ostracized" (5). After examining the traditional scientific and cultural resistances to such phenomena as pseudo-hallucinations, hypnogogic and dream images, extrasensory perception, and hypnosis, the author goes on to describe the current status in these fields. He points to a number of recent breakthroughs in a variety of research areas which, according to him, signal the second phase of a psychological revolution. The first phase, covering the first half of this century, was characterized by the scientific extremism of psychoanalysis and behaviorism—movements which purged psychology of the unique and the private. While both psychoanalysis and behaviorism, in their orthodox forms, have made valuable contributions to our understanding of man, it seems evident now that these orientations can no longer exclude altered states of consciousness and novel perceptual experiences from the *primary* subject-matter of a *normal* psychology.

Interestingly, some of the leading exponents of both views, such as H. Hartmann and B.F. Skinner, have recognized these omissions and indicated a need for revision (3)(19). This is not surprising since the most exciting developments during the past decade have occurred in experimental work with dream activity, subliminal perception, hypnosis, sensory deprivation, parapsychology, creativity, and of course, the consciousness-expanding drugs. Viewing this rich array of experimental activity as occurring within a broader historical context, one convergent finding seems of major significance—namely, that richness of imagination and so-called regressive experiences are not the exclusive privilege of madmen and artists. Rather, it has become abundantly clear that, given the right circumstances, most people can greatly expand their experiential horizons without sacrificing effectiveness in dealing with objective reality.

Consistent with the scene in experimental psychology, the beginnings of a trend *away* from viewing psychedelic phenomena as undesirable or pathological can also be discerned in clinical psychology. Before considering the situation in psychotherapy, I want to at least mention a few incidental observations which seem to convey particularly well the flavor of this shift in viewpoint.

First, according to current estimates, 50 percent of the general population experience hypnogogic imagery naturally in the normal course of living (5). Second, repeated surveys among psychologists conducted over the past twenty years show a progressive increase in the willingness to accept extrasensory perception as an authentic experience. The most recent survey indicates that

<sup>1</sup> Read before the Symposium on LSD: Basic Problems and Potentialities. San Jose State College, May 9, 1964.

very few psychologists consider ESP an impossibility (2). Finally, studies involving hypnotizability have found that naturally-occurring altered states of awareness including loss of distinction between self and nonself, transcendental or peak experiences, and oceanic feeling states are fairly common in the *normal* college population (18). In addition, there has been a greater willingness in recent years to acknowledge and report such experiences without apology or embarrassment.

A growing recognition of the potential value of psychedelic experiences also characterizes contemporary trends in psychotherapy. For example, current theorizing in psychotherapy reveals an increasing awareness of the restraints imposed by our language and habitual modes of perception. Thus, we find that recent revisions in psychoanalytic theory attempt to correct the previous overemphasis on maintaining impulse-control and a sharp distinction between self and nonself (8)(16). Instead, present formulations stress the *constructive* use of regressive states and fantasy activity, i.e., the importance of imaginative experience and the relative flatness of our public view of reality are given explicit recognition in current analytic thinking (15). Similar dissatisfactions with traditional concepts of psychological health are expressed in the current upsurge of interest among psychotherapists of all persuasions, in Zen Buddhism, existentialism, and self-actualization.

In this connection, it is worth calling attention to what is, perhaps, the major issue today in psychotherapy—namely, the search for positive criteria of mental health or personal growth which are explicitly based on humanistic values. It is now generally recognized that psychological health or self-fulfillment involves more than the absence of illness or emotional disturbance (6)(11). These developments in mental-health concepts have paralleled the recent discovery that most recipients of psychotherapy are *not* suffering from the traditional forms of neurosis and character disorder. While certainly self-dissatisfied and unfulfilled, the person seeking therapy today is generally *not* unproductive, ineffective, or crippled with neurotic symptoms. Innumerable writers have described the typical therapy patient as one who is relatively free of physical complaints, neurotic anxiety and depression, failures of achievement, and interpersonal conflicts (10)(20). In short, the hallmarks of emotional disorder are conspicuously absent. Rather, the central struggle for an increasing number of successful and relatively well-adjusted people seems to be "a loss of meaning in life, an absence of purpose, or a failure of faith" (17, p. 67). Modern discontent tends to take the form of alienation.

In William Barrett's terms, alienation from God, from nature, from the human community, and ultimately, alienation from self (1). While recognizing that the person with problems in personal identity and life outlook deserves help, some investigators have concluded that the psychotherapist is ill-equipped for such a *priestly* task (23). This belief is somewhat substantiated by the disillusionment which many patients of this type experience in psychotherapy. Yet a dearth of alternative resources seems open to an individual in this predicament.

In the light, then, of what seems to be an incompatibility between psychotherapy, as traditionally conceived, on the one hand, and the nature of modern discontent, on the other, it is certainly less than a coincidence that many people who fit this description express an interest in the psychedelic experience and find their way to LSD. It should, perhaps, be emphasized that the only sentiment these people share with the stereotyped beatnik is a sense of alienation from traditional values.

The attitudes and reactions to LSD, both positive and negative, become more understandable when viewed against this background of present-day trends in experimental psychology, clinical psychology, and psychotherapy. Within this broader context, it is not surprising that the major application of LSD today is to *treat* mental illness rather than to *produce* it. Beyond this shift in emphasis, the use of LSD for therapeutic purposes clearly reflects the ambivalence among therapists toward the ever-growing number of meaning- and identity-seekers who request their services.

The research and clinical literature concerning LSD as a therapeutic agent reveals two major viewpoints which seem representative of this ambivalence. These two theoretical orientations are associated with two greatly dissimilar methods of administration. One emphasizes the use of LSD periodically and in small doses as an adjunct to traditional techniques of psychotherapy. The other major approach employs LSD in a single, large dose, producing an intense and prolonged psychedelic experience. Applied in this manner, LSD serves as a catalyst for inducing rapid and profound changes in the subject's value-belief system and in his self-image. 2

While recognizing the therapeutic effects of LSD, this latter

2. For a more detailed and referenced critique of the extensive applications of LSD as a therapeutic agent, see the reviews compiled by Mogar and Savage and Unger (21).



technique places greater emphasis on its more unique potentialities and value — namely, as a means of facilitating personal growth and self-fulfillment. Rather than freedom from emotional symptoms, the primary objective of the psychedelic experience becomes a major reconstruction of one's belief and life outlook. In short, the first method is essentially illness-oriented, the second, health or growth-oriented.

With regard to their effectiveness, both orientations have reported impressive results. Used in conjunction with psychotherapy, LSD has been found to facilitate improvement in patients representing the complete spectrum of psychological disorders and diagnostic types. In the mass of research and clinical findings published in professional journals, predominately positive results have been almost uniformly reported. The consistency of results is particularly noteworthy in view of the many uncontrolled factors, in this work, which are known to influence reactions to drugs and treatment outcome. In this respect, factors such as dose level, frequency of administration, patient and therapist expectations, and the environmental setting deserve mention. Despite great diversity in the conduct of these studies, impressive improvement rates continue to be reported with both adults and children, and in group as well as in individual psychotherapy. It is also worth noting that LSD has been found effective by therapists of widely divergent theoretical persuasions. Among these are included Freudian therapists, Jungians, behaviorists, existentialists, and a number of eclectic therapies. Furthermore, the therapeutic value of LSD has been reported by investigators from countries all over the world.

