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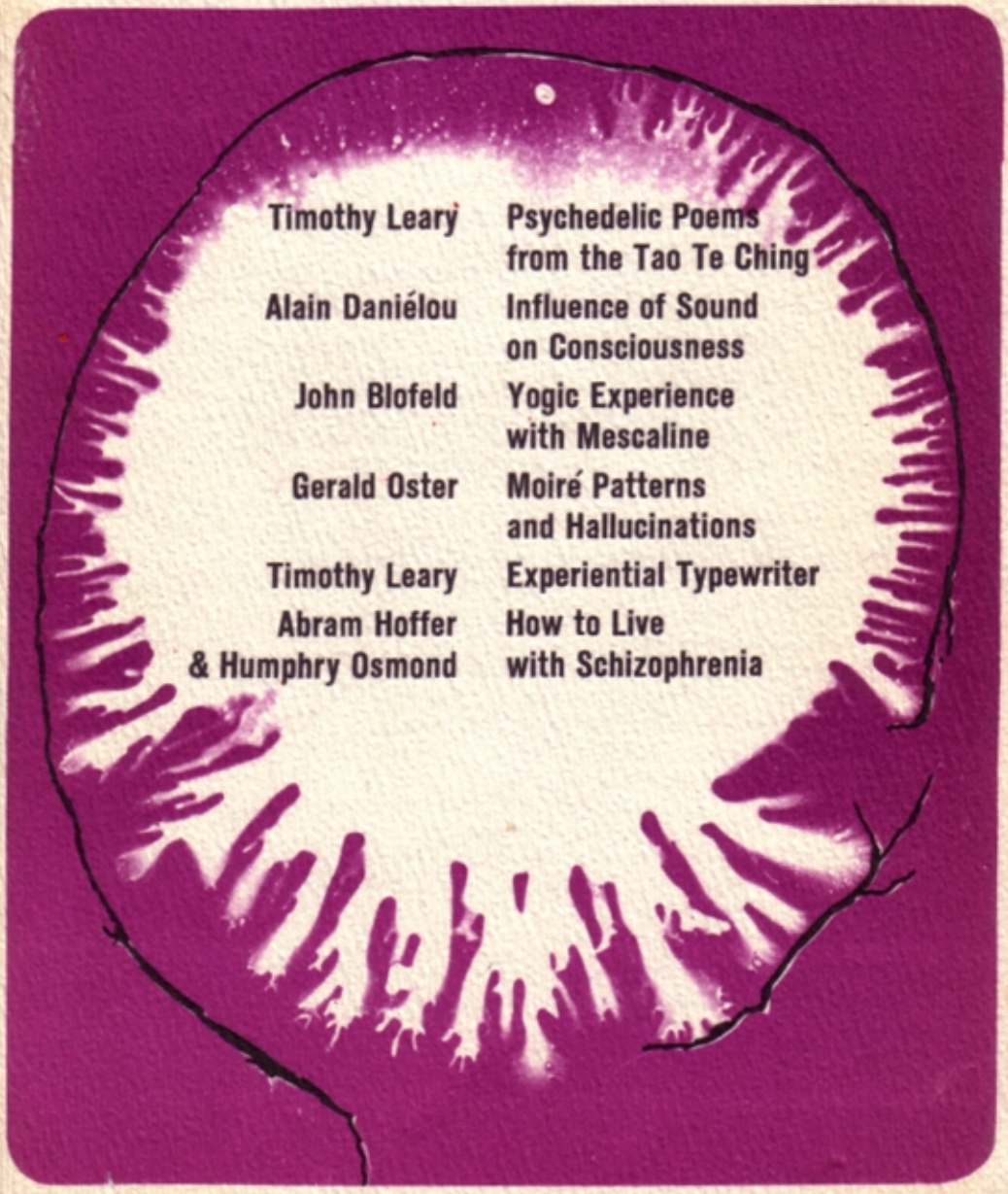

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EDITORIAL

THE USE of LSD and other psychedelics is increasing among a variety of people, mostly laymen. Sidney Cohen estimates that about 40 doctors use it and about 40,000 laymen. Newspaper writers sensationalize the "teen-age drug scene" and give lurid reports of LSD "parties." However, the best available data indicate that teen-agers are not a major group of LSD-users. Rebelliousness may be one motive for involvement with psychedelics but it does not seem to be the major one. As the well-known sociologist Howard Becker points out in a recent article in *The Nation* (100th Anniversary Issue) on "Deviance and Deviates,"—"the LSD movement differs from other organizations . . . in being composed of people who were not, prior to their involvement with LSD, deviant in any sense. . . . They exemplify the increasing militancy, organization and self-consciousness of deviant worlds and their growing unwillingness to let respectable society have its own way with them unchallenged." In Charlotte, N. C., a newspaper published an extensive series of articles about a group of businessmen and professionals who meet regularly to have psychedelic sessions and make no secret of it. In other words, we may speak of a *white-collar black market,* composed of groups of serious men and women, who have in general made satisfactory "adjustments" to society, but sense that something has been left out. The two main goals pursued by these psychedelic "cells" are (1) self-development in the sense of greater awareness, consciousness expansion; and (2) improved marital relations. The latter is an extremely important potential application, in view of the growing body of evidence that LSD and other psychedelics are extraordinarily potent aphrodisiacs (actually heightening all forms of sensory awareness, including the sexual), when taken in the appropriate set and setting. In ill-prepared subjects who are given LSD in "cold" surroundings the release of sexual energies will of course only cause confusion, fear and paranoia.

Some of the many varied applications of psychedelics which are interesting professional people are illustrated by the articles in this issue: Hoffer and Osmond, two pioneers in psychiatric research with LSD, advocate its widespread use in psychiatric training; Gerald Oster, a professor of chemistry, reports on its use in

studying the structure and functioning of the retina; John Blofeld finds mescaline confirming the teachings of Vajrayana Buddhism; Timothy Leary reports on a new device to record empirically the flow of consciousness in LSD and ESP research.

Meanwhile, Senator Thomas J. Dodd, in a statement regarding consideration of the Drug Abuse Control Amendments of 1965 before the United States Senate, refers to "pseudo-intellectuals who advocate the use of drugs in the search for some imaginary freedoms of the mind and in the search for higher psychic experiences." The outcome of the federal lawmakers' deliberations is quoted below, along with another set of restrictions imposed by the State of New York.

Thus the creative tension increases between those who wish to realize the potentials of their nervous systems more fully and those who regard such activities as dangerous. The American system, for all its faults, is an admirable field for this kind of constructive conflict since, as Howard Becker points out: "Our institutions can, when they are spurred into action by determined men, protect minorities of whatever kind from the restraints of cultural tradition and local prejudice."

R.M.

TWO NEW LAWS RELATING TO PSYCHEDELICS

I. FEDERAL LAW

President Johnson signed into law on July 15, 1965, a bill known as the "Drug Abuse Control Amendments of 1965," originally sponsored by Senator Thomas J. Dodd. This law is effective from February 1, 1966. Relevant sections are quoted verbatim from the law below:

FINDINGS AND DECLARATION

SEC. 2. The Congress hereby finds and declares that there is a widespread illicit traffic in depressant and stimulant drugs moving in or otherwise affecting interstate commerce; that the use of such drugs, when not under the supervision of a licensed practitioner, often endangers safety on the highways (without distinction of interstate and intrastate traffic thereon) and otherwise has become a threat to the public health and safety, making additional regulation of such drugs necessary regardless of the intrastate or interstate origin of such drugs; that in order to make regulation and protection of interstate commerce in such drugs effective, regulation of intrastate commerce is also necessary because, among other things, such drugs, when held for illicit sale, often do not bear labeling showing their place of origin and because in the form in which they are so held or in which they are consumed a determination of their place of

origin is often extremely difficult or impossible; and that regulation of interstate commerce without the regulation of intrastate commerce in such drugs, as provided in this Act, would discriminate against and adversely affect interstate commerce in such drugs.

CONTROL OF DEPRESSANT AND STIMULANT DRUGS

SEC. 3. (a) Section 201 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 321) is amended by adding at the end thereof the following:

"(v) The term 'depressant or stimulant drug' means—

"(1) any drug which contains any quantity of (A) barbituric acid or any of the salts of barbituric acid; or (B) any derivative of barbituric acid which has been designated by the Secretary under section 502(d) as habit forming;

"(2) any drug which contains any quantity of (A) amphetamine or any of its optical isomers; (B) any salt of amphetamine or any salt of an optical isomer of amphetamine; or (C) any substance which the Secretary, after investigation, has found to be, and by regulation designated as, habit forming because of its stimulant effect on the central nervous system; or

"(3) any drug which contains any quantity of a substance which the Secretary, after investigation, has found to have, and by regulation designates as having, a potential for abuse because of its depressant or stimulant effect on the central nervous system or its hallucinogenic effect; except that the Secretary shall not designate under this paragraph, or under clause (C) of subparagraph (2), any substance that is now included, or is hereafter included, within the classifications stated in section 4731, and marihuana as defined in section 4761, of the Internal Revenue Code of 1954 (26 U.S.C. 4731, 4761).

DEPRESSANT AND STIMULANT DRUGS

SEC. 511. (a) No person shall manufacture, compound, or process any depressant or stimulant drug, except that this prohibition shall not apply to the following persons whose activities in connection with any such drug are solely as specified in this subsection:

"(1) (A) Manufacturers, compounders, and processors registered under section 510 who are regularly engaged, and are otherwise qualified, in conformance with local laws, in preparing pharmaceutical chemicals or prescription drugs for distribution through branch outlets, through wholesale druggists, or by direct shipment, (i) to pharmacies or to hospitals, clinics, public health agencies, or physicians, for dispensing by registered pharmacists upon prescriptions, or for use by or under the supervision of practitioners licensed by law to administer such drugs in the course of their professional practice, or (ii) to laboratories or research or educational institutions for their use in research, teaching, or chemical analysis.

"(B) Suppliers (otherwise qualified in conformance with local laws) of manufacturers, compounders, and processors referred to in subparagraph (A).

"(2) Wholesale druggists registered under section 510

who maintain establishments in conformance with local laws and are regularly engaged in supplying prescription drugs (A) to pharmacies, or to hospitals, clinics, public health agencies, or physicians, for dispensing by registered pharmacists upon prescriptions, or for use by or under the supervision of practitioners licensed by law to administer such drugs in the course of their professional practice, or (B) to laboratories or research or educational institutions for their use in research, teaching, or clinical analysis.

"(3) Pharmacies, hospitals, clinics, and public health agencies, which maintain establishments in conformance with any applicable local laws regulating the practice of pharmacy and medicine and which are regularly engaged in dispensing prescription drugs upon prescriptions of practitioners licensed to administer such drugs for patients under the care of such practitioners in the course of their professional practice.

"(4) Practitioners licensed by law to prescribe or administer depressant or stimulant drugs, while acting in the course of their professional practice.

"(5) Persons who use depressant or stimulant drugs in research, teaching, or chemical analysis and not for sale.*

"(6) Officers and employees of the United States, a State government, or a political subdivision of a State, while acting in the course of their official duties.

"(7) An employee or agent of any person described in paragraph (1) through paragraph (5), and a nurse or other medical technician under the supervision of a practitioner licensed by law to administer depressant or stimulant drugs, while such employee, nurse, or medical technician is acting in the course of his employment or occupation and not on his own account.

"(b) No person, other than—

"(1) a person described in subsection (a), while such person is acting in the ordinary and authorized course of his business, profession, occupation, or employment, or

"(2) a common or contract carrier or warehouseman, or an employee thereof, whose possession of any depressant or stimulant drug is in the usual course of his business or employment as such, shall sell, deliver, or otherwise dispose of any depressant or stimulant drug to any other person.

"(c) No person, other than a person described in subsection (a) or subsection (b) (2), shall possess any depressant or stimulant drug otherwise than (1) for the personal use of himself or of a member of his household, or (2) for administration to an animal owned by him or a member of his household. In any criminal prosecution for possession of a depressant or stimulant drug in violation of this subsection (which is made a prohibited act by section 301 (q) (3)), the United States shall have the burden of proof that the possession involved does not come within the exceptions contained in clauses (1) and (2) of the preceding sentence.

"(d) (1) Every person engaged in manufacturing, compounding, proc-

* *Editors' Note:* Paragraphs 4 and 5 will have to be ultimately clarified by the courts.

essing, selling, delivering, or otherwise disposing of any depressant or stimulant drug shall, upon the effective date of this section, prepare a complete and accurate record of all stocks of each such drug on hand and shall keep such record for three years. On and after the effective date of this section, every person manufacturing, compounding, or processing any depressant or stimulant drug shall prepare and keep, for not less than three years, a complete and accurate record of the kind and quantity of each such drug manufactured, compounded, or processed and the date of such manufacture, compounding, or processing; and every person selling, delivering, or otherwise disposing of any depressant or stimulant drug shall prepare or obtain, and keep for not less than three years, a complete and accurate record of the kind and quantity of each such drug received, sold, delivered, or otherwise disposed of, the name and address of the person, and the registration number, if any, assigned to such person by the Secretary pursuant to section 510(e), from whom it was received and to whom it was sold, delivered, or otherwise disposed of, and the date of such transaction. No separate records, nor set form or forms for any of the foregoing records, shall be required as long as records containing the required information are available.

"(2) (A) Every person required by paragraph (1) of this subsection to prepare or obtain, and keep, records, and any carrier maintaining records with respect to any shipment containing any depressant or stimulant drug, and every person in charge, or having custody, of such records, shall, upon request of an officer or employee designated by the Secretary permit such officer or employee at reasonable times to have access to and copy such records. For the purposes of verification of such records and of enforcement of this section, officers or employees designated by the Secretary are authorized, upon presenting appropriate credentials and a written notice to the owner, operator, or agent in charge, to enter, at reasonable times, any factory, warehouse, establishment, or vehicle in which any depressant or stimulant drug is held, manufactured, compounded, processed, sold, delivered, or otherwise disposed of and to inspect, within reasonable limits and in a reasonable manner, such factory, warehouse, establishment, or vehicle, and all pertinent equipment, finished and unfinished material, containers and labeling therein, and all things therein (including records, files, papers, processes, controls, and facilities) bearing on violation of this section or section 301(q); and to inventory any stock of any such drug therein and obtain samples of any such drug. If a sample is thus obtained, the officer or employee making the inspection shall, upon completion of the inspection and before leaving the premises, give to the owner, operator, or agent in charge a receipt describing the sample obtained.

"(B) No inspection authorized by subparagraph (A) shall extend to (i) financial data, (ii) sales data other than shipment data, (iii) pricing data, (iv) personnel data, or (v) research data, which are exempted from inspection under the third sentence of section 704(a) of this Act.

"(3) The provisions of paragraphs (1) and (2) of this subsection shall not apply to a licensed practitioner described in subsection (a) (4) with respect to any depressant or stimulant drug received, prepared, processed, administered, or dispensed by him in the course of his professional practice, unless such practitioner regularly engages in dispensing any such drug or drugs to his patients for which they are charged, either separately or together with charges for other professional services.

"(e) No prescription (issued before or after the effective date of this section) for any depressant or stimulant drug may be filled or refilled

more than six months after the date on which such prescription was issued and no such prescription which is authorized to be refilled may be refilled more than five times, except that any prescription for such a drug after six months after the date of issue or after being refilled five times may be renewed by the practitioner issuing it either in writing, or orally (if promptly reduced to writing and filed by the pharmacist filling it).

"(f) (1) The Secretary may by regulation exempt any depressant or stimulant drug from the application of all or part of this section when he finds that regulation of its manufacture, compounding, processing, possession, and disposition, as provided in this section or in such part thereof, is not necessary for the protection of the public health.