In spite of the breadth and consistency of this extensive body of evidence, a number of limitations and shortcomings characterize these studies, if the standards of valid research are applied. The major criticisms include small samples of patients, subjective and vague estimates of improvement, inadequate or short follow-up evaluations, and lack of control groups. While it seems safe to conclude on the basis of this work that LSD can produce far-reaching beneficial effects in some people, under some conditions, the more important questions remain unanswered. Specifically, in what ways do various kinds of people respond to LSD, both during the experience and afterward? What are the optimal conditions of administration for given objectives? And how can we account for the various kinds and extent of change which follow an LSD experience? Beyond these initial questions lies a vast vista of intriguing unknowns which warrant intensive and extensive investigation. For example, can LSD facilitate the cultivation of

special talents and abilities? Is the experience akin to the creative process? Is it related to similar altered states of consciousness such as hypnosis, transcendental experiences, dreams, or religious conversions? From the standpoint of research, attempts to investigate such questions in a relatively objective manner involve a number of methodological problems concerning experimental design and the measurement of such factors as value-belief systems, personality characteristics, behavior patterns, and criteria of improvement or personal growth. It should be emphasized that, although these problems in design and measurement are complex and costly, they are not insoluble.

As a case in point, the ongoing research program currently being conducted at the International Foundation for Advanced Study (IFAS) at Menlo Park, California, has made significant progress in solving some of these methodological problems. Beyond this, a wide variety of carefully collected and reliable data is presently being analyzed, which will throw considerable light on the questions referred to previously. A brief examination of the conduct of this research program and some of our findings to date indicate quite clearly that the various claims and counterclaims made for LSD are readily testable and given to further systematic exploration.

Our initial results were obtained on a large group of voluntary subjects who underwent a single, large dose LSD session conducted in a comfortable, esthetically-pleasing setting. Although trained staff members were present throughout the session day, primarily for emotional support and human contact, no attempt was made to direct or interpret the experience. Rather, the subject was urged to explore himself and his universe without external guidance or intrusion. Prior to the LSD experience, each subject was given a physical and psychiatric examination followed by a series of preparatory interviews. These exploratory interviews were designed to help the individual examine or re-examine his reasons for taking LSD, to clarify whatever problems or questions he wished to explore, and to become accustomed to altered states of consciousness. Following the psychedelic experience, extensive follow-up evaluations were made covering a minimum of six months.

From the moment an individual entered the program to the final follow-up contact, a mass of detailed personal information, ratings, evaluations, and psychological test data were collected. At the present time, analyses are being completed on data concerning *changes* which an individual undergoes following the psychedelic experience. For both theoretical and methodological reasons,

significant changes are assumed to occur along three main dimensions: values and beliefs, personality, and actual behavior in major life areas. Attempts have been made to measure these various aspects of personal functioning at a number of different points in time, both prior to and following the LSD experience. This procedure permits a comprehensive test of the hypothesis that a profound psychedelic experience tends to be followed by a major resynthesis of one's value system and life outlook. It is further hypothesized that this change in basic beliefs will in turn be followed by *slower* alterations in personality structure as well as changes in characteristic behavior patterns. Beyond this general hypothesis, the research program at IFAS is designed to study the role of life-history experiences and personality factors in various outcomes. Also under investigation are different aspects of the psychedelic experience itself and how these relate to the personality of the subject and subsequent changes.

Our findings so far provide considerable support for the general hypothesis concerning changes in values, personality, and behavior (12)(13)(14). For example, three days following the LSD session a consistent and reliable increase was found in the extent to which an individual agrees with test items reflecting a deep sense of meaning and purpose in life, open-mindedness, greater esthetic appreciation, and sense of unity or oneness with nature and humanity. Also significant was the finding that these changes in personal beliefs either remained constant or further increased at the two month follow-up. This was a consistent result cutting across such factors as age, sex, religious orientation, or personality type. Thus, it seems safe to conclude that a rapid and extensive change in values does tend to occur in most subjects, and importantly, is maintained over time.

The additional hypothesis that slower modifications in personality and behavior would occur, consistent with a particular change in life outlook, has also received considerable support. For example, our data indicate that if a person values human brotherhood more after his psychedelic experience, his personality and behavior reflect this new conviction. Specifically, he tends to be less distrustful and guarded with others, warmer and more spontaneous in expressing emotion, and less prone to feelings of personal inadequacy. With regard to characteristic behavior patterns, parallel changes tend to occur in such areas as marital relations and work effectiveness.

Although our overall results indicate that almost all subjects derive some degree of benefit along the lines indicated, it is important to emphasize that the nature, the extent, and the stability of

changes vary considerably. Our present focus is on three major sources of this variability: first, pre-LSD personality structure; second, the type of presenting problem; and third, variations in the psychedelic experience itself. With regard to personality differences, we have been able to establish a number of personality types which are related to particular patterns of response to LSD. For example, recent findings indicate that all subject-groups, defined according to personality pattern, demonstrated significant positive changes during the months immediately following LSD.

However, at subsequent follow-up evaluations, it was found that these groups differed considerably in the ability to assimilate the psychedelic experience, i.e., wide differences were found in the capacity to integrate rapidly acquired insight into one's life style and life situation. In other words, some subjects either consolidated initial gains or displayed further personal growth, while others tended to regress in the direction of pre-LSD behavior patterns. Importantly, none of these personality subtypes completely reverted to its former status. Yet, these differences in the ability to maintain or further enhance newly realized potentialities certainly warrant further study.

With regard to differences in presenting problems and variations in the nature of the psychedelic experience, I will merely mention work which is currently in progress. First, the kinds of change which a subject undergoes, and the stability of these changes over time seem related to whether the motivation for taking LSD involves neurotic symptoms or problems of a more existential nature. While the relationship is presently not clear, nor is it a simple one, some sort of association seems apparent. Secondly, various aspects of an individual's response *during* the LSD session seem significantly related to outcome. For example, recurrent themes such as some form of death and rebirth, self as creator, and the common experience of unity with all life may correlate highly with subsequent changes in values and beliefs. The significance of the occurrence of such themes is not only relevant to outcome but may also serve as an important link to dreams and archetypal myths. The ubiquity of these and other themes in dreams and cross-cultural symbolism, as well as in the psychedelic experience, suggests a number of important convergences in these areas (4)(7)(9)(22).

Although tentative at this point, these lines of investigation seem highly significant and certainly suggestive for future directions in LSD research. And if the historical perspective described earlier is relatively accurate, the exploration of ways of expanding human consciousness will soon occupy a prominent position in the

mainstream of contemporary psychology. Should this prediction materialize, we can look forward to a far more extensive application of these powerful agents as a means of facilitating social as well as individual potentialities. For the present, research with the psychedelics will continue to seek those conditions which maximize their safety, their effectiveness, and their human value.

## REFERENCES

1. Barrett, William. *Irrational Man*. Garden City, N.Y.: Doubleday, 1958.
2. Berelson, Bernard & Steiner, G.A. *Human Behavior: An Inventory of Scientific Findings*. New York: Harcourt, Brace & World, 1964.
3. Hartman, H. *Ego Psychology and the Problem of Adaptation*. New York: Internat. Univ. Press, 1958.
4. Henderson, J.L. & Oakes, M. *The Wisdom of the Serpent: the Myths of Death, Rebirth, and Resurrection*. New York: George Braziller, 1963.
5. Holt, R.R. Imagery: the Return of the Ostracized. *Amer. Psychologist*, 1964, 19, 254-263.
6. Jahoda, Marie. *Current Concepts of Positive Mental Health*. New York: Basic Books, 1958.
7. Jung, C.G. *Symbols of Transformation*. New York: Harper Bros., 1962.
8. Kris, E. On Preconscious Mental Processes, in *Psychoanalytic Explorations in Art*. New York: Internat. Univ. Press, 1952.
9. Long, C.H. *Alpha—the Myths of Creation*. New York: George Braziller, 1963.
10. Maslow, A.H. *New Knowledge in Human Values*. New York: Harper Bros., 1962.
11. Maslow, A.H. *The Psychology of Being*. New York: Van Nostrand, 1962.
12. Mogar, R.E. & Savage, C. Personality Changes Associated With Psychedelic (LSD) Therapy. *Psychotherapy*, 1964, 154-162.
13. Savage, C., Hughes, Mary A., & Mogar, R.E. The Effectiveness of Psychedelic (LSD) Therapy: A Preliminary Report. *Int. J. Social Psychiatry*. In Press, 1964.
14. Savage, C., Savage, E., Harman, W.W., Fadiman, J. Therapeutic Effects of the Psychedelic Experience. *Psychological Reports*, 1964, 14, 111-120.
15. Schachtel, E. *Metamorphosis*. New York: Basic Books, 1959.
16. Schafer, R. Regression in the Service of the Ego, in *Assessment of Human Motives*. New York: Rinehart, 1958.
17. Schofield, W. *Psychotherapy: the Purchase of Friendship*. New York: Prentice-Hall, 1964.
18. Shor, R.E. The Frequency of Naturally-Occurring Hypnotic-Like Experiences in the Normal College Population. *Int. J. Clin. & Exp. Hypnosis*, 1960, 8, 151-163.
19. Skinner, B.F. Behaviorism at Fifty. *Science*, 1963, 140, 951-58.
20. Szasz, T.S. *The Myth of Mental Illness*. New York: Harper Bros., 1961.
21. Unger, S.M. Mescaline, LSD, Psilocybin, and Personality Change. *Psychiatry*, 1963, 26, 111-125.
22. Watts, A.W. *The Two Hands of God: the Myths of Polarity*. New York: George Braziller, 1963.
23. Wheelis, A. *The Quest for Identity*. New York: Norton, 1958.