"(2) The Secretary shall by regulation exempt any depressant or stimulant drug from the application of this section, if—

"(A) such drug may, under the provisions of this Act, be sold over the counter without a prescription; or

"(B) he finds that such drug includes one or more substances not having a depressant or stimulant effect on the central nervous system or a hallucinogenic effect and such substance or substances are present therein in such combination, quantity, proportion, or concentration as to prevent the substance or substances therein which do have such an effect from being ingested or absorbed in sufficient amounts or concentrations as, within the meaning of section 201(v), to—

"(i) be habit forming because of their stimulant effect on the central nervous system, or

"(ii) have a potential for abuse because of their depressant or stimulant effect on the central nervous system or their hallucinogenic effect.

PROHIBITED ACTS

SEC. 5. Section 301 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 331) is amended by adding at the end thereof the following new paragraph:

"(q) (1) The manufacture, compounding, or processing of a drug in violation of section 511(a); (2) the sale, delivery, or other disposition of a drug in violation of section 511(b); (3) the possession of a drug in violation of section 511(c); (4) the failure to prepare or obtain, or the failure to keep, a complete and accurate record with respect to any drug as required by section 511(d); (5) the refusal to permit access to or copying of any record as required by section 511(d); (6) the refusal to permit entry or inspection as authorized by section 511(d); or (7) the filling or refilling of any prescription in violation of section 511(e)."

GROUNDS AND JURISDICTION FOR JUDICIAL SEIZURE AND CONDEMNATION

SEC. 6. (a) Subsection (a) of section 304 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 334) is amended by inserting "(1)" after "(a)" and redesignating clauses (1) and (2) of the proviso thereto as "(A)" and "(B)," respectively; and by adding at the end of such subsection the following new paragraph:

"(2) The following shall be liable to be proceeded against at any time on libel of information and condemned in any district court of the United States within the jurisdiction of

which they are found: (A) Any depressant or stimulant drug with respect to which a prohibited act within the meaning of section 301 (p) or (q) by any person has occurred, (B) Any drug that is a counterfeit drug, (C) Any container of such depressant or stimulant drug or of a counterfeit drug, (D) Any equipment used in manufacturing, compounding, or processing a depressant or stimulant drug with respect to which drug a prohibited act within the meaning of section 301 (p) or (q), by the manufacturer, compounder, or processor thereof, has occurred, and (E) Any punch, die, plate, stone, labeling, container, or other thing used or designed for use in making a counterfeit drug or drugs."

(b) (1) The first sentence of subsection (b) of such section 304 is amended by inserting, "equipment, or other thing proceeded against" after "article."

(2) Subsection (d) of such section 304 is amended by inserting "(1)" after "(d)" and redesignating clauses (1) and (2) of the second sentence of such subsection as "(A)" and "(B)," respectively; and by adding at the end of such subsection the following new paragraphs:

"(2) The provisions of paragraph (1) of this subsection shall, to the extent deemed appropriate by the court, apply to any equipment or other thing which is not otherwise within the scope of such paragraph and which is referred to in paragraph (2) of subsection (a).

"(3) Whenever in any proceeding under this section, involving paragraph (2) of subsection (a), the condemnation of any equipment or thing (other than a drug) is decreed, the court shall allow the claim of any claimant, to the extent of such claimant's interest, for remission or mitigation of such forfeiture if such claimant proves to the satisfaction of the court (i) that he has not committed or caused to be committed any prohibited act referred to in such paragraph (2) and has no interest in any drug referred to therein, (ii) that he has an interest in such equipment or other thing as owner or lienor or otherwise, acquired by him in good faith, and (iii) that he at no time had any knowledge or reason to believe that such equipment or other thing was being or would be used in, or to facilitate, the violation of laws of the United States relating to depressant or stimulant drugs or counterfeit drugs."

PENALTIES

SEC. 7. (a) Section 303(a) of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 333(a)) is amended by inserting after the final word "fine" and before the period the following: *"Provided, however,* That any person who, having attained his eighteenth birthday, violates section 301(q) (2) by selling, delivering, or otherwise disposing of any depressant or stimulant drug to a person who has not attained his twenty-first birthday shall, if there be no previous conviction of such person under this section which has become final, be subject to imprisonment for not more than two years, or a fine of not more than $5,000, or both such imprisonment and fine, and for the second or any subsequent conviction for such a violation shall be subject to imprisonment for not more than six years, or a fine of not more than $15,000, or both such imprisonment and fine."

(b) Section 303(b) of such Act (21 U.S.C. 333 (b)) is amended by inserting after the word "shall" the following: "(except in the case of an offense which is subject to the provisions of the proviso to subsection (a) relating to second or subsequent offenses)."

POWERS AND PROTECTION OF ENFORCEMENT PERSONNEL

SEC. 8. (a) Section 702 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 372) is amended by adding at the end thereof the following new subsection:

"(e) Any officer or employee of the Department designated by the Secretary to conduct examinations, investigations, or inspections under this Act relating to depressant or stimulant drugs or to counterfeit drugs may, when so authorized by the Secretary—

"(1) carry firearms;

"(2) execute and serve search warrants and arrest warrants;

"(3) execute seizure by process issued pursuant to libel under section 304;

"(4) make arrests without warrant for offenses under this Act with respect to such drugs if the offense is committed in his presence or, in the case of a felony, if he has probable cause to believe that the person so arrested has committed, or is committing, such offense; and

"(5) make, prior to the institution of libel proceedings under section 304(a) (2), seizures of drugs or containers or of equipment, punches, dies, plates, stones, labeling, or other things, if they are, or he has reasonable grounds to believe that they are, subject to seizure and condemnation under such section 304(a) (2). In the event of seizure pursuant to this paragraph (5), libel proceedings under section 304(a) (2) shall be instituted promptly and the property seized be placed under the jurisdiction of the court."

(b) Section 1114 of title 18 of the United States Code is amended by striking out "or any security officer of the Department of State or the Foreign Service" and by inserting in lieu thereof the following: "any security officer of the Department of State or the Foreign Service, or any officer or employee of the Department of Health, Education, and Welfare designated by the Secretary of Health, Education, and Welfare to conduct investigations or inspections under the Federal Food, Drug, and Cosmetic Act."

II. NEW YORK STATE LAW

The New York State senate and assembly approved a new law restricting the sale and possession of psychedelic drugs on June 7, 1965, effective July 1, 1965. The following quotation is from *Laws of New York, 1965*, Chapter 332:

1747-d. *Sale or possession of hallucinogenic drugs or preparations.* The possession, sale, exchange or giving away of hallucinogenic drugs or preparations by other than registered manufacturers or licensed physicians who hold a license issued by the commissioner of mental hygiene to receive such drugs shall constitute a violation of this section.

The provisions of this section restricting the distribution and possession of hallucinogenic drugs or preparations shall not apply to common carriers or to warehousemen while engaged in lawfully transporting or storing such drugs or preparations, or to any employee of the same acting within the scope of his employment; or to public officers or their employees in the performance of their official duties requiring possession or control of hallucinogenic drugs or preparations; or to temporary incidental possession by employees or agents of persons lawfully entitled to possession, or to persons whose possession is for the purpose of aiding public officers in performing their official duties.

For the purposes of this section, the term "hallucinogenic drugs" shall mean and include stramonium, mescaline or peyote, lysergic acid diethylamide and psilocybin, or any salts or derivatives or compounds of any preparations or mixtures thereof, except such preparations as the commissioner of mental hygiene has, by regulation, excluded from the restrictions of this paragraph.

Any person who violates any of the provisions of this section shall be guilty of a misdemeanor and shall, on conviction thereof, be subject to imprisonment for not more than one year, or a fine of not more than five hundred dollars, or both such imprisonment and fine; but if the violation is committed after a conviction of such person under this section has become final such person shall be subject to imprisonment for not more than two years or a fine of not more than one thousand dollars or both such imprisonment and fine.

3. Subdivision three of section sixty-eight hundred four of the education law is hereby amended by adding thereto a new paragraph, to be paragraph r, to read as follows: r. Any person to sell or dispense any hallucinogenic drug; provided, however, that a registered manufacturer of such drugs may supply such drugs to licensed physicians who hold a license issued by the commissioner of mental hygiene to receive such drugs and a holder of such a license may sell or dispense such drugs in accordance with the regulations of the commissioner of mental hygiene. For the purpose of this section, the term "hallucinogenic drugs" shall mean and include stramonium, mescaline or peyote, lysergic acid diethylamide and psilocybin, or any salts or derivatives or compounds of any preparations or mixtures thereof. The commissioner of mental hygiene may, by regulation, exclude any such preparation as he may determine to be desirable from the restrictions of this paragraph.

229. Hallucinogenic drugs

No person, except a registered manufacturer as permitted by subdivision r of subdivision three of section sixty-eight hundred four of the education law, may receive, sell or dispense a hallucinogenic drug without first obtaining a license therefore from the commissioner. Such license, if issued, may be issued only to licensed physicians, may be issued for a definite period and shall be issued only for such scientific and medical reasons and under such conditions regarding receipt, possession, sale or dispensation as the commissioner may, by regulation, prescribe. For the purpose of this section, the term "hallucinogenic drugs" shall mean and include stramonium, mescaline or peyote, lysergic acid diethylamide and psilocybin, or any salts or derivatives or compounds of any preparations or mixtures thereof. The commissioner may, by regulation, exclude any such preparation as he may determine to be desirable from the restrictions of this paragraph.

FIVE PSYCHEDELIC PRAYERS ADAPTED FROM THE TAO TE CHING

TIMOTHY LEARY

THE PSYCHEDELIC or visionary experience releases an enormous amount of awareness-of-energy and tunes us in to patterns of neurological signals which are usually censored from mental life.

Understanding, description, and intelligent use of these released energies have puzzled scholars for thousands of years. Today, LSD sessions puzzle, enrapture, awe, and confuse.

Mainly they confuse.

During the last five years, 1960-65, we have witnessed a psychedelic revolution. It is estimated that well over a hundred thousand Americans have taken the timeless voyage through their nervous systems—have had the veil of symbolic illusion lifted for a few hours.

And what is the net effect?

A chaos of potentiality.

A confusion of promise.

Most of these psychedelic voyagers are now aware of the limitless realities stored in the nervous systems, but there is no conception of the meaning and use of these potentials.

There are of course no pat solutions, no easy answers provided by LSD. On the contrary, every paradox, every ambiguity, every problem of static-symbolic life is intensified, raised to exponential powers. Where there once was a blind robot symbolic uncertainty (Johnson or Goldwater?), there is now an uncertainty compounded and multiplied by the knowledge of the illusory nature of routine reality and the existence of countless realities.

From the beginning of the Harvard-IFIF-Castalia exploration into consciousness two facts were apparent. First, that there were no extant maps, models, myths, theories, languages to describe the psychedelic experience. Second, that the temptation to impose old models, premature theories must be resisted.

No current philosophic or scientific theory was broad enough to handle the potential of the 13 billion-cell computer.

Our decision then was to maintain an open posture, to collect data on psychedelic sessions from a wide variety of subjects, in a wide variety of settings, and to continue to look for better models and theories to explain the psychedelic experience.

It became apparent that, in order to run exploratory sessions, manuals and programs were necessary to guide subjects through transcendental experiences with a minimum of fear and confusion. Rather than start *de novo* using our own minds and limited experiences to map out the voyage, we turned to the only available psychological texts which dealt with consciousness and its alterations—the ancient books of the East.

The *Tibetan Book of the Dead* is a psychedelic manual—incredibly specific about the sequence and nature of experiences encountered in the ex-static state. A revision of this text published under the title *The Psychedelic Experience* was our first attempt at session programming.

For the last two years we have been working with another old, time-tested psychedelic manual—the Chinese text, *Tao Te Ching,* sometimes translated as *The Way of Life.*

Written some 2600 years ago by one or several philosophers known to us now as "the old fellow" (Lao Tse), this text is still timelessly modern and will remain so for thousands of years to come—as long as man has the same sort of nervous system and deals with the range of energies he now encounters.

The *Tao Te Ching* deals with energy. *Tao* is best translated as "energy," as energy process. Energy in its pure unstructured state (the E of Einstein's equation) and energy in its countless, temporary states of structure (the M of Einstein's equation).

The *Tao* is an ode to nuclear physics, to life, to the genetic code, to that form of transient energy structure we call "man," to those most static, lifeless forms of energy we call man's artifacts and symbols.

The message of the *Tao Te Ching* is that all is energy, all energy flows, all things are continually transforming.

The *Tao Te Ching* is a series of 81 verses which celebrate the flow of energy, its manifestation and, on the practical side, the implications of this philosophy for man's endeavors. Most of the pragmatic sutras of the *Tao* were directed towards the ruler of a state. How can the King and his ministers use this knowledge of the energy powers to govern harmoniously?

Like all great biblical texts, the *Tao* has been rewritten and re-interpreted in every century and this is as it should be. The terms for *Tao* change in each century. In our times Einstein re-

phrases it, quantum theory revises it, the geneticists translate it in terms of DNA and RNA, but the message is the same.

The practical aspects of the *tao* must also be rewritten and adapted to the everyday situation. The advice given by the smiling philosophers of China to their emperor can be applied to how to run your home, your office, and how to conduct a psychedelic session.

The five sutras or prayers presented in the following pages are selected from a psychedelic translation of the *Tao Te Ching* to be published by University Books.

The forty-nine sutras in this volume are divided into five groups:

I. *Preparatory Prayers* to be read before the session.
II. *Prayers Concerning Pure Energy Flow* which are to be read, slowly and ethereally during the early "high" points of the session.
III. *Prayers Concerning Biological Flow* and seed energy.
IV. *Prayers Relating to Experience of Bodily Processes,* awareness of *cakras* or nerve centers of the body.
V. *Re-imprinting Prayers* which concern the later parts of a psychedelic session (from eight to twenty-four hours after the session begins), when the subject is re-entering the routine world and selecting a post-session personality.

Each of the five prayers which follow has been selected from one of these five sections—preparation, pure energy flow, seed energy, *cakra* energy, and re-imprinting.

The *Tao* manual, like all other psychedelic texts, must be studied intensively, the detailed theory of energy transformations thoroughly learned, and the commentary notes for those sutras selected for the session re-read several times.

Psychedelic poetry, like all psychedelic art, is crucially concerned with flow. Each psychedelic poem is carefully tailored for a certain time in the sequence of the session. Simplicity and diamond purity are important. Intellectual flourishes and verbal pyrotechnics are painfully obvious to the "turned on" nervous system.

Psychedelic poetry should be read aloud (or taped) at a slow tempo, in a low natural voice. The prayers are best read or taped by one who is "high" at the time. Any tension, artificiality, or game-playing on the part of the reader stands out in embarrassing relief.

Read by the static intellect, imprinted to symbols, and inundated by the verbosity of our culture these sutras are simply another sequence of lifeless words. But to the consciousness released from imprinted statics these prayers can become precise bursts of trembling energy and breathless meaning.

You will wonder, perhaps, at the use of the term "prayer" to label these sutras.

Prayer is ecstatic poetry. Psychedelic communication.

Ordinary, static communication in terms of prose symbols, is game. Mind addressing mind.

You cannot describe the ecstatic moment in static terms.

You cannot (without regret) communicate during the ecstatic moment in static prose.

You cannot produce ecstasy with static symbol sequences.

When you are in a psychedelic state—out beyond symbols—game communication seems pointless. Irrelevant. Inappropriate. Inadequate.

There is no need to communicate—because everything is already in communication. You are plugged into the multiplex network of energy exchanges.

But there are those transition moments of terror, of isolation, of reverence, of gratitude . . . when there comes that need to communicate.

That need to communicate with the non-game energy source that you sense in yourself and around you.

And there is the need, at exactly that moment, for a language which is not mental, cliché. A straight, pure, "right" non-game language.

This is prayer.

Mantra.

Ejaculation.