## SOME OBSERVATIONS ON THE RESISTANCE TO THE USE OF LSD-25 IN PSYCHOTHERAPY

HAROLD R. STERN

"My psychiatric colleagues seem to have taken no trouble to overcome the initial bewilderment created by my new approach to dreams. The professional philosophers have become accustomed to polishing off the problems of DREAM&LIFE (which they treat as a mere appendix to conscious states) in a few sentences and usually in the same ones; and they have evidently failed to notice that we have something here from which a number of inferences can be drawn that are bound to transform our psychological theories. The attitude adopted by reviewers in the scientific periodicals could only lead one to suppose that my work was doomed to be sunk into complete silence while the small group of gallant supporters, who practice medical psychoanalysis under my guidance and who follow my example in interpreting dreams and make use of their interpretations in treating neurotics, would never have exhausted their first edition of the book. Thus it is that I feel indebted to a wider circle of educated and curious-minded readers, whose interest has led me to take up once more after nine years this difficult, but in many respects fundamental, work." (9)

Thus, Freud viewed somewhat darkly the reception of what he considered to be his greatest discovery in the field of psychology. After viewing historically the great changes in the psychological sciences, one must be prepared to conclude that any new change is more likely to be met with scepticism and rejection than openness and understanding.

For any therapist interested in dreams, the interpretation of a dream by a patient treated with LSD-25 is a rare and exciting experience. The breadth and depth of the patient's associations to a dream can be of a nature seldom experienced under ordinary analytic circumstances. Why then, one may ask, is there in the psychotherapeutic profession so wide a taboo against the use of a

drug which may have such large potential for more rapid and profound intervention in a wide range of emotional disorders?

In general we may say that part of the answer lies in the general human resistance to any sort of change. More specifically, the answer may lie in a certain amount of misunderstanding, as, for example, the recent comment, "The drugs are indeed dangerous even when used under the best of precautions and conditions." (12)

One systematic study of any serious negative reactions to the psychedelic drugs covered nearly five thousand case histories in which LSD was used on more than twenty-five thousand occasions. Conditions deemed psychotic, lasting more than forty-eight hours, were seen *in less than two-tenths of one percent of the cases*. The rate of attempted suicides was slightly higher than one-tenth of one percent, and this referred to psychiatric patients, with histories of grave instability. There were no attempted suicides among those who took the drug simply as experimental subjects. So-called psychotic reactions occurred in less than a tenth of one percent of the latter cases. (5)

Although the drug is often referred to as an hallucinogenic drug, it rarely produces hallucinations. The difference between the LSD experience and an hallucination has been described in this way:

It is part of the definition of an hallucination that it cannot be distinguished from the normal sense perception by the participant. This is not the case with the images evoked in a person under the influence of LSD-25; where an hallucinated subject might say: "There's a jaguar coming into the room," an LSD-25 subject would say: "I can see a jaguar coming into the room, but I know it isn't real." Moreover, the LSD-25 subject not only realizes that the so-called hallucinations are unreal. He very often has a fairly clear idea of the subjective elements they represent or symbolize. Thus, in the example I have just given, the subject might well go on to say: "and that jaguar represents my own hostile impulses towards you and towards myself." (13)

In his last unfinished and posthumously published book, Freud concluded his chapter on techniques by saying: "The future may teach us how to exercise a direct influence, by means of particular chemical substances, upon the amounts of energy and their distribution in the apparatus of the mind. It may be that there are other undreamed of possibilities of therapy. But, for the moment, we have nothing better at our disposal than the techniques of psychoanalysis, and for that reason, in spite of its limitations, it is not to be despised." (10)

Sandison, one of the more objective and experienced workers

in the field using LSD, has stated: "Early LSD experiences frequently lead one straight to the core of a patient's problem. They do so more surely and more frequently than is normal in psychotherapy, and many months of time can be saved. I am convinced that patients under LSD come to the central problem long before they can possibly realize it by ordinary analytic means." (18)

This therapist's LSD experience with twelve subjects ranging from the severely schizophrenic to the mildly neurotic, treating some in as many as thirty sessions, others in as few as one, testifies to the significant resolution of conflicts. With many of these patients, one could have had little hope of helping them after their years of effort with competent therapists, and some with a few years of hospitalization behind them.

Almost without exception, after the first session, the patients expressed a desire for additional sessions, not because of "kicks," but because of insight and subsequently favorable personality changes.

None of the patients or colleagues of this writer have enjoyed mystical or "transcendental" experiences. This can be probably explained in terms of the particular therapeutic settings and the conditioned expectation that reflects the orientation of the therapist.

The drug has been established to be non-addictive. (1,3) Quite often, at first, the experience may be painful, inasmuch as the repressions are often lifted. Early traumas recalled with any of the original intensity usually generate anxiety.

"The doctrine of repression is the foundation stone on which the whole structure of psychoanalysis rests, the most essential part of it," (11) stated the founder of psychoanalysis, yet in terms of early pre-Oedipal memories, this foundation stone is left often untouched. (19) The writer's own experience of the three-year training analysis, though most helpful, revealed few early memories before the age of four and was in sharp contrast to the second analysis utilizing LSD psychotherapy with clear recall of many pre-verbal memories, pre-Oedipal memories, with personality changes as a consequence.

The complaint that "none of these claims are based upon detailed, carefully controlled studies designed to be free from possible distortions due to bias or enthusiasm," (7) is all too true and echoes the same charges that are leveled at psychoanalysis in general, from within the profession (4) and from outside. (17) Unfortunately, under the present restrictive circumstances it may be that these claims will never be established. However, the

opportunities for quasi-laboratory verification are greater in the field of LSD therapy than with more orthodox procedures.

Hopefully, seriously-minded investigators will have the will and opportunity to explore the potentials and possible dangers of this and other so-called hallucinogenic drugs. (14) So-called hallucinogenic drugs have been and will be with us for some time to come. It is only the "hue and cry" that is current.

LSD-25 is not a new drug (1943) and precedes almost all the currently-used psychotropic drugs by many years. The latter are only recently being studied by psychoanalytically oriented therapists in terms of the libido theory and other dynamic considerations. (2) Let us hope that similar studies will be made of the psychotomimetic drugs.

One of the reasons given for requiring psychoanalysts to go through the training analysis is that they will offer as little counter-resistance to the patient's unconscious disclosures as possible. This is based on the oft-stated idea that one of the greatest objects of resistance in psychoanalysis is the unconscious. The very fact that LSD-25 helps provide a rich source of unconscious material would in itself be sufficient reason to suspect that it would meet with vast resistances.