There are moments in every psychedelic session when there comes that need to communicate—at the highest and best level you are capable of.

This need has been known and sensed for thousands of years. All prayers are originally psychedelic communications with higher freer energies—tuning yourself into the billion-year-old energy dance.

Conventional prayers, for the most part, have degenerated into game rituals. Slogans. Meaningless verbalizations. Appeals for game help.

But that crucial non-game terror-reverence awefull moment comes. . . .

There comes that time when the ecstatic cry is called for.

At that time, you must be ready to pray.

To go beyond yourself. To contact energy beyond your game.

At that time you must be ready to pray.

When you have lost the need to pray . . .

You are dead.

I — 1*

The Session Guide

In the greatest sessions
One does not know that
    there is a guide

In the next best sessions
One praises the guide

In the good session
One admires the guide

It is worse when
One fears the guide

The worst is that
One pays him

If the guide lacks trust
    in the people
Then
The trust of the people
    will be lacking

The wise guide guards his words
The wise guide sits serenely

When the greatest session is over
The people will say—

"It all happened naturally"

Or

"It was so simple, we did it
    all ourselves"

(Adapted from Tao Sutra 17)

* This sutra should be read aloud before the session so that both the guide and the voyagers are explicitly aware of the guiding contract.

II — 1*

That Which Is Called the Tao
Is Not the Tao

The flow of energy .....

Here .....

It .....

Is .....

Nameless .....

Timeless .....

Speed of light .....

Float beyond fear .....

Float beyond desire .....

Into this Mystery of Mysteries

Through this Gate of All Wonder

(Adapted from Tao Sutra 1)

* This sutra can be read, at very slow, measured, hushed tempo, in the first hour of the psychedelic session.

III — 5*

Lao Tse's Mind Becomes Preoccupied With a Very Difficult Subject—To Describe the Production of Material Forms by the Tao

Is it a dream?

Shadowy

Elusive

Invisible

All things,
All images
Move slowly
Within
Shimmering nets

Here
Essence endures
From here
All forms emerge

All forms
Emerge
From this second
Back to the ancient beginning

(Adapted from Tao Sutra 21)

* This sutra can be read between the first and the fifth hours of the LSD session.

IV — 2*

The Water Cakra

Can you float through the universe of your body
and not lose your way?

Can you lie quietly
engulfed
in the slippery union
of male and female?
Warm wet dance of generation?
Endless ecstacies of couples?

Can you offer your stamen trembling in the meadow
for the electric penetration of pollen
While birds sing?

Twist sinuously on the river bank
While birds sing?

Wait soft-feathered, quivering, in the thicket
While birds sing?

Can you coil serpent writhing
While birds sing?

Become two cells merging
Slide together in molecule embrace?

Can you, murmuring

Lose

All

Fusing

(Based on Tao Sutra #10)

* This sutra seeks to "break through" to the sexual *cakra* and is to be used in programmed sessions which attempt to systematically explore the sequence of *cakras* or somatic nerve plexes.

V — 9*

How to Recognize the TAO Imprint

He who returns in the flow of *tao*
Brings back a mysterious penetration
So subtle
That it is misunderstood

Here is his appearance
Hesitant like one who wades in
a stream at winter
Wary as a man in ambush
Considerate as a welcome guest
Fluid like a mountain stream
Natural as uncarved wood
Floating high like a gull
Unfathomable like muddy water

How can we fathom his muddiness?
Water becomes clear through stillness

How can we become still?
By moving with the stream

(Based on Tao Sutra #15)

* This sutra should be read during the last third of the psychedelic session to those who have selected the *Tao* model of flow for their re-imprint.

THE INFLUENCE OF SOUND PHENOMENA ON HUMAN CONSCIOUSNESS*

ALAIN DANIÉLOU

OUR KNOWLEDGE OF THE EXTERNAL world is conditioned by our possibilities of perception. The phenomenal aspect of things, which we tend to take for their reality, is an effect of the limits of our sense perceptions. Senses more refined than ours would show us worlds of atoms, of light, of energy, where now we think we see tables, buildings, individuals. Subtle beings, whose substance escapes our perception, can exist around us, penetrate us, play with us, act on our thoughts and our senses, without our having the least awareness of it. The number of senses which are theoretically possible cannot be determined. We probably have within us latent senses of which the organs are undeveloped, and which we cannot consciously use, although sometimes a vague and uncontrolled perception may result in some partial knowledge, some otherwise inexplicable "intuition."

For man, the spheres of sensory perception are limited to five —this is not necessarily true for other species. Therefore, we know five aspects of the external world, which do not necessarily coincide exactly.

Hindu philosophers call these spheres "forms of existence" (*bhuta*), a term translated approximately by the term "elements." This is inexact unless we understand it not in the sense of elementary matters, of substances or states of matter of which the universe is formed, but rather take it to mean the subjective elements by means of which we construct, for want of better information, the idea which we have of the external world.

Moreover, the Hindus think that if we can orient the perceptual centers, to which our sense organs are connected, towards the internal, we can escape the limitations of these sense organs and perceive aspects of the sensible world which are deeper and larger and more profound.

The spheres of the five senses are symbolically represented by five aspects of the perceptible world, but these aspects should only be understood as images which help us to understand their hierarchy. These images are earth, water, fire, air, and ether. Earth

* The original of this article first appeared in *L'Age Nouveau* (#111, Nov. 1961).

or the state of "cohesion" of things, which corresponds to the sphere of smell, is also perceived by the other senses. We can taste it, touch it, see it, and hear it. Water, or the state of "formation" of things, represents the sphere of taste. We can hear it, see it, touch it, taste it, but never smell it. Fire, or the state of "transformation" of things, represents the sphere of vision. We can hear it, touch it, see it, but never taste it or smell it. Air, or the state of "conception" of things, represents the sphere of touch. We can hear it, touch it, but we cannot see it, taste it or smell it. Finally, ether, or the "vibratory" state of things, represents the sphere of hearing, the most subtle since it escapes all other senses.

It goes without saying that we never perceive the spheres of pure elements, and that all our perceptions apply to the states of "matter" in which one element predominates without the others being completely absent. The fact that in practice we do not perceive external sounds except through vibrations of other elements, is merely a deficiency of our external organs and doesn't change the fact that, even thus limited, hearing remains the only direct perception we have of a pure vibratory state. The other senses produce perceptions of vibratory states which are more and more complex and therefore more difficult to understand and to analyze. The vibrations of sound are the forms of perception closest to the primary state of cosmic manifestation. The vibratory states which give birth to the world cannot be differentiated from thought. Creation is conceived as a mental vibration, which is the thought of the universal being and which composes a world which is nothing but a manifestation of mental energy; a thought which appears as a reality precisely because of the limits of sensory perception of the individual consciousness of living beings. Sound, even in its grossest, most limited form, is not only the vehicle of thought but the image of its intrinsic nature. For this reason through the intermediary of sound, through the Word, the utterance, knowledge is expressed, revelations are made manifest. And by sound also, all thought is conditioned, formed, and fashioned. Sound is the instrument of all development. The effect of sound upon human consciousness is therefore fundamental.

Pure vibration, organized expression and vehicle of thought, is perceived by us in two forms: the musical language and the spoken language. These two forms of language, closely linked with each other, are not arbitrary. Certain sound relations, certain syllabic units, are the vibratory expressions of certain concepts. The more music and language approach these forms of the true language, the more immediate and profound is their effect. When the sound of words or of chords deviates from the form of the true language, their effect becomes weaker and is then perceived only by a mental mechanism which reconstructs, according to

these symbols which have now become arbitrary, the genuine relations which constitute the idea.

If in certain rites we use formulas articulated to correspond to certain cosmic entities, we immediately enter into contact with them. This is why *mantras* or magical formulas are an essential element of all rites.

Similarly, if we set up in music harmonies which represent with sufficient exactness specific sentiments or emotions, we are immediately penetrated with these sentiments or emotions. This is the first role of music. The use of inexact or arbitrary sound formulas is mere play, which is perhaps harmless, but which may be penetrating us with influences which we cannot master, and which may be injurious to our internal equilibrium, and to the harmonious development of our thinking.

The true language, the original language, is syllabic, formed in man of monosyllables corresponding to the different possibilities of articulation. These are: relative pitch (five steps of sound, reduced to three in most languages in use today); the sound shapes of vowels determined by the five places of vocal emissions above and in combination; and the interruptions of sound or consonants, which permit us to attack or to leave the vowels in the five steps of articulation. Certain consonants may combine, the syllables may be nasalized or aspirated. The number of monosyllables forming the vocabulary of the fundamental language is almost indefinite. One *mantra* like STRING, for example, representing the feminine principle, is composed of seven elements of articulation.

The effect of these syllables upon our inner being is considerable if they are frequently repeated. They let penetrate into us, little by little, the principle that they represent, and consequently retransform our personality. The practice of *mantra* repetition is one of the major exercises in yoga.

The musical language presents divisions parallel and complementary to those of spoken language. It represents a more abstract form of language, in which we perceive the sound manifestation of numerical relationships, corresponding to ideas or sentiments. Music, therefore, plays an important role in the knowledge and perception we can have of the mechanisms of thought and of sensation, since it permits us to realize directly that thought and sensation are probably mathematical operations. In fact we only perceive relations between luminous frequencies, auditory or other, but we perceive them as if there were distinct elements which we call colors, substances, forms or chords. It is through music that we receive the most direct statements. These sound relations evoke sentiments in us, ideas, but we can, to a certain extent, abstract their psychological or mental effect, and we can consider them themselves in the abstract.

There exist, therefore, two types of musical theories and analyses. Those which start from the psychological effect of intervals and of rhythms, according to the sentiment which it provokes in us; and those which start from their purely physical relation, their numerical relation, and their harmony phenomena. In the first case, we would speak of sad or gay chords, exalting, depressing, tender or cruel, harmonies; in the other case, of consonance or dissonance, harmony, equilibrium, of form, etc. These two approaches lead to different musical systems. The first makes of music an instrument of psychological action, capable of modifying our internal equilibrium. The other tends to make an abstract art, an architecture of sound, which may have high aesthetic or evocative value, but in which the psychological action is weak and without lasting value.

The principal system conceived as a means of psychological action capable of bringing important modifications in our internal equilibrium, our sentiments, our ideas, is constituted by music which we may call modal, in the sense we give to this word when we talk about Greek, Persian, or Hindu music. This system is based upon the fact, easily verifiable, that certain very definite sound relations are perceived by us as having a certain emotional color. At first, this perception may be very vague, especially if our musical habits intervene with all sorts of purely mental artistic conventions. But it is undeniable that this perception exists. Intervals we classify at first roughly, into gay or sad, active or passive, soft or hard, calm or restless, etc. It is only through repeated and systematic use of very precise intervals that we will begin to distinguish the psychological effect of intervals, which may be very close to each other, but which have in the long run a definite and distinct action upon our sensibility, creating in us the most diverse "states of the soul."

In modal music one establishes first a base, a point of reference absolutely fixed, represented by a continuing or a frequently repeated sound, which is called the Tonic. All the intervals of a mode are established with reference to this Tonic. After this one looks in the scale of sound frequencies for certain perceptible points which form with the Tonic easily analyzable relationships. These points will be the notes of the mode. We will see that these perceptible points are quite numerous and have very distinct effects upon our perception. Depending on the desired effect, the relative pitch of the notes of the modes should therefore be adjusted. These adjustments may be established little by little through experience, but they may also be analyzed in such a way that they can be defined arithmetically, and reproduced mechanically at will.

In a musical performance, melodic or harmonic forms are developed by moving from one point to another on the scale

chosen for the mode. Since the Tonic is fixed, the same note will always correspond to the same sound, the same sound frequencies will evoke the same relations, and hence, the same sentiment. This consistency is very important for the action to be effective. It is then that the psychological action begins. No matter what music it is, we can recognize, more or less vaguely, the emotional color of an interval, but in modal music this interval, always represented by the same frequency, the same sound, is constantly repeated. We thus become more and more sensitive to it. Like the drop of water of the Chinese torture, this sound always hits the same point of our auditory system. We become conscious of its precision, of its color, of its meaning, in an extraordinary way, and after a certain time, we are emotionally conditioned by the sound complex which the different notes of the mode represent. The idea, generally accepted in the Orient, but also supported by Plato and Aristotle, that certain modes incite virtue and others debauchery, is not at all imaginary. To convince oneself of this it is sufficient to see even today the audience of an Indian or Persian concert being shaped by the performer, assuming more and more the same expression, the same face, moving together as if hypnotized by the musician, who carries them away in the direction in which he throws himself, toward a very intense emotional state, in which he himself is completely immersed.

We can see that slight differences between intervals, which in other systems may appear negligible, play a considerable role in those musical forms whose aim it is to act systematically on the psyche, and not to construct vague structures which, following convention, we regard as aesthetic, but which completely lack any marked psychological effect. One can, moreover, determine certain laws of frequency relationships which act most strongly on our sensibility, and classify them according to categories in which

• NOTE: The relations between musical sounds are determined by ratios between their frequencies. Thus, an octave represents a double frequency, a fifth corresponds to a ratio of 2 to 3, etc. These ratios between sound-frequencies are perceived directly, just as we perceive a square or a triangle, provided the numbers involved in the ratios do not go beyond the number 6 (limit of non-verbal counting) and the simple multiples of the first four prime numbers.

According to the prime numbers used in the structure of intervals, different basic scales can be built which have distinct psycho-semantic contents, i.e., create different emotional reactions.

A typical example of these differences appears in the major third. The major third can be "Pythagorean," i.e., built on multiples of 3/2. It is then a part of the cycle of fifths used in tuning instruments (C G D A E). But the major third can also be "harmonic," that is, built on the ratio 5/2. The interval between these two major thirds is called "comma diesis." It corresponds to 81/80 or 21.5 cents (100 cents make a

certain prime numbers seem to play a major role. Music becomes then a very powerful psychotherapeutic method, and we will observe conversely that musical systems in which the interval is imprecise, badly defined or calculated on erroneous bases, may create strange nervous disorders, and in any case atrophy our sensitivity to sound stimuli, with easily observable physical, psychological, and physiological results. On the other hand, musical reëducation using the repetition of precise intervals has an effect with appreciable medical applications. Moreover, this effect is not peculiar to man. Experiments which have been made with plants and animals have apparently yielded very interesting results.

The precision of the interval is essential for its efficacy. This can be recognized today through technical means which greatly facilitate experimentation. It is only when the musician becomes completely involved and taken by the sentiment of the mode, that he can develop sufficient precision at the end of a certain amount of playing. This explains the interminable preludes of the Indo-Iranian music. The musician plays at the outset with a very approximate precision. It is only little by little when he is seized by the sentiment of the mode that his play becomes precise, in a way that seems incredible if one has not yet had the experience. The audience, which, until now, only listened vaguely, was agitated, talked, appears all of a sudden to be subjugated, magnetized, by a sort of magic ability of sounds. According to measurements which I was able to make, the intervals are exact to a hundredth of a comma.* Measures made in monthly intervals gave absolutely identical results. We will understand the importance of this precision if we consider, for example, that the so-called Pythagorean third, obtained by the cycle of fifths, and corresponding, therefore, to a frequency ration of $3^4/2^6$ or 81/64 is an active interval, brilliant, enterprising, glorious, intrepid, exalting; whereas the

semi-tone). The artificial "tempered" major third of the piano scale is about halfway between the two "natural" thirds.

There is another comma spoken of in technical literature. It is the "Pythagorean comma" which represents the difference between an octave and the 12th of twelve successive fifths. This comma corresponds to $3^{12}/2^{19}$ or 23.5 cents. The Pythagorean comma, however, is beyond the limits of our mechanisms of analytical perception and has no reality in music, while the comma diesis is an essential part of the mental mechanism through which we analyze, classify and interpret musical sounds, and is therefore the only logical basis for the establishment of musical scales and of a musical vocabulary. The equally tempered scale is obtained by dividing the octave (2/1) into twelve equal parts. The frequency of each half tone is $\sqrt[12]{2}$ in relation to the previous one. We have no mental mechanism to identify such a numerical entity. We therefore always interpret the tempered half tone as a slightly out of tune form of the nearest natural interval.

so-called harmonic major third corresponding to a frequency ratio of $5/2^2$ or 5/4 is a tender interval, affectionate, peaceful, calming, passive, relaxing. The difference between these two intervals is only one comma, a difference which may seem almost negligible to us. If we then use the theoretical interval of the so-called tempered major third, corresponding to a frequency ratio of $4/\sqrt{2}$, which is intermediate between the other two, it can only have a very vague effect, or even create a sort of fluctuation, a nervous disturbance, as we try unconsciously to identify it with one or the other of the two real intervals which surround it. The tempered intervals will moreover always remain very approximate because we apparently do not have an audio-mental apparatus which would permit us to analyze multiples of $\sqrt[12]{2}$. To make the inexactitude and the painful effect of the so-called tempered intervals bearable one has to mask them with the aid of sound clouds, obtained by adding to the sounds the fundamental multiples very close one to another: (the three strings of the piano, the double reed stops of the harmonium, etc.) or by the means of string vibratos. These procedures weaken the emotional color of the intervals to such a degree that one encounters today musicians and musicologists who deny that musical intervals have by themselves any other than a purely conventional meaning. Thus, we attribute to the Minor mode a more melancholy character than to the Major mode—as limited as this character may be—because we hear the former used more in funeral services and the latter more for marriages. It goes without saying that it is sufficient for any one to hear an instrument only once which gives precise intervals to realize the expressive reality of the intervals established according to certain very definite arithmetical relations. Moreover, we find again the same intervals in all kinds of music in the instrumentalist as well as in the singer, when the performer feels genuine emotion.

We can see, therefore, that the mechanism of auditory perception and of the analytic mental perception which corresponds to it, permits sounds to act through repetition upon our internal personality, to transform our sensibility, our way of thinking, the state of our soul, and even our moral character. This is true of music, where arithmetic (or rather, harmonic) frequency ratios, based on the combinations of certain specific numbers, which our mental mechanism permits us to recognize and to analyze, produce considerable effects on our psycho-physiological condition. This is also true, although less directly, for language, where the repetition of certain syllables corresponding to specific ideas, produces a mental conditioning utilized as one of the fundamental methods of yoga.

Translated by Paul Huebner and Ralph Metzner

A HIGH YOGIC EXPERIENCE ACHIEVED WITH MESCALINE

JOHN BLOFELD

PRIOR TO THE EXPERIMENT described here, I had entertained some doubts as to the claims of Aldous Huxley and others, which imply that mescaline can induce yogic experiences of a high order. The experiment took place on 25 May, 1964 (Visaka Puja) at my Bangkok house under the supervision of Mr. Jonathan Stoker, who had had previous experience (direct and as an observer) of the effects of mescaline.

At 9.50 a.m., I took a half-dose (0.25 gr.). For some time there were no remarkable effects—nothing but a slightly heightened sense of color and form, as exemplified by the vividness of the patterns seen upon my eyelids when I closed my eyes after gazing through the open slats of a Venetian blind. At 10.40, an unpleasant state of mental tension supervened. I found myself involved in a struggle to preserve a hold on my "I," which seemed to be in process of disintegration. This schizophrenic effect was accompanied by a sensation of cold (although the temperature in the room must have been about 90° F.) and by an increasing lethargy which discouraged the smallest action. After awhile, these unpleasant symptoms abated and I was able to enjoy attending to what was happening to me.

At 11.10 a.m., I took the second half-dose (0.25 gr.). Shifting colors and forms danced upon my closed eyelids. Some of these were patterns of great intricacy, such as those which embellish certain parts of sacred buildings—mosques, temples, etc.—or sacred objects of various kinds. These elaborate patterns were abstract, floral, etc.; figures of deities, humans or animals formed no part of them. I recognized each one for what it was—Islamic, Tibetan, Indian, Siamese; but now, for the first time, I saw them not as arbitrary decorations but as profoundly meaningful. I felt that, in spite of belonging to widely varied traditions, they were all equally "valid" and all derived from a single source.

Presently, I tried to visualize the Tibetan Mandala of the Peaceful Deities, but succeeded only in conjuring up some rather metallic-looking demons; although they were far from frightening and not even very life-like or realistic (being something of a cross between metal statues and living beings), they did convey to me (as though mockingly) that to expect a profound religious experience as a result of taking mescaline was too presumptuous.

Soon after that, the sensation of a rapidly fragmenting personality returned to me with frightening force. I grew alarmed for my sanity and should have hastened to take an antidote for the mescaline had one been available. Though J. S. persuaded me to eat some lunch, I was in no condition to enjoy it. By then, things seen and heard presented themselves as independent visual and aural experiences with no seer and hearer to link them into one of those single compositions which, at any given moment, form the content of normal consciousness. The food went down my throat as usual, but it seemed to be disappearing into a receptacle connected with me only to the extent that it was too near to be visible. The mental stress grew agonizing. My fear of permanent madness increased and I suffered especially from the feeling of having no inner self or center of consciousness into which to retreat from the tension and take rest. An additional discomfort was the sensation of bright lights shining now and then from behind me, as though someone were standing there flicking a flashlight off and on. The movements of my man-servant, who came in several times with dishes of food, sweets and coffee, occasioned great uneasiness. Whenever he was out of sight, I felt he might be standing behind me for some vaguely sinister purpose; and, since he knew nothing of the experiment, I was afraid he would suppose that I was mad. Doubtless anyone else's uninvited presence would have made me equally distrustful and uneasy—though I was not bothered at all by the company of J. S., because he was "in the know" and I felt the need of a nurse or guard.

No words can describe the appalling mental torment that continued for well over an hour. All my organs and sensory experiences seemed to be separate units. There was nothing left of me at all, except a sort of disembodied sufferer, conscious of being mad and racked by unprecedented tension. There seemed no hope of being able to escape this torture—certainly for many hours, perhaps forever. Hell itself could hardly be more terrifying.

At about 1 p.m., I dragged myself to my bedroom, shut myself away from everyone like a sick animal and fell on my bed.

In my extremity, I suddenly made a total surrender and called upon my Idam.[1] Come madness or death or anything whatever, I would accept it without reservation if only I could be freed from the tension. For the first time in my life I ceased to cling—to cling to self, loved ones, sanity, madness, life or death. My renunciation

[1] In the Vajrayana it is taught that *all* "deities," and therefore a man's own *Idam* (in-dwelling deity), are products of his own consciousness; and that when consciousness is unimpeded by the karmic incrustations left by the sensory experiences encountered during a long succession of lives, it is clearly seen to be not the property of the individual but common to all beings—to be the sole reality in all the universe. (Cf. C. G. Jung, William James and others, whose conclusions seem to tend in this direction.) Hence salvation through "self-power" and "other power" (God, deities, etc.) are in fact identical. Thus, a total

of myself and its components was so complete as to constitute an act of unalloyed trust in my *Idam*.

Within a flash, my state was utterly transformed. From hellish torment, I was plunged into ecstasy—an ecstasy infinitely exceeding anything describable or anything I had imagined from what the world's accomplished mystics have struggled to describe. Suddenly there dawned full awareness of three great truths which I had long accepted intellectually but never, until that moment, experienced as being fully self-evident. Now they had burst upon me, not just as intellectual convictions, but as experiences no less vivid and tangible than are heat and light to a man closely surrounded by a forest fire.

1. There was awareness of undifferentiated unity, embracing the perfect identity of subject and object, of singleness and plurality, of the One and the Many. Thus I found myself (if indeed the words "I" and "myself" have any meaning in such a context) at once the audience, the actors and the play! Logically the One can give birth to the Many and the Many can merge into the One or be fundamentally but not apparently identical with it; they cannot be *in all respects* one and many simultaneously. But now logic was transcended. I beheld (and myself was) a whirling mass of brilliant colors and forms which, being several colors and several forms, were different from one another—and yet altogether the *same* at the very moment of being different! I doubt if this statement can be made to seem meaningful at the ordinary level of consciousness. No wonder the mystics of all faiths teach that understanding comes only when logic and intellect are transcended! In any case, this truth, even if at an ordinary level of consciousness it cannot be *understood*, can, in a higher state of consciousness, be directly *experienced* as self-evident. Logic also boggles at trying to explain how I could at once *perceive* and yet *be* those colors and those forms, how the *seer*, the *seeing* and the *seen*, the *feeler*, the *feeling* and the *felt* could all be one; but, to me, all this was so clearly self-evident as to suggest the words "childishly simple!"

2. Simultaneously, there was awareness of unutterable bliss, coupled with the conviction that this was the *only* real and eternal state of being, all others (including our entire experience in the day-to-day world) being no more than passing dreams. This bliss, I am convinced, awaits all beings when the last vestiges of their selfhood have been destroyed—or, as in this case, temporarily

surrender of every vestige of the self can take the guise of surrender to what is "inside" (as in *Zen*, for example), or to what is "outside" (as in Amidism, etc.). The *Idam* or "in-dwelling deity," which is synonymous with "the Original Nature" of *Zen* (and perhaps with the Holy Ghost of Christianity), is a concept which, to my mind, admirably covers both inside and outside; as the Self beyond the self it lies beyond all dualistic categories; but, viewed as the real "you" or "me," it is "inside" and, viewed as "universal," it is in a sense "outside" the individual.

discarded. It was so intense as to make it seem likely that body and mind would be burnt up in a flash. (Yet, though the state of bliss continued for what I later knew to be three or four hours, I emerged from it unscathed.)

3. At the same time came awareness of all that is implied by the Buddhist doctrine of "dharmas," namely, that all things, whether objects of mental or of sensory perception, are alike devoid of own-being, mere transitory combinations of an infinite number of impulses.[2] This was as fully apparent as are the individual bricks to someone staring at an unplastered wall. I actually experienced the momentary rising of each impulse and the thrill of culmination with which it immediately ceased to be.

I shall now attempt to describe the entire experience in terms of sensory perception, though not without fear that this will cloud rather than illumine what has been said; for the content of my experience, being supra-sensory and supra-intellectual, can hardly be made understandable in terms originally coined to describe the mental and physical content of ordinary perception.

Reality, it seems to me in retrospect, can be viewed as a "plasma"[3] of no intrinsic color or form that is nevertheless the "substance" of all colors and all forms. Highly charged with vivid consciousness, energy and bliss, it is engaged in eternal play. Or it can be viewed not as plasma but as an endless succession of myriads of simultaneous impulses, each of which arises like a wave, mounts and dissolves in bliss within an instant. The whirling colors and shapes which result produce certain effects that recall flashes of rare beauty seen in pictures, dreams, or in the world of normal everyday consciousness; it can be deduced that the latter are in fact faint reflections of this eternal beauty. (I remember recognizing a well-loved smile, a well-remembered gesture of uncommon beauty, etc., though I perceived no lips to smile, no arm to move. It was as though I beheld and recognized the everlasting abstract quality to which such transient smiles and gestures had owed their charm.) Again, Reality can be viewed as a god dancing with marvelous vigor, playfully, his every movement producing waves of bliss. From time to time he makes stabbing movements with a curved knife. At every stroke, the bliss becomes intense. (I remember that the plunging knife made me cry aloud: "That's it! That's right! Yes, yes, YES!!!"). Or else Reality can be viewed as a whirling mass of light, brilliant color, movement and gaiety coupled with unutterable bliss; those who experience it cannot refrain from laughing cries of "Yes, yes, YES! Ha ha ha! That's how it is! Of course, of course!" (I felt as though, after many years of anxious search for the answer to some momentous problem, I was suddenly confronted with a solution so wholly satisfy-

[2] Analogous to electrical charges.

[3] "Düdzi."

ing and so entirely simple that I had to burst out laughing. I was conscious of immense joy and of incredulous amazement at my own stupidity in having taken so long to discover the simple truth.)

Within this "play of the universe," there is endless giving and receiving—though giver, gift and receiver are of course the same. It is as though two deities (who are yet one) are locked in ecstatic embrace, giving and receiving with the abandon of adoration. (The Tibetan *Yab-Yum* representations of deities hint at this. The artists who paint them must be forgiven for their inability to indicate that giver and receiver are not only one but formless; though, indeed, some artists manage to suggest the oneness by blending the figures so well that the *Yum* is not seen unless the picture is given prolonged and careful scrutiny.) During the experience, I was identical with the giver, the receiver and the incredible bliss given and received. There is nothing sexual about this union; it is formless, the bliss is all-pervading, and giver and receiver, giving and receiving are not two but one. It is only in attempting to *convey* the experience that the imagery of sexual joy suggests itself as perhaps coming a little closer than other imagery to the idea of an ecstatic union in which two are one.

Some of the conclusions I drew from the whole experience are as follows:

a. Fear and anxiety as to our ultimate destiny are needless self-inflicted torments. By energetically breaking down the karmic propensities which give rise to the illusion of an ego and of individual separateness, we shall hasten the time when Reality is revealed and all hindrances to ecstatic bliss removed—unless Bodhisatva-wise, we compassionately prolong our wanderings in Samsara so as to lead other beings to that goal.

b. The world around us—so often gray—is the product of our own distorted vision, of our ego-consciousness and ego-clinging. By casting away our selves together with all longings, desires, qualities and properties that pertain to them, we can utterly destroy the illusory egos which alone bar us from the ecstatic bliss of universal consciousness. The key is total renunciation; but this, alas, cannot often be achieved by a single effort of will because each of us is hemmed in by a hard shell of karmic propensities, the fruit of many, many misspent lives. The three fires of desire, passion and ignorance are hard to quench—and yet they would be quenched in an instant could we but make and sustain an act of *total* renunciation. Such an act cannot result from effort or longing, because these would involve our egos and thus actually strengthen them. Thus, in the ultimate stage, even effort and longing for Nirvana must be abandoned together with everything else. This is a truth hard to understand.

c. The Buddha's experience indicates that, when Enlighten-

ment (i.e., full awareness of that blissful Reality whose attributes include inconceivable wisdom, compassion, light, beauty, energy and gaiety) is obtained in this life, it is possible to continue carrying out human responsibilities, behaving as required, responding to circumstances as they arise and yet be free of them all. So it is with a talented actor who, in the part of Romeo, weeps real tears; when his grief for Juliet threatens to overwhelm him, he can withdraw inwardly from his role long enough to recollect the unreality of Juliet and her death, and yet continue to give the same fine performance as before.

d. A single glimpse of what I saw should be enough to call forth unbounded affection for all living beings; for, however ugly, smelly or tiresome they may seem, all that is real about them is that gloriously blissful shining consciousness which formed the center of my experience. Hatred, dislike, disdain, aversion for any being sharing that Consciousness (i.e., any being at all) must amount to blasphemy in one who has seen Being itself.

It may be objected that my description of the experience is too closely reminiscent of Vajrayana imagery and that what I perceived was not Reality at all, but a mere subjective illusion based on the content of my previous studies and practices. The answer to this objection is that, as Aldous Huxley brought out so well in his "Perennial Philosophy," in all ages and all countries everyone who has undergone a profound mystical experience—even though in essence its content is apparently the same in every case—has been compelled to fall back on the imagery of his co-religionists or of those for whom he writes; the experience itself is so unlike anything known to us in ordinary states of consciousness there are no words to describe it. Moreover, while my own experience fully confirmed what my Vajrayana teachers had taught me, it was much too foreign to my previous understanding of those teachings to have been a subjective illusion based on them.