Many LSD research staffs have found that the environment around them in hospitals and clinics soon became hostile as their work progressed. (1) The very fact that it is alleged to have psychotic-like effects helps us comprehend the hostility of an environment where people would manifest such behavior.

A very practical objection to the use of LSD is the question of convenience. It is very difficult to attend and interact with one patient for a duration of six to eight hours. It is not easy to arrange time for this without disrupting one's schedule or giving up evening or weekend hours needed for rest and other personal needs. Moreover, the nature of the patient's communications under LSD is such that it is difficult to concentrate without great fatigue. The writer's memory of the aftermath of the first LSD session of eight hours with a patient, rampant with restlessness, resulting in sleeplessness and finally a fitful sleep ravaged by dreams, impels him to urge that therapists prepare for this by personal experience with the drug. It is much like learning to play a different musical instrument than one is accustomed to. This takes time and practice.

It would seem reasonable to raise three questions to any new proposed psychotherapeutic technique, theory or drug. In what way might it be harmful? Does the new approach cause any changes in

the subject or is it more like a placebo? Finally, we can ask, does the new form of intervention do any good?

One of the most detailed articles on the prolonged adverse reactions to LSD states the belief that the actual incidents of serious complications following LSD are infrequent. The authors feel that "when properly employed, LSD is a relatively safe and important research tool." (6) Others have stated that, applying certain diagnostic principles, it is possible to make fairly accurate predictions about how a given subject will respond to LSD. (15)

We will pass lightly over the second question because there is probably fire where there is so much smoke, and we can discount the drug acting like a placebo.

The answer to the third question lies in the future. The experience of this writer, who has conducted more than fifty LSD individual sessions, leads him to comment very positively on the usefulness of the drug. Statements of a number of patients, who believe they could not otherwise have achieved the mental health they now enjoy, add further testimony to this belief. It is to be hoped that the future will provide occasions for an open exploration, investigation and discussion of this drug or of any other proposed psychotherapeutic adjunct.

#### SUMMARY

This paper discusses the various types of resistances that arise in response to a new idea; more specifically, some of the arguments for and against the use of LSD-25 for psychotherapeutic purposes. An attempt is made to show that many of the objections to the use of LSD-25 are exaggerated and based more on unconscious resistances than valid experience.

#### REFERENCES

1. Abramson, H.A., Editor, *The Use of LSD in Psychotherapy*. Josiah Macy, Jr. Foundation, 1959.
2. Azima, H., and Wittkower, E.D., *Anacletic Therapy Employing Drugs*. *The Psia Qlty.*, 26: 190, 1957.
3. Barron, F., Jarvil, M.E., and Bunnell Jr., S. *The Hallucinogenic Drugs*. *Scientific American* 210: 29 April 1964.
4. Bellak, L., *Research In Psychoanalysis*. *The Psia Qlty.* 30: 519, 1961.
5. Cohen, S., LSD: Side Affects and Complications. *J. Nerv. and Ment. Disease*, 1960, 130: 30-40.
6. Cohen, S., & Ditman, K., Prolonged Adverse Reactions to Lysergic Acid Diethylamide. *Arch. of Gen. Psychiatry* 8: 475-480, 1963.
7. Cole, J.C., and Katz., M., *The Psychotomimetic Drugs*. *J. A. M. A.*, 187: 758, 1964
8. Eysenck, H.J., *The Effects of Psychotherapy: An Evaluation*. *J. Consult. Psychol.* 16: 319, 1952.

9. Freud, S., *The Interpretation of Dreams* Basic Books, New York, 1956.
10. Freud, S., (1940) *An Outline of Psychoanalysis*. J. Strachey trans., Norton New York.
11. Freud, S., (1914) On The History Of The Psychoanalytic Movement. In *Collected Papers*. 1:287-359, Hogarth Press, London 1957.
12. Grinker., Bootlegged Ecstasy, *J.A.M.A.* 187: 768, 1964.
13. Hayes, J.S., Clinical Investigations With LSD, Research Dept. Bulletin No. 1., *Phila. Mental Health Clinic*, 1961.
14. Huxley, J., Psychometabolism. *J. Of Neuropsychiatry* 3: 5, 1962.
15. Klee, G.D., and Weintraub. W., Paranoid Reaction Following LSD-25, Bradley, P.B., Deniker, P., and Radouce-Thomas C., Editors: *Neuropsychopharmacology*, Princeton, N.J., D. Van Nostrand Co., Inc., 1959, 457-460.
16. Ostow, M. *Drugs in Psychoanalysis and Psychotherapy*. Basic Books, New York. 1962.
17. Rosenweig, S., A Transvaluation of Psychotherapy: A Reply to Jans Eysenck. *J. Abn. Soc. Psychol.* 39:298, 1954.
18. Sandison R. & Whitelaw, J.D.A., Further Studies In the Therapeutic Value of LSD in Mental Illness. *J. Of Ment. Sci.* 103: 1957
19. Saul, L.J., Snyder, T.R. Jr., and Sheppard, E., On Earliest Memories., *The Psa Qtly.* 15: 258, 1956.

---

## BACK ISSUES AND SUBSCRIPTIONS

Back issues numbers 4 through 8 are available at \$2.00 each. Set of four: \$7.50

A very limited quantity of *bound volumes*, containing numbers 1-4, is available at \$17.50 per volume.

New and renewal subscriptions beginning with issue #9 will cost \$4.50 for four issues.

Use the reply envelope enclosed in this magazine.

Order from: **Psychedelic Review**, Box 498, Peter Stuyvesant Station New York, N.Y. 10009

## SEEDS OF GLORY

### An Interview

*This is a transcription of a taped interview with Karl Kunst, a 26-year-old hospital engineer. It's his description of the religious hallucinatory experience he had under LSD, as obtained from Morning Glory seeds.*

*Also present during this experiment was Karl's wife Frieda, and their close friends, Fred and Mary Sater; Fred is a high-school teacher. The setting was a farmhouse upstate in New York, owned by Frieda's parents.*

*I conducted this interview between Karl and myself; my friend Lester Levoe, of Pace College, was also present and asked some of the questions. The total interview, covering a variety of subjects, lasted for more than an hour; therefore I have excerpted this portion from the middle. Karl had just explained to us, a few minutes before, that while he, Fred, and an unnamed girl tried the seeds in this session, Fred, for some unexplained reason, failed to feel any of the euphoric effects.*

ROBERT WOLF

KARL: Well, anyway, this Morning Glory seed thing is very funny because I had read about it in the papers and the papers had said that none of these seeds were even available anymore, that people had been buying them up just on the rumor that it would make you high. So we went up to the farm and found that locally there was just no problem getting any of these things. Because up in the Catskills, you know, the *New York Times* is a rare, rare thing - and even then it wouldn't have made any difference.

So we bought up . . . well, we had a very funny afternoon. We went around, laughing at the top of our voices, going into all these places and copping all these seeds.

We bought about \$4 worth; at 25c a packet, that's about .16 packets. And we opened one packet experimentally and found that there were about 80 seeds in a packet. And according to the *Times* article, 200 to 500 seeds was about the average dose-range.

So we figured we'd take a little over 300 apiece, and this would be toward the bottom end of the thing. A little over the minimum, just to make sure something happened, but not all the way, you know—obviously we didn't want to try *that*.

BOB: A toe in the water.

KARL: Yes. So at the beginning none of us knew exactly who was going to turn on with this stuff; and finally when it came down to actually doing it, I was definite I wanted to try it, and then Fred was going to try. But his wife absolutely refused, she didn't want to have any part of this thing.

And then Frieda also was afraid to, but finally said she'd participate as far as staying up with us and taking care of us and so forth.

And then this girl that Fred and Mary had hired for the summer, who was supposed to take care of their kids. She was a very unusual girl: at 17, she had turned on to more things than I had even heard of, and was a very groovy chick in many ways, although she wasn't really particularly good-looking — I mean, nothing extraordinary, really.

BOB: Isn't it funny: when you think of groovy chicks you always think of them as being good-looking.

LES: With long blonde hair.

KARL: Well, she had blonde, sort of golden hair, but it wasn't particularly long. And she smoked like a fiend; which really disturbs me, because I can't kiss a chick—

BOB: I'm hip.

KARL: —that has all that tobacco smell; I'm not a smoker and I don't particularly care for it.

In many ways she was extremely nervous. You'd say "Boo!," and she'd fly three feet out of her chair, just so nervous all the time.

So, anyway, we ground the stuff up in a pepper mill, which we had cleaned out before.

BOB: Did you think about making tea out of it? Because the *Times* article said—

KARL: Well, I just decided that the best way to get at what's in them is to pulverize them, which gives the greatest surface area and the greatest possibility of quick absorbency; so we ground the stuff up.

It comes out very fluffy, because there's little moisture in it,

and it comes out sort of spongy. We had sort of half a shot-glass apiece.

We took it in different ways. Fred made a sandwich out of it; took a piece of rye bread, put mayonnaise on it, and sprinkled the stuff over it; maybe that's why he didn't get high. I took mine in a fruit-juice cocktail. The first part of it is nothing; it's a little gritty, and it's neutral tasting. Then somehow, very quickly, the next tablespoon becomes almost impossible to get down.

So we sat there. We had taken this stuff—

BOB: What did you do? You mixed it with fruit juice, and drank the juice?

KARL: Yeah. It was sort of like slush. We got the stuff down and we sat down to dinner. And we were really hungry, you know. When we sat down, anyway.

And as this food was before us . . . well, the girl was the first one; she said, "You know . . . I don't . . . feel . . . very hungry. I think I'll just . . . sit here . . . and . . . not eat." And then, after awhile, she said, "I think I'll go and lie down; I don't feel very good." And she really split and lay down.

And Fred was mixing up his plate of spaghetti, or something, and all of a sudden he said, "You know, it's amazing but I just don't have the appetite I started out with." And he had one or two bites, and he said, "I think I'll go and lie down for awhile. My stomach doesn't feel good!"

And I laughed and laughed. I mean really, it was too much . . . these weak stomachs. And so I had one bite, then two bites, and suddenly—Oh! It was so unbearable! And I ran and lay down, too!

So there we were, in the living room. Fred was laid out on the bed, and the chick was laid out on the couch, and I went to this easy chair; and we were all looking at each other, realizing that the seeds were doing something that wasn't very, very good.

BOB: Were you feeling nauseous, or—?

KARL: We really got stomach aches! And great discomfort; nothing you could really put your finger on, but it felt best when we were sort of doubled over. Pretty soon we got kind of nauseous.

We started laughing; it was so silly. Three supposedly grown up people doing something just on the weight of an article in the paper, and getting absolutely sick and perhaps poisoning ourselves! And there was nothing we could do to get it up—there it was . . . it had to go one way or the other.

LES: Yeah, it was either die or get high!

KARL: And it got worse and worse. Finally Frieda went out and



made tea. Mary split, meanwhile; she just couldn't stand the whole thing.

We sat there and we started laughing and laughing, but we weren't particularly high.

BOB: Let's see. Mary is Fred's wife. But the girl was still there . . . ?

KARL: Right. Finally the girl went "Whoop!" and ran outside and chucked all the stuff up and came back. She was very upset—because she wasn't going to get high now; she knew she'd thrown it all up, and she was really depressed.

So she lay there, because she was still feeling a little lousy. Fred and I heroically managed to keep the stuff down with tea and a little yoga.

BOB: Lying on the floor?

KARL: Fred was lying on the bed, all doubled over, and I was in the chair. We felt that if we just didn't move, and could have tea, we could keep it down. And it worked; but it was a miserable time.

About 2½ hours later, I decided "This isn't going to work;" and I wasn't really very unhappy about it. So I got up; I thought I'd better turn off the light, because if we were going to fall asleep it would be very annoying to have the light on. So I got up and I noticed that I was weaving. Tremendous vertigo; I was weaving all over the place.

And I got into the kitchen, which was very bright, and there I immediately noticed that something was working. And I was very happy. I said, "Thank God!," you know. And it was an incredible thing, because no object in the kitchen had its normal shape—all the lines were flowing! And the whole room was sort of this solid gold light. It was really beautiful! But the thing was, I had this mission, you see; I had to go and turn off the light. I had set out to do this, and I just sort of waded through all this beautiful stuff, and I turned off the light.

BOB: Did it seem like a long time? I mean, was time drawn out?

KARL: Not particularly. And I got to the switch with no trouble, and I got back; no panic or anything. And when I got back to the living room—what we call "the parlor"—that was when the most amazing thing happened. You see, the thing seems to work in a step-wise fashion, rather than gradual . . .

BOB: When you turned the light off, how did you feel physically? Were you numb, or did you have physical control?

KARL: Not much. Except for vertigo and rocking back and forth.

I wasn't very stable. But my mind was working perfectly! Inside all the illusion, there I was, perfectly clear and cool, and knowing exactly what it was and the proper time sense and everything.

LES: You knew it was an illusion?

KARL: Oh yes. And it was fine; I was glad about it. It was beautiful. And then I turned off the light and I got back, and when I hit the doorway, that's when the most amazing illusion began. Because this farm room, you see—nothing very special about it . . . some old furniture—turned into this huge, oval marble hall. It was just so big. And the most intricate, beautiful marble work. And all around it was this metal inlay—you know, real bronze or gold stuff. It was dark, of course, but you could still see.

I lay down on the floor. The girl was lying on the floor, too. And right next to us, in between us, opened up this huge, sunken pool. It was so *real*. It was so beautiful. And the amazing thing was that the illusion stayed still! In other words, I would turn my head and it would stay there.

BOB: Where were you? Where did you think you were? Because, you got back to your chair, but meanwhile it was another room.

KARL: Right, but I knew that the whole thing was an illusion. And I thought it was marvelous; I was very, very happy about it!

BOB: Could you see the *old* room?

KARL: Absolutely not; I just knew that it was there. It had completely changed, gone.

BOB: You just knew where things were?

KARL: I knew that one thing was just superimposed on the other.

BOB: You mean where a couch had been, that would be a marble bench, or something?

KARL: Well, that I don't know; because I was lying on the floor, and the girl was lying on the floor, and that's all I could see.

BOB: And this pool just opened up?

KARL: It was right in front of us. Very deep, and the water was very dark and still; it was just as if the regular walls weren't there.

LES: Oh, you mean it was a bigger room?

KARL: It was a *much* bigger room.

LES: That's what I mean; you were just seeing your illusion. You weren't seeing the room itself.

KARL: Oh no.

LES: That's what I mean. The couch was there and you knew it was there, but you didn't see the couch—you saw an oval, marble room.

KARL: Right.

BOB: Were there windows and stuff like that, too? Or what?

KARL: That I don't remember.

LES: You know, when you visualize a movie-scene-type-thing like this—

KARL: Well, the marvelous thing was—Well, first of all—Well, I'll go into that later, but what I thought was really marvelous is what it shows about the mind.

But, anyway, we were lying down, sort of like a prince and princess, you know, in this palatial hall—

BOB: Cleopatra and—

KARL: —and I looked at the girl and her face started to change. Instead of being a normal, flesh face, all the surfaces became planes, very shiny little planes, and from the top of her head, coming down, were these strings of beads. That was one illusion which didn't stay constant; it was always changing somewhat.

BOB: The beads, you mean?

KARL: The beads and her decorations and so forth.

BOB: But the room stayed the same?

KARL: The room stayed very stable. And the ground was very hard, you know . . . it was marble.

BOB: Did you feel like you could reach over and run your fingers through the water?

KARL: But I didn't try, unfortunately.