As to how it happens that a dose of mescaline can make such an experience possible to someone who has not yet attained it by the profound and prolonged practice of yogic meditation—I just do not know. The way I explain it to my own satisfaction is that the effect of mescaline is to free the consciousness temporarily from the obstacles to true realization of universal unity normally imposed by that karmic structure which each of us takes to be his "individual self." I believe that psychologists of C. G. Jung's school would have no difficulty in expressing this idea in terms more scientifically acceptable. Indeed, if one of them chances to read this article, I shall be grateful if he will elucidate my mescaline experience in scientific terms for the sake of those not prepared to accept my mystical and perhaps quasi-religious explanation of its content.

MOIRÉ PATTERNS AND VISUAL HALLUCINATIONS

GERALD OSTER

DURING THE PAST FEW YEARS I have been concerned with the scientific[2] as well as the aesthetic[3] aspects of moiré patterns. Moiré patterns are the figures produced by the overlapping of two or more families of lines; the locus of points of intersection form the moiré pattern. My interest in visual hallucinations as evoked by psychedelic drugs was stimulated by the writings of Aldous Huxley.[4] I was particularly struck by his reference to the fact that under the influence of mescaline, patterned structures (*i.e.*, repetitive structures) such as a garden trellis, a striped beach chair, and wood grain appeared to be particularly exciting. It is as if mescaline brings to the fore some screen in the eye which, when superposed on the visual scene, produces a moiré pattern. On the basis of this tentative hypothesis I proceeded to devise experiments, the results of which are reported herein.

My plan was to view in detail *single* highly-structured figures while under the influence of LSD. I also wished to ascertain the possible optical origin of reports that under the influence of psychedelic drugs objects appear "alive," that space appears full, and that colors are enhanced.

I was cognizant of the fact (as reported by Henri Michaux, among others) that the psychedelic experience can be achieved with the eyes closed. In order to proceed in an orderly manner, I decided that throughout my experiments I would be concerned mainly with visual impressions (*i.e.*, eyes opened) but a few experiments were devoted to impressions with my eyes closed.

In attendance during the session was a trained clinical psychologist who administered the drug (75 micrograms of LSD-25 intravenously) and my wife, a physicist who is knowledgeable about moiré phenomena. They report that throughout the session (of six hours' duration) I was coherent and logical in my speech patterns. I recall an extraordinary amount of detail of that session which I rechecked with my wife. Most of the session was devoted

to repetitive viewing of the projection of the figures (transparencies) from my moiré kit[2] on to a smooth white wall.[5] The projector used was of the overhead type (Bessler Vu-Graph) which allows one to move the transparencies about in a horizontal plane. A complication arose because of the choice of this projector in that it contains a Fresnel lens which introduced a further patterned structure. The projected image was about three feet square and was viewed at a distance of about seven feet. The viewing took place in a small country cottage free from external noises and all extraneous objects were removed from the room and the windows were curtained with plain paper. During the session I also examined under strong illumination (a 150-watt GE spotlamp) the illustrations in my moiré article,[6] and various household objects as well as effects (for a short period) with my eyes closed. The session took place in the afternoon (between the hours of one and seven, preceded, by the way, by a very light lunch) in which the first four hours were devoted to the viewing of the projected images.

During the first few hours after the administration of the drug and especially between the first and second hour there was superposed on my vision a pleasant undulatory movement which I timed to be about 0.5 cycles per second (that is, one wave of two seconds' duration) which could conceivably be associated with the delta rhythm in electroencephalography.[7] During the waning hour (between the fifth and sixth hour) of the session I found I could command myself, so to speak, to revert from the normal state to the drugged state.

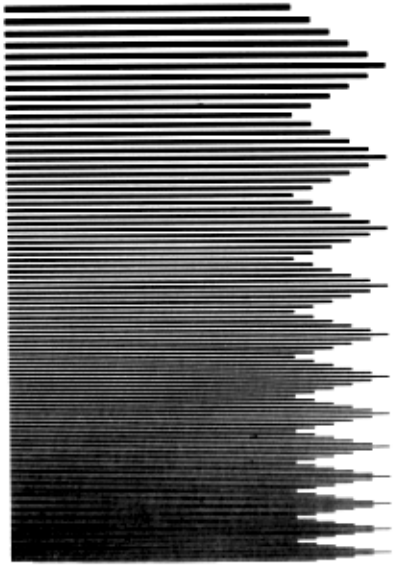
The feeble concentric ring structure of the projected image of the Fresnel lens of the projector, although barely perceptible to others, (*i.e.*, the psychologist and my wife) was clearly visible to me and seemed to be moving in and out of the projection screen. In addition I was acutely aware of specks on the image (arising from dust motes and scratches on the lens of the projector) which seemed to acquire a three-dimensional character. Those specks which were defocused appeared further away than the ones which were sharply in focus. With a little effort I was able to disregard these background images and to concentrate on the high contrast transparencies of the moiré kit. The figures were examined in no particular sequence. In fact, throughout the first four hours of the session all the transparencies were re-examined several times. There was no indication that the appearance of a figure was influenced by being preceded by another figure. In this article the number designation for a figure is that given in my book.[2]

The coarse grating (No. 1) with straight lines (equispaced parallel black and white bars) vertical showed nothing particularly unusual except that the lines wobbled slightly, the wobbling being

of the usual two-second period. The faintly-colored blue and yellow diamonds which are seen under ordinary conditions (see ref. 2, p. 24) are not enhanced by LSD. In contrast, the variable spaced grating (logarithmic spaced grating No. 3) appeared rich in detail, especially in the finer portions of the figure. The vertical lines appeared buckled (again in two-second waves) and were colored, purple being particularly prominent. Of considerable interest were the step markings of this figure.[8] These markings (as individual lines) undergo slow successive rises and falls. The intensity of the effect (*i.e.*, the amplitude of the displacement in the vertical direction) was measured at various times. One-and-a-half hours after the drug was administered, the intensity was the greatest; was a minimum one hour later, rose slightly again after still another hour, and then trailed off. In other words, the intensity of the effect followed the same time-course curve[9] as those obtained for large numbers of persons under LSD who were asked, "Do you feel dizzy?." Hence by the viewer actually measuring the displacement of the markings one has a convenient and reasonably quantitative measure of describing the extent of effect of one or another psychedelic drug. It should further follow that the counter-effects of tranquilizers could be evaluated in this manner.

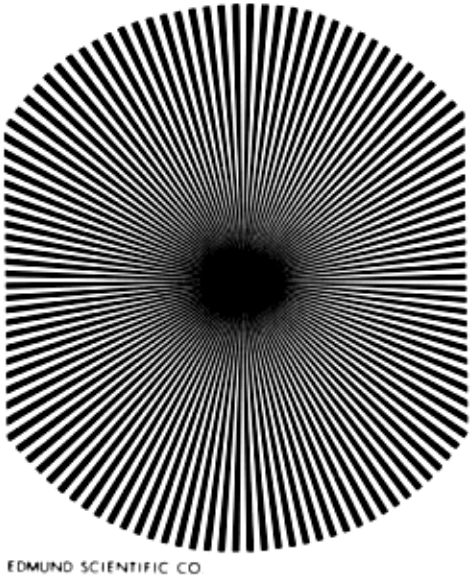
The figure consisting of equispaced concentric circles (No. 5) showed rapid movement in the center rings which appeared to whirl at about ten cycles per second. Further from the center the circles appeared stationary. The zone plate (No. 6) which consists of concentric circles of equal areas between the circles (and hence become closer together as one goes out from the center) exhibited interesting activity in the center portion. In particular, the coarse center circle exhibited a slow eccentric gyration which imparted a rather gelatinous (or highly viscous) quality to the figure.

The radial figure (No. 4) consisting of radiating lines of equal angles is normally a very exciting figure. Staring at it reveals a swirling moiré pattern produced by the figure with its superposed displaced after-image, the movements being due to the saccadic (involuntary) movements of the eyeball. Under LSD this figure revealed no more features than are seen under normal conditions. This lack of feature with LSD provides a clue as to the nature of the screen which seems to be brought to the fore under the influence of the drug. The moiré phenomenon is most pronounced when the lines of the two superposed figures make a small angle. Conversely, when the lines are at right angles no moiré pattern is observed. Since the radial figure produced no special effect under LSD I conclude that the screen of the eye is a circular figure (and hence orthogonal to the radial figure). Histological studies of the human fovea[10] (the point of fixation on the retina) reveals that it

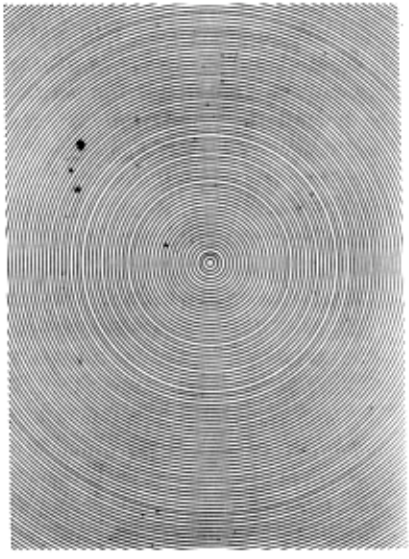


EDMUND SCIENTIFIC CO.
BARRINGTON, N. J. MOIRE PATTERN NO. 3

EDMUND SCIENTIFIC CO.
BARRINGTON, N. J. MOIRE PATTERN NO. 6



EDMUND SCIENTIFIC CO.
BARRINGTON, N. J. MOIRE PATTERN NO. 4



Negative of the circular figure used as a transparency to simulate LSD effect

consists entirely of cones (the daylight illumination light receptors) each of which is connected by individual nerves which lead to the optic nerve via the "blind spot" of the eyeball. The nerves lie in front of the cones, *i.e.*, the light received is intercepted by a layer of nerve fibers (N.B. this region of the retina is free of capillaries). These nerve fibers would be expected to curve out and around the fovea to produce a screen consisting of curved lines which can be approximated as a figure consisting of concentric circles. I have made a screen (a photographic transparency) consisting of equispaced concentric circles of spacing 40 lines per inch with black regions twice that of the transparent lines. Under normal conditions this screen produces a view which simulates many of the effects of LSD. For this purpose the screen is held at a distance of about three inches from the eye and its center is slowly moved about while viewing a scene, the other eye being closed. The unfocused, and hence nearly imperceptible image of the screen, is superposed on the image of the object in question. I have viewed the projections of the transparencies described above while not under the influence of LSD and observed effects similar to those obtained while under the influence of the drug. Among the various LSD-like impressions one sees with the moving screen are the rotating moving of letters on a printed page and the ordering (a centering) of otherwise random structures (e.g., in the viewing of grass, sandpaper, etc.). When a flower having sharp pointed petals or leaves is viewed through the moving screen the flower takes on the appearance of underwater hydra-like movements. Edges of well-lit objects take on a lively appearance. Apropos of edges, I spent a considerable time under the influence of LSD trying to find out why objects looked "alive." A sharply defined edge has a visible pattern by virtue of the moiré pattern produced by the superposition of the diffraction image of the edge and its after-image.[11] LSD heightens this effect, possibly due to enhanced after-image production (but the duration of the after-images is normal). The wobbling of edges also has the appearance of emanations arising from the object. This may have, in the case of smell, the effect of making food seem more odoriferous.

Depth clues (or cues) are particularly effective under the influence of LSD even when the effects of the drug are waning. Thus, under the influence of LSD the cover of the May 1963 number of *Scientific American* which consists of red and blue lines on a white field appears three-dimensional, the red lines appear forward and the blue lines recede in the background. The black and orange circular patterns on the upper right hand corner of p. 61 of that same number of *Scientific American* appear as if the black circles are hovering far above the orange circles. The depth effects of the

scratches on the projector lens mentioned above are also due to this general phenomenon. Studies of the visual anomalies of persons judged to be suffering from schizophrenia show quite an opposite effect in this regard. These depth clues are not utilized in the normal manner[12] and the world appears as theatre backdrops (the "cardboard" world).[13]

Another demonstration of heightened perception of LSD was the fact that under the influence of the drug the circles of the figure on the lower right hand corner of p. 61 of the May 1963 number of *Scientific American* actually winked at me. That is, the circles (multiple zone plates produced by moiré) went in and out of phase. Closer examination of the figure after the LSD session revealed that the effect arose from subtle differences in projection effects or in reflectivity of the two inks used (black and orange) and the winking effect could be simulated, but to a much weaker degree, by varying the angle of observation of light from the page.

Another feature of the LSD experience is a heightening of colors. This effect can be duplicated by placing a screen over a multicolored patterned object (see ref. 2 pp. 24-25). The black portions of the screen isolate the colors from the white (and hence color-diluting background) to give an enrichment of the colors. This technique was used in my piece "Quadruple Colored Radial"[3] which some viewers reported to simulate the color effects seen under the influence of LSD. If, as I have contended, LSD brings to the fore a screen in the eye one would expect to observe this color enrichment.

The space-filling aspects of LSD are very reminiscent of the effects one achieves with moiré patterns produced by a screen placed a certain distance from another screen. This floating quality of moiré has been discussed in my book[2] and many of my moiré constructions[3] have this quality. Essentially, it arises from the shifting of points of intersection as one views the object from slightly different angles.

What I have tried to do in this essay is to attempt some rationalization of the remarkable visual effects one obtains with LSD. My experiments demonstrate that the primary effects of LSD are a tremendously heightened awareness of optical phenomena which are present but which are only vaguely (if at all) seen under normal conditions. I further conclude that all vision has a circular pattern superposed on it and LSD reveals the presence of this screen *via* the moiré effect. It may be a misnomer to regard visual hallucinations with LSD as being "hallucinations" (*i.e.*, perceptions with no external cause). In fact, LSD has, it seems to me, quite the opposite effect in that it makes us more aware of the

visual world without the usual rejection of "useless" information.

Following these lines along a little further, a few remarks are in order about the figures seen under LSD when the eyes are closed. It is well known (*e.g.*, Paul Valery's *Monsieur Teste*) that in a restful mood prior to sleep and when the eyes are closed, visions of geometric patterns are seen. Children seem to "see" them clearly. The literature on these "visions" (phosphenes, as they are called) is quite extensive.[14] Under LSD I found that phosphenes (notably a checkerboard figure) could be evoked particularly easily, apparently again a manifestation of heightened perception due to the drug, and was even more striking if I applied mild pressure on the temporal side of both eyes while closed. Phosphenes can also be produced by applying electrical current to the temples, especially if the voltage is in the form of a square-wave pulse of about 20 cycles per second. The type of figures obtained depends on the frequency.[15] It is not unexpected, therefore, that electrically-produced phosphenes are enhanced by LSD.[16] Here again, LSD may prove to be an important aid in revealing the structure and orderliness, judging from the highly geometric nature of the phosphenes, of the nervous system.

REFERENCES

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2. G. Oster, *The Science of Moiré Patterns*, Edmund Scientific Company, Barrington, N.J. This book is accompanied by a kit with which the reader may perform the experiments described in the book.
3. As exemplified by the one-man show "Oster's Magic Moirés," Howard Wise Gallery, 50 W. 57th Street, New York City, Feb. 5-27, 1965. Accounts of the show were given in, for example, the Village Voice (Feb. 18, 1965, p. 9), the New York Times (Sunday, Feb. 14, 1965, p. X17), and the New Yorker magazine (Feb. 25, 1965, pp. 24-26). Two more of my pieces appear in the Museum of Modern Art Show, "The Responsive Eye," Spring, 1965.
4. Aldous Huxley a) *The Doors of Perception* and b) *Heaven and Hell*, printed together as a paperback book by Harper and Row, New York and Evanston, 1963. See also c) *Island*, reprinted by Bantam Books, New York, 1963.
5. Some of the newer projection screens consist of a fine patterned structure. For the present experiments it is preferable to use some unstructured projection screen such as white cardboard or, in my case, the wall of the room which was of white painted composition board.
6. G. Oster and Y. Nishijima, "Moiré Patterns," *Scientific American*, May 1963.
7. See, for example, Chapter 3 of W. G. Walter, *The Living Brain*, W. W. Norton and Co., New York 1953.
8. Stephen Durkee has pointed out to me that these step markings are reminiscent of the ziggurat motif in Hindu art.
9. See, for example, F. Barron, M. E. Jarvick, and S. Bunnell, Jr., "The Hallucinogenic Drugs," *Scientific American*, April 1964.
10. S. L. Polyak, *The Retina*, Univ. of Chicago Press, Chicago, 1941. Especially Chapter 15.

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16. M. Knoll, J. Kugler and O. Hofer, and S. D. Lawder, "Effects of Chemical Stimulation of Electrically-Induced Phosphenes on their Bandwidth, Shape, Number, and Intensity," *Confin. neurol., 23*, p. 201, 1963.

MECHANISMS OF HALLUCINATIONS[1]

HEINRICH KLÜVER

THE THEORIES that have been evolved for an understanding of hallucinatory phenomena have frequently stressed one set of factors to the exclusion of others. They have stressed either psychological or physiological factors, "peripheral" or "central" factors, sensory or motor factors, cortical or subcortical mechanisms. In recent years, however, it has been generally recognized that all these factors are of importance. Since all of them are involved in any complex behavioral reaction, it is to be expected that they are involved in hallucinations. An investigator may insist, for instance, that pathological changes in the lens of the eye in conjunction with certain psychological factors are primarily responsible for the appearance of a given hallucinatory phenomenon or that the combined effects of vestibular dysfunction and a lesion of the occipital cortex determine another hallucinatory picture. The fact that certain agents can be found which banish or provoke hallucinations does not mean that the mechanisms involved in bringing about such a result are known. We know at present that hallucinations are influenced by a large number of widely different factors and that they exhibit a wide diversity of phenomenal characteristics. Confronted with these etiological and phenomenal differences, we may ask whether it is possible at all to identify something like a general "structure" in hallucinations or whether such a structure is dissolved by the operation of heterogeneous factors. In other words, are there any *hallucinatory constants?* This question will be briefly discussed by utilizing certain findings in the literature as well as the author's own studies in the field of eidetic phenomena and his studies of the effects produced by mescaline.

1. Reprinted, by permission, from *Studies in Personality*, ed. Terman & Merrill, McGraw-Hill, N.Y., 1942, pp. 175-207.

HALLUCINATORY CONSTANTS

Mescaline (3, 4, 5-trimethoxyphenethylamine) has been of unusual interest because of its remarkable psychological and physiological effects (4, 7, 22, 32, 33, 41, 42, 52, 56, 75, 87). Particularly the visual effects have been the subject of many studies. Veit and Vogt (81, 82) injected various alkaloids, including mescaline, into animals, which were then killed to determine the concentration of the poison in different parts of the central nervous system and in other tissues. The amount of mescaline recovered from the occipital cortex of monkeys and dogs did not differ significantly from that found in the frontal cortex. As regards the effects on the optical sensorium, Maloney (46) claimed that injections of mescaline sulfate led to an enormous enlargement of visual fields in "blind or nearly blind" tabetics and to an improvement in visual acuity, as measured by Snellen's test types. Some of the patients were enabled to read who, previous to the injection, could not; one of them went to a motion-picture show. Recently Zádor (88) reported that mescaline resored perception of movement in the hemianopic field of one of his patients (case 6). In this connection, the appearance of the "reddish-blue arcs" of the retina in the mescalinized state is of interest. It is generally agreed that these elliptical reddish-blue arcs, discovered by Purkinje (64), correspond to fibers of the optic nerve, which become entoptically visible (10, 40). Normally, these arcs are very distinct for only a moment, but after an injection of mescaline sulfate the author noticed that they could be seen for a long time.

It is characteristic of the action of many drugs that visual effects predominate. Dominance of visual phenomena, a *traduzione visiva* (Sante de Sanctis), seems to be also typical of deliriums, dreams, and eidetic imagery. As regards the hallucinatory phenomena produced by mescaline, their chief character, according to Havelock Ellis, is their "indescribableness." More than a decade ago, the author raised the question whether it was possible to find any constants in the flow of these "indescribable" experiences and analyzed the available data with reference to the *form* of the hallucinatory material (33). Investigators, such as Berze (5), emphasizing the importance of motor, kinesthetic, or "myopsychic" components in hallucinations, have called attention to the fact that most visual hallucinations are *formed*. There is no doubt that most reports on hallucinations refer to forms of some kind and not to the appearance of visual "dust" or similar material.

The author's analysis of the hallucinatory phenomena appearing chiefly during the first stages of mescaline intoxication yielded the following *form constants: (a)* grating, lattice, fretwork, filigree,

honeycomb, or chessboard; *(b)* cobweb; *(c)* tunnel, funnel, alley, cone, or vessel; *(d)* spiral. Many phenomena are, on close examination, nothing but modifications and transformations of these basic forms. The tendency towards "geometrization," as expressed in these form constants, is also apparent in the following two ways: *(a)* the forms are frequently repeated, combined, or elaborated into ornamental designs and mosaics of various kinds; *(b)* the elements constituting these forms, such as the squares in a chessboard design, often have boundaries consisting of geometric forms. At times, the boundaries are represented by lines so thin that it may be impossible to say whether they are black or white. Many observers have stressed the fineness of these lines, especially Ceroni (6) and Möller (54). As Möller has pointed out, the "absolute one-dimensional" appears to have become a reality.

For the sake of analysis in terms of "form," we have ignored aspects of color, brightness, and movement, but it is just these aspects which often deeply impress the subject and which he cannot adequately characterize when describing the kaleidoscopic play of forms and patterns. He may, for instance, claim that colors unknown in his previous experience appear; he may even be more impressed by the textures of colors—"fibrous, woven, polished, glowing, dull, veined, semi-transparent" (11); he may insist that the hallucinatory objects consist of materials that are never seen in nature and yet may strangely resemble certain kinds of wood, straw, hair, jewels, wool, silk, or marble. If we ignore the colors and movements as well as the "meaning" with which the phenomena are invested by the subject, the geometric-ornamental structure of the hallucinations becomes apparent. This appears even in the drawings made by artists during or after mescaline intoxication. Such drawings have been published by Szuman (77), Marinesco (48), and Maclay and Guttmann (44).

The fact that certain geometric forms and designs constantly recur has led us to assume certain hallucinatory form constants. Although further analysis may reveal additional form constants, it seems certain that the number of basic forms is limited. At certain stages of the poisoning, the geometric forms and designs may be seen with open as well as with closed eyes, *e.g.*, on the face of a person or on the soup the subject is about to eat. It is significant that the tendency toward these forms may be so strong as to dominate the perception of external objects. One of Beringer's subjects looked at the small branch of a tree and reported: "The leaves . . . suddenly appeared in an ornamental pattern as if joined in a circular design having the form of approximately a cobweb. I looked at other branches, and, looking at them, all leaves assumed the same lattice-like arrangement" (4).

Some or all of the form constants found in mescaline hallucinations are also found in certain hypnagogic hallucinations, in entoptic phenomena, in the visual phenomena of insulin hypoglycemia, and in phenomena induced by simply looking at disks with black, white, or colored sectors rotating at certain speeds (9, 23, 49, 64, 84). Occasionally they seem even to occur in fever deliriums. One of the patients of Wolff and Curran (86), who happened to be a trained observer and physician, reported that he observed the same hallucinatory phenomenon during four illnesses precipitated by four different agents (measles, malaria, tonsilitis, influenza) at the ages of 8, 12, 30, and 41: he saw a cloud "with a spiral motion shape itself into a brilliant whorl." In two of these illnesses he saw that "brilliantly illuminated green, yellow and red angular crystalline masses shaped themselves into ever-changing patterns like those formed by bits of glass in a revolving kaleidoscope." It can be easily seen from the descriptions and drawings furnished by Purkinje (64) that all the geometric forms and designs characteristic of mescaline-induced phenomena can, under proper conditions, be entoptically observed.

Let us consider, for instance, the form constant for which "funnel," "tunnel," "cone," or similar descriptive terms are used. This form occurs again and again in mescaline hallucinations; it also appears in hypnagogic hallucinations, in entoptic phenomena, and in the phenomena arising when flickering fields are viewed under certain conditions. Or let us consider the "honeycomb" design consisting of hexagons. Purkinje and a number of other observers saw hexagonal patterns entoptically. After awakening in the morning, König (38) frequently noticed, with eyes closed, that his whole visual field was filled up with hexagons (as in a honeycomb). The author saw after awakening, on two different occasions, a pattern almost identical with König's but saw it on the ceiling and not with closed eyes. One of Klien's (31) patients frequently saw, with eyes open, a hexagonal network during migraine attacks. Weil (84) reported that he saw König's design when observing visual phenomena in the hypoglycemic state. The subjects of Haack (23) saw hexagonal patterns when viewing flickering fields. It is clear, therefore, that the honeycomb design, with its hexagonal elements, appears not only in the hallucinatory phenomena produced by mescaline but also under many other conditions. The same is true with respect to the other form constants.

In an "enquiry into the causes of mescal visions," Marshall (50) has tried to show that the form constants proposed by the author can arise only from some peripheral stimulation that is common to different persons. He accounts for the different form constants by reference to various structures within the eye. It is of

special interest that among these he includes retroretinal structures and the choriocapillary circulation. He concludes from anatomical, physiological, and observational data of various kinds that "the rods and foveal cones can look backwards" and that the retinal pigment and the choriocapillary circulation can, therefore, be seen under certain conditions. Similarly, physiologists have attempted to account for entoptic phenomena in general by connecting them with secretions on the cornea, moving particles in the vitreous humor, the network of retinal vessels, the properties and states of the cornea, lens, or other intraocular structures (10, 49).

Hoppe (26), one of the chief exponents of a peripheral theory of visual hallucinations, maintained as early as 1887 that "central (direct, immediate, psychic) hallucinations" arising somewhere in the brain do not exist and that "the entoptic content of the eye" always furnishes the "hallucinatory material." Morgenthaler (55) and others have emphasized peripheral factors even in the hallucinations of dementia praecox patients. Zucker (90) injected mescaline into patients who had hallucinations. As a result of these injections, the tapestry design and modifications of the chessboard design appeared, among other hallucinatory phenomena, in some of his schizophrenic patients. Zádor's patients with tract hemianopia (amaurosis of one eye, blindness in temporal region of other eye) saw, under the influence of mescaline, kaleidoscopic phenomena, squares, and other geometric figures in the whole visual field before both eyes (88). A totally blind patient (amaurosis due to tabes) frequently reported seeing a beautiful chessboard design in the mescalinized state, but he also saw a blue pattern with regularly distributed white points when he was not under the influence of the drug. Mescaline did not induce any visual phenomena in a 23-year-old patient whose eyes had been enucleated during the second year of life.

It must be said that the experiments on patients with some pathology of the visual system leave so many points unsettled that no general conclusions are warranted. The visual effects, as well as the conditions under which they have been obtained, are often so incompletely described that even available data cannot be interpreted. As Guttmann (21) has pointed out, the crucial experiment with congenitally blind persons still remains to be done. It is a well-known fact that blind persons often report subjective visual phenomena, such as scintillation or photopsiae like "flames" or "sparks," but sometimes they also report definite forms and figures. Whether these figures ever show the patterning indicated in the various form constants described has not yet been systematically investigated. Clear-cut results as to the form constants present in

the visual experiences of persons with loss of both eyes or totally blind for other reasons, examined at different intervals after the onset of blindness, are not available.

One of the author's blind subjects (enucleation of left eye, glaucoma of right eye) saw "balls with oval shape," either still or moving, appearing before him at a distance of about 5 feet. The balls were about as large as a dime and were only occasionally colored, chiefly red or violet. He also reported seeing "silver bars," "arabesques," "rings into which you can put your finger," and "shiny test tubes." He claimed that the phenomena were more prominent before his left eye, which had been removed 1½ years ago, and that they did not appear at all on certain days. It was impossible to elicit more definite information. Alternating current did not influence or banish these phenomena. The flicker phenomena that are seen by normal subjects under certain conditions of stimulation with alternating current (65) could not be electrically produced in this subject.

It should be mentioned that the form constants that we have discussed are apparently not typical for the visual phenomena produced by electrical stimulation of the occipital lobe in man. Urban (78) found that the photopsiae consisted mostly of glowing and colored "roundish forms, disks, or rings" when faradic current was used and of stars and ragged forms such as "pointed sparks" when galvanic current was used.

It should be obvious that the factors determining the appearance of certain form constants are so numerous that all theories stressing either "peripheral" or "central" factors are too simple. That there is an interaction of these factors may be true, but this remains in the present state of our knowledge a vague assertion. We wish to stress merely one point, namely, that under diverse conditions the visual system responds in terms of a limited number of form constants. Any general theory, however, will have to go beyond a consideration of visual mechanisms per se. The mescaline-produced phenomena demonstrate this point in a striking manner. Mescaline induces changes not only in the visual field but also in other sensory spheres, particularly in the somatosensory sphere. "Haptic hallucinations" and other somatosensory phenomena may dominate the symptomatology to the exclusion of phenomena in the visual sphere.

We shall not enter into a description of the somatosensory changes, but merely mention that Professor Forster (16), for example, felt a net similar to a "cobweb" on his tongue: "When I opened my mouth, a cold wind passed through and the net moved." Serko (72) frequently had the sensation that his legs or his feet consisted of "spirals." In his case, sometimes the haptic spiral of a

leg blended with a luminous spiral that had been rotating in the visual field. "One has the sensation of somatic and optic unity." To dismiss such phenomena as synesthetic experiences merely emphasizes the present lack of knowledge concerning the processes involved in synesthesias and intersensory relations in general. A physician, a subject of Beringer (4), "saw and "felt" the sounds of a concertina played by the experimenter, and the pain produced by it coagulated as luminous curves in the spiral turns of his body, the lower part of his body being a green varnished cone with spiral windings. Such experiences would probably be classified as instances of complex synesthesias. However, a form constant may involve so many spheres that even a synesthetic basis would be too narrow. In one of Beringer's subjects (also a physician), the "lattice" or "fretwork" constant became so dominant that it appeared to penetrate the whole personality.

> The subject stated that he saw fretwork before his eyes, that his arms, hands, and fingers turned into fretwork and that he became identical with the fretwork. There was no difference between the fretwork and himself, between inside and outside. All objects in the room and the walls changed into fretwork and thus became identical with him. While writing, the words turned into fretwork and there was, therefore, an identity of fretwork and handwriting. "The fretwork is I." All ideas turned into glass fretwork, which he saw, thought, and felt. He also felt, saw, tasted, and smelled tones that became fretwork. He himself was the tone. On the day following the experiment, there was Nissl (whom he had known in 1914) sitting somewhere in the air, and Nissl was fretwork. "I saw him, I felt him; Nissl was I."

It seems necessary to assume some basic process operative in different sense modalities to cope with all varieties of synesthetic experiences. Even the fact that a sensory impression or a hallucination in one of the sense fields is followed by manifestations in other sense fields does not give us the right to speak of "primary" and "secondary" sensations (or hallucinations) except in the sense of a temporal succession. One event may be primary and another one secondary in this sense, and yet the intersensory relation may involve only one basic process. Similarly, we may doubt whether the preceding example of a "mescal psychosis" with "fretwork" or "lattice" as the central theme can be understood by considering the hallucinatory occurrence of the fretwork in the visual field as the "primary" event that determines "secondary" and "tertiary," etc., events, such as changes in other sense fields and in the mechanisms of thought and emotion.