Now, I don't know how long all these things lasted, but, in any case, the whole thing didn't last very long. Anyway, I sat down, and I must again say that at this point I knew it was an illusion. I knew that the drug had caused it; I felt no panic, no loss—you know, no worry about not getting back. I just said, "This is what I've always read about and it's finally happening, and it's a gas!"

BOB: Were you talking out loud?

KARL: No; the girl was there, but she was quiet.

BOB: Did you *see* her?

KARL: I knew that she was there some place, but at this point I

had actually lost that train of thought, you know. But I'll go back to that later. Anyway, I don't know how long this thing lasted; I remember I turned around and I was afraid to talk for fear it might go away. So anyway, I sat there and this is when the next phase of the thing began. Without any warning—you see, this is the thing: there is no graduation between the stages. Without warning—in fact, if I'd had any warning of this next phase, I would have been out of my mind! I would have yelled or called for someone or grabbed onto someone.

BOB: You mean out of fear, or exultation?

KARL: Yeah, out of fear. Because all of a sudden I felt that there was an inward explosion, kind of, in the Self. And it felt like all the pieces of the "I" were rushing away from each other at an incredible rate, until they filled all space. And then it stopped! It was this tremendous "whoosh," and then everything was quiet, and there it was, you know, kind of hanging, this tremendous expanded state.

BOB: Of your Self?

KARL: Yes. And there were no more illusions at this point. I saw the room absolutely clearly, and saw everyone clearly. But the most incredible state of consciousness! Now I still—I'm not in it now, but I remember it because it was such a powerful thing that you can't forget it.

BOB: And you saw the room, and everything, just as if you were straight?

KARL: Yeah. There were no more illusions.

LES: Could you liken it to anything?

KARL: No. Because I said at that point: "Nothing that anybody has written about this thing has been like this."

BOB: You said that to yourself at the time?

KARL: Yes. I said, "It must have been what has happened to them occasionally," because I could see how they were trying to hint at it. And I saw, right away, the impossibility of describing it when I would come back. Now, again, there was this interesting sense of knowing exactly what was going on, except that this part was *real*, the other was an illusion. But this state *had* to be real, because this was *a consciousness*. And although it was drug-induced, it didn't matter. This was a sense, a state, I had never experienced before. These other illusions could be seen in a movie; they could be built.

LES: And this was partially physical too? It was partially physical?

KARL: What? This next state? No, it wasn't. It seemed to be an explosion, but that's only a physical analog of the thing. What it actually was, if I can borrow this phrase, was an "expansion of consciousness."

BOB: This sounds very Zen-ish. You know, very much like "nirvana."

KARL: Well, I felt— First of all, there were some definite things I thought about. One was that time does not really exist. Of course I have to be careful and think that perhaps many of these thoughts are elaborations of things I have read; you know, one never knows just where one is picking up some of this stuff: so I can't call it enlightenment, particularly...I'm being very cautious. But, anyway, it seemed to me that there was no such thing as time in actuality; that time was a restriction imposed on us; that all it is and all it was and all it will be is just part of the scene that is going on at all times: and therefore the feeling of guilt that human beings have, and which is the big thing that hangs them up, is a useless feeling and the biggest thing that keeps us back. "Sure, we're not good in many ways," I thought, "but this is part of what has to be. You can't fight it. It's part of the inevitable pattern. This is the way we're going to turn out; guilt is just a dead end."

BOB: You were feeling all these things?

KARL: All these things were coming to me. Meanwhile, I had no recognizance of this girl. She didn't particularly attract me. I wasn't out to make any scene with her, or anything. In fact, I was very much unaware of her until now. And then all of a sudden, in this state—All I can say is that my head felt like it was 30,000 miles across, embracing everything.

BOB: Your head.

KARL: Just so beautiful! I mean, I ended this day so grateful, in a way, for this experience. The feeling that I've had before, you know, that I'd hate to die now because there's so much I haven't lived—I can't feel this anymore, because this was such a beautiful thing! There is almost nothing I've ever felt that could come close to this.

LES: Repeat what you just said about dying.

KARL: Well, you know, I've often felt very—I've seen people die and I felt very bad; it could be my turn next. Then I've felt very sorry for myself—

BOB: Yeah. Like you might miss something.

KARL: Sure. I mean, what the hell, I've got just so many years left, and I really rebel, theoretically, against the concept of death—

BOB: But the way you felt at the time was that you'd had it all?

KARL: If death would happen then, I felt—or even now, I feel . . . if I knew this was about to happen, I would feel less regrets now.

BOB: You mean right now?

KARL: Even right now. Because this is almost a permanent experience. This is also why I've had almost no need to do it again.

BOB: This is detracting, but do you feel it made any *permanent* changes in your psyche?

KARL: Yes.

BOB: Well, maybe you'll get into that later, then.

KARL: Well anyway, as I was thinking about these things, suddenly—I wasn't looking at this girl—but suddenly I felt, again, almost physically as if there was another consciousness floating in this space. So I turned around to look at the girl and found that she was looking at me. And she had these tremendously big eyes, you know, just like a child. And I had to start speaking then, because I really wanted to know if I was alone in this thing, or if anybody was with me in it; so far, I didn't know if the girl was getting any place at all. And she said, "Oh, it's beautiful! It's wonderful. It's incredible. I never want to get out of this, it's so beautiful!" And I had to tell her that she would. I said, "The drug, you know, is going to wear off and you're going to come down out of this." She said, "But no, I don't want to": she couldn't conceive of not being in this state. Because you see, again, it was real. What your consciousness is, is *real!* I mean, that's — But anyway, I sort of spoke prophetically. I said: "You know, when you come down off this, you're gonna deny everything that happened"—sort of like Christ telling Peter . . . But I said, "Look, don't deny this, because it's really very beautiful." She said, "Oh no, I'm not going to deny anything. You know, it's just so incredible." So anyway, we sat there just sort of looking at each other, and digging each other in a completely spiritual way. It was the most incredible thing.

BOB: Did you ever think about making it with her, while you were high?

KARL: Now again, you see, my mind was very clear. So I thought back to my pot highs; I would have wanted to ball the chick right away. And it wouldn't have mattered whether the chick was high

or not. Because when I get high, I get very horny, and every chick is beautiful. But the thing was, that meanwhile Frieda wanted to know what was going on, and she wanted to know if she could lie down next to me. And I said no, she couldn't. I said, "It's very hard to explain now, but I perceive that you're not where I am and where she is, and you're so far away, there's nothing I can do." And she said, "Okay, I understand." You know; she accepted it on faith. And then I thought, "On pot I'd really be very aroused. But there's no erotic feeling at all with this girl." In fact, I don't think I *could* have made it. And I know—I've learned subsequently that a number of people who have been high on this stuff have been unable to make it. They've tried, you know, with their wives, but they just couldn't get it up. Which is also true, I think, of other narcotics. Anyway, meanwhile there was a tremendous mental strain in all of this, because our minds were working on a level they had never worked on before. And there was a mental communication that was the most perfect telepathy I have ever experienced. You know; I've done this card thing and the ESP thing, and it's worked, kind of. But this was a whole thing. This was two minds in such union that it was incredible!

BLB: How could you tell there was union? You know only *your* part.

KARL: I sensed it. And this girl sensed it, you see. And then there was also something which followed. Anyway, I finally had to lie down, because I couldn't take any more. And she laid down. And then, almost by agreement, our hands met, you know, and we held each other's hand. But it was sort of like a brother-and-sister thing. It was very, very beautiful and incredibly close, and it was almost as if our consciousnesses were funneled into each other's hand. You know, just sort of right there.

BOB: You felt very aware of holding hands?