In a further search for hallucinatory constants, we shall again start with a consideration of the form factor. We note that a single form (figure, object) may be duplicated or multiplied, that its size may change or that its shape may be altered or distorted; *i.e.*, we may have monocular or binocular diplopia or polyopia; dysmegalopsia (micropsia or macropsia); metamorphopsia or dysmorphopsia.

If we analyze the visual phenomena produced by mescaline, we find diplopia, polyopia, dysmegalopsia, and dysmorphopsia not only of hallucinatory objects but also of real or imaginal objects. That is to say, the same mechanisms may be operative, no matter whether an object is perceived, imagined, or hallucinated. The mescaline experiments demonstrate, therefore, that we must go beyond the level of visual hallucinations to determine hallucinatory constants. In fact, we must even go beyond the visual mechanisms that cut across distinctions between perception, imagery, and hallucination and raise the question whether similar mechanisms are operative in nonvisual spheres. There is no doubt that polyopia, dysmegalopsia, and dysmorphopsia find their parallel in experiences in the somatosensory sphere. Subjects in the mescalinized state feel that their limbs shrink or grow, that they are shortened or elongated, or that they are distorted in many ways. The experience of changes in size and the sensation of distortions and alterations may involve the whole body. As regards polyopia, its counterpart is found, for example, in a "polymelia" of the fingers or of the arms. The subject may feel several arms growing out of his shoulder until he feels "like the Buddhas." At times, the alterations in the somatosensory sphere may be so profound that parts of the body feel separated from the rest. As Serko insisted, there may be, not a "sensation" but a "somatopsychic hallucination" of two bodily forms, *e.g.*, of an amputated leg and of a foot entirely separate lying beside it.

The tendency toward reduplication appears not only in polyopia and "polymelia" but also in hallucinatory experiences involving the presence of one or many persons in the room. Although these persons are not seen, their reality is in some way experienced or "felt." In this connection, it is of interest that "splitting" of personality and various degrees of "depersonalization" have been frequently reported. It may be said, therefore, that polyopia, dysmegalopsia, and dysmorphopsia involve mechanisms that are characteristic of mescaline-induced phenomena not only in the visual sphere (hallucination, imagery, perception) but also in the somatosensory sphere.

Further analysis reveals the fact that mescaline is only one of many agents bringing about polyopia, dysmegalopsia, and dys-

morphopsia. Thus, under certain conditions, the same effects can be observed in "psychogenic" and "nonpsychogenic" hallucinations, even in the *hallucinations autoscopiques,* in the perception of real objects, in visual imagery, in dreams, in eidetic imagery, in hypnagogic hallucinations, in the phenomena that arise when flickering fields are viewed (4, 12, 14, 15, 23-25, 29, 36, 51, 53, 58, 66, 69, 83, 84). In other words, reduplication or changes in size or shape of a given visual form may occur, no matter whether the object in question is real or has appeared as the result of looking for a considerable time at a flickering field; whether it is hallucinated, visually imagined, or seen as an eidetic or hypnagogic image. In fact, some spontaneous drawings seem to exhibit similar tendencies, so that Maclay, Guttmann, and Mayer-Gross speak of a "mescaline type" of drawing (45). By way of summary, it may be said that polyopia, dysmegalopsia, and dysmorphopsia occur not only in visual hallucinations but also in many other phenomena of the visual sphere (visual perception, eidetic imagery, dreams, etc.).

The fact that diverse visual phenomena commonly assigned to different functional levels of the visual system may show the same typical behavior becomes of still greater interest if we consider the various conditions and clinical states in which such typical behavior occurs. The "symptoms" of polyopia, dysmegalopsia, and dysmorphopsia have been observed in different psychoses, especially in toxic psychoses or at the beginning of certain psychoses, in deliriums, in insulin hypoglycemia, in hysteria, in patients with cerebral lesions, particularly with parieto-occipital or occipital lesions, in the basedoid constitution, in eidetic individuals, and in poisonings produced by certain drugs (hashish, cocaine, etc., chronically used). Beringer (4) has called attention to the existence of these symptoms in the acute phases of schizophrenia. The symptoms were especially striking in one of his hebephrenic patients. Gurewitsch (18, 19) has described an "interparietal syndrome" in which polyopia, dysmegalopsia, and dysmorphopsia are combined with alterations in the postural model of the body or in the bodily schema (Head). According to him, this syndrome is found in nosologically different diseases, such as *lues cerebri,* epilepsy, schizophrenia, hysteria, and cerebral trauma. Thus, the optical symptoms are paralleled in the somatopsychic sphere in other conditions as well as in mescaline intoxication.

In trying to account for polyopia, dysmegalopsia, and dysmorphopsia, ophthalmologists have stressed the importance of dioptric and retinal conditions. Such conditions, however, are not likely to explain the occurrence of similar visual changes in imaginal objects or the fact that the alterations selectively affect only

specific objects in a room or only parts of certain objects. Since the optical symptoms occur under many different conditions and in diseases with different etiology, the relative importance of the various factors influencing the visual mechanisms may be expected to vary in different conditions or from one disease to the other. However, we should not necessarily expect entirely different factors to become operative if polyopia and related symptoms appear in a schizophrenic, a mescalinized or eidetic individual or in a patient with a parieto-occipital lesion. The search for some basic factor underlying the optical symptoms in etiologically different conditions is undoubtedly surrounded by the same difficulties as the search for so-called neurological syndromes in psychoses. The "interparietal syndrome" of Gurewitsch is present, for instance, not only in patients with cerebral lesions but also in schizophrenic patients in whom such lesions are absent. It would be rash to conclude that the same syndrome is produced by two different agents. Unfortunately, we are far from knowing the pathophysiological mechanisms that become operative as the result of a parieto-occipital lesion. Once the nature of these mechanisms is known, we shall perhaps understand why the same symptoms may appear, for instance, in schizophrenic patients.

The diversity of conditions in which polyopia, dysmegalopsia, and dysmorphopsia occur has not deterred investigators from looking for some fundamental mechanism. That such a mechanism must be assumed is strongly suggested by the fact that polyopia and related symptoms are characteristic not only of different functional levels in the visual sphere (perception, imagery, hallucination, etc.) but also of the somatosensory sphere. In recent years, the analysis of these symptoms has led most investigators to assign a fundamental role to vestibular factors. It is thought that reduplication of objects, micropsia, macropsia, and dysmorphopsia in hallucinations are indicative of a vestibular influence. The same conclusion is reached, for example, by Menninger-Lerchenthal (53) in his thoroughgoing analysis of autoscopic hallucinations. His view is that autoscopy is a hallucination of the bodily schema which has a visual and a tactile-kinesthetic component. He believes that it does not make any difference whether the study of autoscopic hallucinations is approached from the phenomenological angle or from facts of brain physiology, since the analysis always leads to vestibular factors. Skworzoff (74) has presented similar views. Other investigators have emphasized tonic, postural, and oculomotor factors. In this connection, it is of interest that Pötzl and Urban (63) have stressed the importance of the supravestibular system (in the sense of Muskens).

The experimental data on the influence of the vestibular ap-

paratus on the visual sphere are rather meager. Most of the experiments have been concerned with determining the effects of various forms of labyrinthine stimulation (rotation, galvanic, or caloric stimulation) on different visual phenomena. There is no doubt however, that the available anatomical, clinical, and experimental data are sufficient for supporting the view that any future research directed toward elucidating the role of the vestibular system is bound to yield extremely significant results not only for the study of hallucinations but also, as some neurologists and psychiatrists insist, for a deeper understanding of neurotic and psychotic behavior. It has even been maintained, particularly by French neurologists, that great strides will be made in psychiatry by obtaining data on vestibular chronaxy.

At this point, it is not possible to outline the various experimental problems that urgently require a solution. We shall be content with calling attention to a new technique that may be employed in analyzing different factors influencing hallucinations or other subjective visual phenomena. By applying alternating current of low intensity and frequency, it is possible to produce flicker that is visible with open or closed eyes under conditions of light as well as dark adaptation. During recent years, the author has obtained some data on the behavior of negative after-images, eidetic images, and hallucinations in the presence of electrically produced flicker. For evaluating the flicker phenomenon itself, it was necessary to examine patients with some pathology of the visual system (hemianopia, enucleation of one eye, etc.). In general, negative after-images disappear almost entirely or change radically in appearance the moment the stimulating current is turned on. Cessation of electrical stimulation immediately leads to a reappearance of the after-image and to a restoration of its normal properties. Eidetic images and certain types of hallucinations may vanish, change, or remain unaltered upon appearance of the electrically produced flicker.

To illustrate: one subject, a student, saw an eidetic image of the face of a person looking at him. When the current was turned on, he suddenly saw the profiles of five faces looking to the right. These faces rapidly changed into other faces; they were seen through the "muslin curtain" of the flicker, as the subject expressed it. More than three decades ago, Urbantschitsch (79, 80) used galvanic current for influencing eidetic images. He reports, e.g., that one of his subjects saw an eidetic image of a hepatica. Application of the galvanic current immediately led to the appearance of a large number of hepaticas. It should be realized, of course, that rotation of the subject or electrical and other forms of stimulation may merely accentuate tendencies inherent in eidetic

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In an attempt to define hallucinatory constants, we have purposely taken visual forms and their interrelations as a point of departure. It is obvious that we have ignored many aspects of hallucinatory phenomena in order to arrive at these constants. *The hallucinatory constants that we have found may be tentatively assigned to three levels: (a) the level of "form constants"; (b) the level of alterations in number, size, and shape (polyopia, dysmegalopsia, dysmorphopsia); (c) the level of changes in spatio-temporal relations.* We have shown that the same constants appear in other visual, and even in nonvisual, phenomena. These constants are, therefore, not specific for hallucinations but represent general characteristics. The "structure" of hallucinations is a general structure that is typical of numerous phenomena in the visual sphere.

THE CONTENT OF HALLUCINATIONS

Since we have been interested in an analysis in terms of formal criteria, we have paid no attention to the *content* of the hallucination. If a childless woman hallucinates many babies, it is readily assumed that the hallucination represents a "projection" of affective needs. But if it should be found that the same woman, when looking at a pencil or a chair, suddenly sees a row of pencils or a row of chairs, it appears unlikely that emotional factors are responsible for the multiple seeing of objects. Of course, any object, no matter whether it is eidetically seen, hallucinated, imagined, or perceived as a real object, may be of emotional significance. It is one thing to admit that objects in multiple vision may have emotional significance; it is an entirely different thing to assert that polyopia itself is created by emotional factors. One of Schilder's (67) patients, an officer with a crippled arm, saw in a fever delirium all persons around him with crippled or missing arms and legs. A blind patient hallucinated heads with empty eye sockets. Following an ophthalmological examination, a schizophrenic woman stated that one of her eyes was red and inflamed; subsequently she saw all persons in the room with one red eye (53).

It may be said that in such cases of transitivism, to use Wernicke's expression, affective factors determine the content of the hallucination. However, to say that the "projection" of disturbances in the motor, vasomotor, and cenesthetic spheres, or of other disturbances, occurs on an affective basis is an empty statement and adds nothing to our knowledge of the workings of affective mechanisms. We want to know the exact nature of these mechanisms in a given case. That a particular object should appear in

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a hallucination under the stress of some affective need is not more surprising than the fact that the perception of objects, even of a black line, may be "modified" by affective factors.

Psychologically, objects per se have no existence; they exist only as nodal points in a network of perceptual, affective, or logical relations. It is the determination of these relations that is the task of psychology. A live bull snake, a boa constrictor in a motion picture, and a wavy black line of certain dimensions may lead to reactions of "fear" in a certain monkey, whereas a live garter snake and a boa constrictor in a film running at a higher speed may not. It is not a certain size, color, shape, or speed of movement that leads to the manifestation of "fear" in the monkey but a specific form of "togetherness" of these properties that constitutes the behaviorally effective stimulus, and this can be determined only experimentally. We cannot specify the psychological nature of the "fear" existing in the animal without specifying the effective stimulus properties existing outside the animal. Certain objects or events become emotionally equivalent because they share certain properties. By studying the properties of equivalent and non-equivalent situations, we may be able to learn something about the nature of the affective mechanism. Under the influence of *different* affective factors, objects and events become imbued with *different* properties, just as under one set of conditions a circle becomes perceptually "similar" to and, under another set of conditions, "different" from an ellipse. The affective mechanism in a crippled patient who hallucinates the absence of a leg not only in other persons but also in their photographs and mirror images, as well as in dogs and chairs, is undoubtedly not the same as the affective mechanism in Schilder's patient, who saw his defect only in other persons.

As far as dreams are concerned, a widely held theory explains their content by reference to affective factors. It is assumed that all dreams are wish fulfillments. According to this theory, the appearance of certain objects and events in a dream is determined by some egocentric wish. Certain considerations are pertinent here.

Objects and events, no matter whether they exist in the external world, in a hallucination, or in a dream, may be similar and dissimilar in many respects. To understand particular forms of similarity, we have recourse to mechanisms of sensory organization, to affective factors, to logical relations, etc. The author previously pointed out (37) that it is by virtue of certain similarities that heterogeneous objects and events lie in the same "dimension" or belong to the same "series" and that the problem of determining basic mechanisms in animal and human behavior often reduces itself, therefore, to determining and locating properties or

factors in terms of which diverse objects and events may become similar.

It may be said that the behavioral reactions of animals as well as the perceptual and affective reactions or processes of "abstraction" in man proceed by constantly shifting "dimensions," *i.e.*, by constantly destroying similarities and constantly creating new ones. The existence of similarities presents, therefore, no problem; the only problem consists in determining just why particular similarities exist. The occurrence of similarities, *i.e.*, the fact that there exist certain characteristics, factors, or processes that bind objects together and relate them in many specific ways, seems to be of such fundamental nature that the physiologist, Kries, considered it simply an expression of some basic property in the functioning of the central nervous system. Freud, for instance, was forced to the conclusion that the factor of similarity is of paramount importance in the mechanism of dream formation. Since the fundamental role of similarity is apparent in any other group of psychological phenomena, it is not surprising that any superficial analysis of dreams leads to the same result.

However, we must demand that the analysis of the phenomena provides us with the *particular* factors that account for the specific ways in which objects and events are related. To account for particular similarities, factors ranging from physical *Gestalten* to castration complexes have been advanced. It is not the large range of such factors that presents a serious problem; the chief difficulty lies in determining which particular factor accounts adequately for certain relations between objects and events, whether it is, for instance, "visual asymmetry" or "fear of bodily injury."

We recall that in eidetic images and certain other phenomena we find translocation of objects or transfer of certain characteristics of these objects, fusions and composite formations, substitutions, the appearance of parts instead of wholes, the nonappearance or the belated appearance of objects or parts of objects, reversals of right and left, up and down, or of other directions. In other words, we find condensation, displacement, and other mechanisms that have been considered typical of dream formation. In eidetic individuals, similar changes may occasionally appear in the perception of real objects and thus become more easily amenable to an experimental approach. From various studies, it is evident that phenomenal properties of objects, visuo-spatial factors, and motor factors play a great role in effecting condensations, displacements, and similar changes in eidetic imagery. *This suggests the possibility that the changes in dreams, such as condensations and displacements, frequently result from an operation of the same (visuo-spatial, motor, etc.) factors.*

In eidetic images, some of these changes can be experimentally demonstrated by setting up certain conditions. The fact that colors, shapes, movements, etc., occur at all in eidetic images, dreams and related phenomena can be understood only by reference to some fundamental properties and processes in the visual system; it seems that the occurrence of certain condensations and displacements can be accounted for only on a similar basis. It should also be recalled that G. E. Müller went so far as to consider the behavior of the eidetic images studied by Urbantschitsch as an example of the influence of "apsychonomic" (anatomico-physiological or metabolic) factors. Urbantschitsch was able to produce a variety of changes in eidetic images by a compression of blood vessels or by the application of visual, auditory, thermal, and other stimuli. At any rate, if visuo-spatial factors lead, for instance, to the fusion of several houses or persons into one, the condensation itself is obviously not created by some affective reaction toward nudity or some similar factor, although, once created, it may still serve as a vehicle for affective needs.