KARL: Yes, but it was a necessity. We were getting high, in a way. I don't know if we were getting higher, but we were getting more far out, in a human sense. Because we were coming down off this cosmic sort of sensation. And now began the only really difficult part in all of this whole thing. Now began the period when nothing made sense anymore and we had only each other's hand to rely on. Everything we had been thinking before—or at least, in my mind, that I could clearly think—began going away. It was like one layer of logic peeling away and getting thrown out. And the only thing that remained in the end was this tiny kernel of, "Well, it's only a drug, and I'll eventually get off it"—which was like a beacon light, you know, that I could see. But you have no idea how

things didn't make sense. I began to feel at this point, "Every psychiatrist should go through this, because then they'd have more compassion for schizophrenics, or whatever mental derangement is like this:" all of a sudden I felt sorry for the poor bastards who are like this all of the time; now we weren't high any more, and nothing made sense anymore. I'd think things like, "Frieda's lying on the bed and she must be very unhappy that I'm lying here holding hands with this chick." And the moment I'd think that—which, after all, made sense—that thought would completely slide away and disintegrate, and another thought would come up: "Frieda doesn't mind because she understands"; and that would slide away. And then, "Frieda's asleep: she doesn't know what's going on"; and that would slide away. And "Frieda is sitting up"; and that would slide away. "She's lying down"; and that would slide away. And it began to be like planes, sliding past each other, each one a complete, logical thought. And finally, Oh, I was going out of my mind! Then the girl began to cry—that's how I knew she was suffering like hell. And then began this two hours of just *suffering*. It was a strange kind of thing; it was like a vicarious suffering, but for everyone in the world. It wasn't specific and it wasn't personal.

BOB: It wasn't a guilt thing, was it? I mean, like you felt sinful?

KARL: No, no, not at all; "Everything there had to be." But I felt pain for the condition that most people are in, including ourselves, I guess.

BOB: Did you think this specifically?

KARL: Yes.

BOB: Was this one of the plane things which kept sliding away?

KARL: No, no. This was after that.

LESS: But every thought which came into your mind was of suffering?

KARL: Yes. And I saw this girl as a child, and then I saw her within minutes become a girl, and then an adolescent, and then a woman, and then a woman with children, and then an older woman...

BOB: You mean you physically visualized—

KARL: I just saw—I actually saw her face change. It was an amazing thing to see this. But while the suffering was going on it was kind of simultaneous with the feeling, you know, of human beings, and the things they have to go through and so forth, a lot of which isn't really necessary.

BOB: How long did this pitying thing last?

KARL: It must have lasted two hours. It was awful! It was as if—The chick began crying and crying and crying, and I kept holding her and comforting her and wiping away her tears and—

LES: And you knew the reasons? You knew it was the drug? You were conscious of that?

KARL: Yes.

LES: You knew you couldn't control it?

KARL: Right. Because it really was real. This pity was profound, and deep.

BOB: It was sort of an empathy with all mankind?

KARL: It really was.

LES: It was felt, but you had no control?

KARL: It was as if all restrictions on feeling had completely gone out; and when all restrictions are loosed, after all, you *will* feel like this all the time. You will feel so emotional you can't live, actually. I mean, our restrictions and inhibitions are necessary, you know . . . these "callousness" things. Our "callousnesses" are necessary in order that we function. But, anyway, finally it became too much, and I threw up, just from mental vertigo. And then I went up to bed and I lay down, and when I got up about—by this time it was morning, about 9 o'clock in the morning—I got up about noon, and I was stoned. But I just had a big head and nothing else; it was very silly. And the girl didn't get up until later in the afternoon. Meanwhile there was nothing between us again. And I was exhausted. Finally she came down, and she started bullshitting. "Oh," she said, "Wow! I really had a strange, you know, 'attitude' last night. I guess I was kind of tired . . ." And all kinds of—You know, she wouldn't believe she was high. So I was a little disgusted with her. Anyway, we sat there, you know, playing with Fred's kids, and then Fred put on some Bach, and the first measures of this music did something to trigger, at least for a couple of seconds, this experience. And the girl stopped what she was doing, and her eyes opened wide again, you know, and we both looked at each other. And I got all weak, kind of, and had to sit down, because it all came flooding back. And right away, you know, no matter what she said after that, she knew she couldn't fool me, and she knew that I knew that she couldn't fool me, and so forth. Well, anyway, that was that.

## SYNCHRONICITY AND THE PLOT/ PLOT

ARTHUR KLEPS

I recently spent a week in the company of a damned soul, that is, one who considers himself a damned soul, and found the experience most stimulating, educational and the cause of much self-congratulatory ideation and emotion, resolutions to continue steadfast in my current prejudices, to listen even less to those who seem to think visionary experiences are the object of visionary experiences, and so forth.

But I also learned something that made me feel slightly foolish (every dimension balances perfectly at every point in time):—the flood of "coincidence" (synchronicity) which characterizes the truly genuine mystical experience (that is to say, my experience) as distinguished from mere psychedelic "tripping," pleasure center button pushing, etc. need not, as I formerly thought, coincide with a "good" karma, or be interpreted in the light of a good karma, as evidence of the gentleness and delicacy, humor, and, above all, love with which the Ultimate Reality may reveal Itself, if permitted to do so, to the "little fellow" . . .

In fact, I have good reason to believe, now that my eyes have been opened another hairsbreadth, that sheer terror is as common a reaction to synchronicity-awareness as is happy acceptance, at least in those cases in which psychedelic drugs provoke the awakening. This is a serious matter, and ought to be systematically investigated.

Synchronicity, apparently, does not "go away" the way visions do. It is not a picture of reality, it *is* Reality (somewhat diluted) . . . (thank God) . . .

Now, if, as my damned soul friend did, one has synchronicity "shoved down the throat" along with all sorts of secondary occult phenomena, such as other people's dreams, "winkle buttons," inappropriate vivid imagery (if your ideation is on a low level, your images *should* be dim), and a variety of hypnagogic hallucinations,

because of too many non-integrated LSD experiences, synchronicity will appear to be just one more, or perhaps the ultimate demonstration, that It *doesn't* care about you.

My friend, if he ever frees himself from the erroneous assumptions which have led him to believe he is being persecuted rather than instructed, will no doubt be the world's greatest expert on demonology, and one may see in this expectation (he is a Capricorn) an excuse for his present suffering. However, be that as it may, the lesson I see in his experience for myself and others—at least for other non-Capricorns—is “the same old one”: MAKE UP A GOOD STORY ABOUT YOURSELF, OR NONE AT ALL.

I must add at once that I consider the latter alternative almost impossible. It is, in fact, satori—ultimate mastery—total relaxation at the state of highest tension, and anyone who imagines he can transcend *plot* in ordinary life because of *visions* is a fool. Nor will “powers” do it—they merely assist in producing the “state of highest tension.” Unfortunately, the teachings of Tim Leary have been widely misinterpreted as an excuse for just wandering around in the world in an aimless manner, such behavior being thought of as a demonstration of one's freedom from “games routines.” The idea is that you trust the world to take care of you (scrounge), have those great visions every now and then, and wait for Der Tag, when you will be transported out of this purgatory and into the Great Beyond. Unfortunately, this attitude is dangerous as well as silly. If it was just silly I would advocate it without hesitation as much preferable to teaching school, bombing the oriental peasantry, or any other common way of life.

What we ought to do is give up our (dirty) neuroses in favor of (clean) karma, but what apparently happens in many cases is that *karma* (the Plot) is abandoned, or is ignored, and the neuroses inflated to truly magnificent proportions. Man is a myth maker. If he can bring his ordinary life into conformance with the Plot with a capital P (karma) he is on the path, he need not be “driven to the pasture with blows,” but if he refuses to “read his lines” he is at the mercy of that which proceeds from “the gates of horn.” Wandering around backstage, he will be frightened by the jumbled paraphernalia, the incongruously disordered scenery and props.

Plot/plot. If the Plot is not accepted, then it must all be some kind of a “plot.” Instead of a wise order, a fiendish design.

I cannot advocate a second LSD experience until the first is integrated. In fact, I regard all visionary experience as secondary to the correct apprehension of “what is going on” *in this world*. (Or, better, in this system.) Seeing things is not the object.

The object is to become what you are.

## SKY TASTE ALIVE INSIDE

GEORGE ANDREWS

I feel like a rocket that has just been launched  
 brain waves travel at the speed of light  
 shot through by all the stars  
 tense liquid movements turn me inside out  
 I am in all the worlds at once  
 after I have made a flute from the bones of my own skeleton  
 then I can begin to dance  
 my own ghost is holy and it is all I have  
 mother earth alive within me  
 calling all her children home  
 lost ones playing in the sky  
 I am in all your eyes  
 we are all inside each other's bones  
 all wearing jewels from the same ocean  
 radioactive salt sounding in each ear  
 it is working just like magic sure as shit  
 writing with my own intestines  
 writing in my own intestines  
 signature of maker sealer in order of the chromosomes  
 supreme secret foundation of the empire  
 protector of what is fine in all the worlds  
 of what in all the worlds holds true  
 coming up from beneath out of the abyss  
 tortoise shell oracle from the depths of time  
 seed of the space tribe planted before history began  
 rainbows oscillate through the flesh  
 innumerable worlds revolving in the galaxy of each individual sack  
 of skin  
 each sensitive hungry island universe of an ego  
 has been alive in all the centuries  
 all the centuries are alive in me now  
 all is here now  
 all that ever was since time began  
 sea of primal radiance foam from which beauty springs

rare mountain fragrance snowdrop breath  
 organic rainbow constellation  
 from inside the tissues paradise rays transform the flesh  
 revolution of the beautiful in the protoplasm  
 micro-explosion in the nucleus  
 morning glory story older than the earth we walk on  
 electromagnetic apple in the ecstatic garden  
 the scimitar of lightning severs my head from my shoulders  
 celestial earth within my flesh awakens the subtle part of my solid  
 self  
 as caterpillar becomes butterfly so man becomes  
 a luminous giant thundering anthems  
 crown jewel on the forehead of our star the earth  
 recognize the other world in this one  
 the light takes me apart then puts me together again  
 bird in the mouth of the jaguar saved by a virgin's hand  
 the markings on the tiger skin are in the language of the diamond  
 back rattlers  
 zero in on one of those acts bathed in the fragrance of the night  
 scars of passion like the markings on an animal's coat  
 tell-tale traces of past experience  
 mother's broth of many generations of lamentations  
 sort all the ingredients out  
 put each one in its proper place  
 now let's begin again  
 the family of the forces in harmony  
 all back home again in one stew  
 traces of yesterday stirring in today's home cooking  
 the dead in conscious contact with the living  
 ancestral traits alive and speaking  
 true nobility is this memory engraved in the bones  
 transformation thrice sanctified of the fossil into a living being  
 all the joy of what never was at last has a chance to be  
 scintillating at the peak each atom has danced its glory  
 when really pinned down up here  
 there is a lot of fast action for enormous stakes  
 scurrying of insect feet wars of species  
 whole lifetimes of energy being oozled up in a few instants  
 the marrow of the soul extracted  
 look into the fiery opal listen to the djinn  
 empty place between the eyes  
 space animal hidden in the human form  
 royal tiger science king game  
 armor of chain lightning links each star to its nerve

incredible night-hawks on the frontier of the open sky  
 extreme weathering of time along the seams of matter  
 cut that queen bee nectar with a knife of pollen  
 rainbow amoebas in my organism I am an organism of  
 crystallized light chords  
 each cell is an instrument in the orchestra of the body  
 floating cushion of joyous resonance  
 sound box swinging through the structure of the being  
 each cell in the body can communicate with any cell of any body  
 cosmic joke being played in the navel of the radiance  
 in the cauldron of exploding ether  
 you may think you are pissing it out of you  
 but it is in the salt of the bones forever

## BOOK REVIEWS

**BIOCHEMISTRY AND BEHAVIOR**  
 By Samuel Eiduson, Edward Geller, Arthur Yuwiler and Bernice T. Eiduson. Princeton, N.J.: Van Nostrand Co., 1964. Pp 554, \$15.00. Foreword by Dr. Gardner Murphy.

This is an outstanding summary and review of present-day knowledge regarding the relations between biochemistry and psychological functioning. One section, entitled "Energy, Respiration and Psychological Function," deals with the various behavioral disturbances and alterations concomitant with alterations in the respiratory cycle. Another section deals with the so-called "Neurohumors," also called neural transmitters, such as acetylcholine, norepinephrine, serotonin and others. Other sections deal with "Hormonal Regulation," chemical diagnosis of mental aberration, "psychoactive agents" (including psychotomimetics, energizers, tranquilizers), biochemical genetics and behavior, etc. The volume of data assembled is impressive, and in some cases important breakthroughs in understanding seem about ready to appear, and yet the field still lacks unifying principles and models.

**DRUGS IN PSYCHOANALYSIS AND PSYCHOTHERAPY**

By Mortimer Ostow, M.D. New York, Basic Books, 1962. Pp. 348, \$8.50.

This volume takes, as its starting point, Freud's remark at the end of the *Outline of Psychoanalysis*: "The future may teach us how to exercise a direct influence, by means of particular chemical substances, upon the amounts of energy and their distribution in the apparatus of the mind. It may be that there are undreamed of possibilities of therapy."

The author describes the action of various drugs, chiefly tranquilizers, in terms of the psychoanalytic system. Thus, tranquilizers are described as reducing the ego's content of libidinal energy, the energizers increase libido. Extensive theoretical discussions are given, plus two cases of drug-psychotherapy. Other drugs are classed either as ego-intoxicants, impairing ego-functioning, or ego-tonics, improving ego-functioning. The discussion of these other drugs is weak, but the book is interesting in presenting what is probably the first attempt to provide a consistent theoretical model, derived from the psychoanalytic, for the explanation and application of tranquilizers and energizers.



## NOTES ON CONTRIBUTORS

GEORGE ANDREWS is an American poet living in Europe, whose poem "Annihilating Illumination" appeared in *Psychedelic Review* # 1. He is editor of "The Book of Grass" to be published by Peter Owen Ltd., London, and a collection of his poetry is also to appear shortly.

WALTER HOUSTON CLARK, Ph. D., is Professor of Philosophy of Religion at Andover-Newton Theological Seminary, Newton, Mass., and co-author with Timothy Leary of the paper "Religious Implications of Consciousness-Expanding Drugs".

DANIEL X. FREEDMAN, M.D., is Professor of Psychiatry at the Yale University School of Medicine.

ARTHUR KLEPS, Ph.D., is a Clinical Psychologist practising in Miami, Florida, and Chief Boo-Hoo of the Neo-American Church.

TIMOTHY LEARY, Ph.D., author of the recently published "Psychedelic Prayers after the Tao Te Ching", is conducting Psychedelic Religious Celebrations in New York City and living in Millbrook, N.Y. at the center of the *League for Spiritual Discovery*, a religious organization which uses LSD and marihuana as sacraments. Charges of narcotics possession against him and three others, following a raid on Millbrook in April, 1966, were dropped September 23. He still faces a 30-year Federal prison term for marihuana, which is being appealed.

ROBERT MOGAR, Ph.D. is Associate Professor of Psychology at San Francisco State College, co-author of a major study on the effects of LSD on creative problem-solving.

RAYMOND PRINCE, M.D. is at the Department of Psychiatry, McGill University, Montreal.

CHARLES SAVAGE, M.D. is Director of an NIMH-sponsored LSD-and-alcoholism project at Spring Grove Hospital, Gatonsville, Md.

MARGARET A. PAUL, M.D. is a practising psychiatrist in San Pedro, California.

HAROLD R. STERN is a psychoanalyst in private practice in Philadelphia.

ROBERT K. WOLFF is a free-lance writer living in New York City.