To understand the occurrence of certain spatio-temporal changes in visual phenomena, we must have recourse not only to such factors as brightness, color, shape, and spatial organization but also to factors by virtue of which colors and geometric figures, colors and melodies, sounds and lines may become similar and belong to the same "dimension." Recently, it has even become necessary to resort to "physiognomic characters" to account, for instance, for the similarity between a handwriting, a painting, and the gait of a person. We merely wish to emphasize that the operation of visual factors alone may lead to reversals, displacements, condensations, etc. This does not mean that numerous other factors may not play a role. In an experimental study, Pötzl (62) found that the development of dreams was determined by visual, motor, and "symbolical" factors and that the first two factors were "relatively independent of psychoanalytical factors." He believes that "repressed psychic material," being itself *Gestalt*-less, may act like a catalyzer for optical and motor processes. Whether the psychic material is "repressed" or not does not concern us here, but it is obvious that any color, shape, movement, reversal, displacement, condensation, etc., once supplied by visual or motor processes, may become imbued with "meaning" and that "meaning," in turn, may guide visual and motor reactions.

There is no question that all these factors are also operative in the visual perception of the outer world, but the spatio-temporal stability of external objects is such that fusions, displacements, and the like do not occur in general. Dreams, it has been said, are similar to "eidetic images of the basedoid type." They seem at

least similar in that the visual "stuff" they are made of is more open to an invasion of psychic factors than the "stuff" of other visual phenomena. The visual "stuff" provided by entoptic phenomena, flickering fields, ink blots, dreams, eidetic images of the basedoid type, pseudohallucinations, and certain types of hallucinations is apparently more easily invaded by psychic factors than the "stuff" furnished by the perception of real objects, after-images, eidetic images of the tetanoid type, mescaline hallucinations, and certain other types of hallucinations. It is for this reason that phenomena of the first type have frequently been utilized to learn something about the deeper layers of "personality." *If, for physiological reasons, sleep should suddenly provide us with phenomena of Sinnengedächtnis or belated after-images instead of dreams, even "repressed" wishes would not succeed in changing and distorting the visual material.*

At this point, attention should be called to certain facts that may prove to be of interest in connection with physiological or psychological studies of dreams. Since, in most dreams, visual elements are dominant and since striking alterations in the visual sphere are characteristic of mescaline effects, it seems reasonable to expect an enhancement of dream phenomena under the influence of mescaline. An analysis of available data, however, indicates that most subjects report an absence of dreams for the night following the intoxication, and others refer only to "ordinary dreams." Even though the night may have been dreamless, the next day often provides evidence that the visual system has not yet returned to its normal state. In the literature, the author found only one reference to "unusually plastic, colorful dreams," the nature of which was not described (4). It seems, therefore, that, contrary to our expectations, mescaline does not lead to an enhancement of dreams and that it may even suppress dream activity. This can be only a tentative conclusion, since the whole problem has not been systematically investigated. We know nothing about the effects in chronic mescalinism.

Ludlow (43), who has given the most detailed account of the effects of chronic hashish intoxication, points out that his rest was absolutely dreamless during the whole progress of his hashish life, whereas "he never slept without some dream, more or less vivid" before acquiring the habit. "The visions of the drug entirely supplanted those of nature." Further research should explore the mechanisms of drugs which, under certain conditions, produce striking visual effects in the waking state and at the same time do not increase or even suppress dreams, *i.e.*, phenomena that are primarily visual in nature. In contrast to mescaline and hashish, drugs such as alcohol may turn sleep into a *sommeil vigile* that is

constantly interrupted and haunted by extremely vivid dreams ("200 dreams in a night"). According to Epstein (13), such effects are particularly characteristic of the prepsychotic phases of alcoholic psychoses. This author even speaks of a "hypnagogic form of alcoholic insanity," since the long-lasting and colorful hypnagogic images in such alcoholics become frequently the starting point for various delusions.

The self-observations of the writer confirm the impression gained from the literature that the night following the mescaline intoxication is either dreamless or practically devoid of visual dream elements. In one of the author's experiments, he saw, on awakening in the morning after a dreamless night, that the kaleidoscopic play of mescaline patterns was still present. The patterns were predominantly violet and could be seen with open or closed eyes. He fell asleep again. During this period of sleep he had a dream that may be properly called a "mescaline" dream.

> I am lying in bed in a large hall. It seems to me that there are many similar beds in this hall which are also occupied. I turn over to my right side and see a large window which I subject to close inspection. I see clearly the following black letters R E S T A U R. It surprises me that I can even distinguish letters. To the right of the last R is a vertical pipe, and I am aware of the fact that it covers additional letters. In the window is a large bottle containing red liquid. There are three words on this bottle. These words are complete and meaningful; yet I am dissatisfied with the third word, because I feel that it is somehow too short. The words are surrounded by a reticulated pattern in delicate greenish colors giving the effect of a decorative label. The scene suddenly shifts, and I find myself looking at the gray wall of a house. Very delicate and fragile objects resembling unshelled peanuts are regularly distributed over the whole surface, thus forming a latticelike pattern. Each husk stands on end, forming an angle of approximately 45 degrees with the surface of the wall. Violet clouds pass across the surface. This makes me wonder whether the whole phenomenon is merely a hallucination. To determine whether such is the case I close my eyes; but I still see violet clouds. I conclude that the house and the peanut lattice have objective existence and that the violet clouds are of hallucinatory origin.

At this point, we cannot undertake an analysis of this dream with reference to mescaline phenomena in general and the phenomena experienced on the preceding day or consider it in the light of other psychological factors. We merely wish to state that the mescaline structure of this dream is fairly obvious and that

its mescaline-determined elements range from *presque vu* experiences (33) to mescaline patterns on objects.

In studying hallucinatory and related phenomena in the visual field, we find that they are interrelated in many ways, not only in terms of certain "constants" but also in the sense that the *same* content is experienced on different levels or that a transformation in content is accompanied by a transition from one level to another. It is, of course, well known that the same content may again and again appear on the same visual level, *e.g.*, in an eidetic image, in a hallucination, or in a dream, etc. An eidetic subject may always see the same red cap or the same house when he closes his eyes. One of Ewald's patients (14) saw in three different deliriums the same three huge brown dogs with blue eyes entering his room, except that the third time they suddenly opened their mouths and said, "But this time it's really we." In contrast, we have the appearance of the same content on different visual levels, *e.g.*, when a visual scene experienced in a fever delirium in childhood reappears several decades later in a mescaline hallucination. Guttmann (20) describes a mescaline hallucination that reappeared as a hypnagogic image 2 years later, when one evening he fell asleep after an exhausting day during the First World War. He recognized the identity of the content only when he studied old protocols 5 years afterward. It has also been reported that the content of a hypnagogic image may reappear in a dream. A mescaline hallucination may be the reproduction of a previously perceived visual object, such as a geographical map. In the experience of the individual, a visual memory-image may transform itself into an eidetic image; a positive or negative after-image, into a mescaline hallucination; and a pseudohallucination, into a hallucination.

"HALLUCINATIONS" VS. "SYNDROMES WITH HALLUCINATORY ELEMENTS"

Although it may be true that the complexity of visual hallucinations and related phenomena is somewhat reduced by an analysis which shows that the same constants or even the same contents appear on different visual levels, it does not alter the fact that there still remain many phenomenal characteristics and forms of behavior in hallucinations, eidetic images, dreams, etc., which are refractory to such an analysis. For example, if we consider the phenomenology of mescaline-induced hallucinations, we find "primitive" as well as "scenic" or "panoramic" hallucinations or, expressed differently, "mescaline-specific" and "mescaline-nonspecific" hallucinations (91). It should be remarked that our analysis has been largely confined to "primitive" or "mescaline-specific"

hallucinations. Furthermore, it is clear that the total picture of "primitive" and "scenic" mescaline hallucinations is related to changes in other sense fields and ultimately can be understood only by also considering alterations affecting the total personality. We are undoubtedly safe in assuming that the hallucinatory phenomena in a mescalinized person dictating a description of his visual experiences to an assistant are in some way not the same as those of a person in a "mescal psychosis." Kinnier Wilson (85), for instance, refers to an individual who, under the influence of mescaline, was found "crawling about the floor with extreme care, but averred he was a fly walking on the ceiling upside down and that if he moved quickly he would fall and be injured."

In applying the term *hallucination* to phenomenologically and genetically different phenomena, most investigators have tacitly assumed that they are dealing with the "same" symptom and that criteria employed in studying, for instance, visual hallucinations are also applicable to hallucinations in other fields. However, an "hallucination" always appears as an element in a complex of other symptoms. Schröder (71) doubts, therefore, that there is such a thing as a "hallucination," *i.e.*, something which, as an elementary symptom, can be detached from other symptoms and independently studied by comparing it, for instance, with "hallucinations" in other sense fields. He insists that only the whole complex of symptoms, in which the hallucinations appear, can be profitably studied and describes four such "complexes with hallucinatory elements": (*a*) deliriums; (*b*) verbal hallucinosis; (*c*) sensory deceptions associated with affective states (anxiety, delusions of reference); (*d*) hallucinosis phantastica (paraphrenia). He questions the sensory basis of many so-called sensory deceptions.

It is apparent from a study of the literature that ever-renewed efforts have been made to evolve criteria suitable for describing and classifying the whole range of hallucinatory phenomena. The literature has grown to such proportions that Mourgue (57), for instance, found it necessary to consult more than 7000 titles. In an attempt to cope with the wealth of subjective phenomena arising under normal and pathological conditions, investigators have considered such factors as levels of reality, states of consciousness (degree of "clouding"), phenomenal appearance, the relation to "inner" and "outer" space, and the relation to "intentions" or "acts" of the subject. The employment of such criteria has led to a classification of the phenomena into hallucinations, pseudohallucinations, illusions, eidetic images, eidetic images with *Realitätscharakter*, hypnagogic images, reperceptions, *Sinnengedächtnis*, sensory-after-images, pseudo-memory-images, and phantastic visual phenomena. This does not exhaust the number of distinctions drawn on various grounds. For example, hallucinations have been

divided into "psychogenic" and "nonpsychogenic," *eigentliche* and *uneigentliche,* positive and negative hallucinations.

In view of the large number of distinctions available, we should expect that an investigator would have no difficulty in assigning the various sensory deceptions in his subjects or other forms of subjective experiences their proper place in a classification of hallucinatory and related phenomena. However, this is far from being the case. The *first* difficulty arises from the fact that in actual experience there are many transitions and transformations, so that, for example, an illusion or a hynagogic image may turn into an hallucination. A *second* difficulty is more serious. It frequently happens that the hallucinatory experience of the subject is such that it cannot be adequately described and classified in terms of available concepts. Klein (30), for instance, found that current definitions were of no use in characterizing the hemianopic hallucinations of his patients and that these could be described only as "special forms of pathological experience." Many other phenomena arising under normal and pathological conditions display the same resistance to being labeled and do not fit into any classificatory scheme. In the case of eidetic imagery, for instance, the question has been raised whether the experience of the subject should be classified as a projected memory-image, a pseudohallucination, or a hallucination (28, 60). A similar question arises with regard to "mescaline hallucinations."

We have used the term "mescaline hallucinations," only to characterize the phenomena in a preliminary way. Even the self-observations of qualified observers have not settled the point whether the phenomena arising at certain stages of the poisoning should be designated as hallucinations or pseudohallucinations. Some observers hold that they are pseudohallucinations in the sense of Kandinsky; others believe that the phenomena can be described only by reference to a new concept of "pseudohallucination" different from that of Kandinsky. Instead of classifying the phenomena, some investigators have been content with references to the state of consciousness of the subject or the level of reality on which the phenomena appear. Claude and Ey (7) state than an "hallucinogenic substance" such as mescaline produces an *osmose du réel et de l'imaginaire.* Ewald (14) thinks that we are dealing with hallucinatory-dreamlike experiences occurring in "a kind of delirium without clouding of consciousness" and reports that a similarly "rich optically delirious picture" without clouding of consciousness is sometimes found in cases of chronic encephalitis and in patients with hypophysial tumors.

The fact that present concepts in the field of hallucinations cannot do justice to the wealth of normal and pathological ex-

periences can be remedied in only two ways. It must be recognized, first, that most categories employed in describing psychic phenomena in general are neither clearly defined nor generally agreed upon. It follows that any improvement in the conceptual tools of psychology will benefit the study of hallucinations. In the second place, many normal and pathological experiences have either not been analyzed so far by using techniques already available or could not be analyzed because of the difficulties of an experimental approach. It follows that new approaches and more thorough analyses will help to define more clearly the varieties of hallucinatory experiences.

Psychiatrists have recognized that many hallucinations of dementia praecox patients are not really hallucinations but, to use the German expression, *uneigentliche Halluzinationen*. Although the patients refer to sensory experiences of all kinds, it remains frequently obscure in what sense field the hallucinations occur. In fact, it is questionable whether the hallucinations really represent visual, auditory, or cenesthetic experiences or have any sensory content. It is of interest that an investigation of synesthesias in normal individuals leads into similar difficulties (27). It is true that an auditory stimulus may give rise to a sensation of color in some subjects, but in others the color, *e.g.*, purple, is not actually *seen*. Instead, the subject experiences a "feeling like purple" or a feeling "as if purple." In these subjects it is a similarity in affective relations that is apparently responsible for the quasi-visual "as if" character of the synesthetic experience. In still another group of subjects, the auditory stimulus calls forth merely the visual image of a color.

There are also "complex synesthesias" that are characterized by the fact that the thinking of an abstract concept (infinity, peace, sin, negation, etc.) invariably leads to seeing or imagining certain colors, figures, or lines or to some "as if" experience of such colors, etc. The subject, for example, may have the experience of a "horizontal, sharp, thin, square plate of white metal" when thinking about "negation." We may say, therefore, that there are not only *eigentliche* and *uneigentliche* hallucinations but also *eigentliche* and *uneigentliche* forms of synesthesia. The results of a chemical approach to these problems, however, should warn us that we cannot entirely dismiss the possibility that certain or even all "cenesthetic hallucinations" of dementia praecox patients may have some sensory basis. The profound effects of mescaline on the sensorium are known, and yet, as Mayer-Gross (51) correctly observes, the descriptions of abnormal somatosensory experiences by mescalinized persons are often as fantastic and unintelligible as those of schizophrenics.

The *third* difficulty in arriving at clear concepts in the field of hallucinations arises from the complexity and inconstancy of "hallucination" as a symptom in a group of other symptoms. It is characteristic of drugs, disease processes, and other hallucinogenic factors and conditions that they produce more than one type of sensory deception. In fact, in some psychoses, there are apparently hallucinations of different types and of different sensory origin, "reflex hallucinations," pseudohallucinations, illusions, and almost every kind of sensory deception ever described. Bleuler has presented a truly impressive picture of the varieties of sensory deceptions in schizophrenia. Even in mescaline poisoning, we find different kinds of illusions, pseudohallucinations, and hallucinations. Furthermore, all these phenomena may be very inconstant in the sense that all or some of them may be present or absent under certain conditions or at certain stages of the disease or the poisoning. "Voices" not heard for many months may suddenly be heard again. At one time, the hallucinating may be interrupted by weak forms of external stimulation; at other times even strong stimuli are ineffective.

The fact that the same dose of mescaline may produce at different times different types of hallucinations in the same subject has led Franke (17) to suggest serial poisonings, with intervals of days instead of months. He believes that long intervals may introduce differences in the "actual biological condition" of the individual, a condition that is undoubtedly influenced by factors such as age, hunger, thirst, fatigue, weather, nutrition, emotional states, etc. The question may be raised, however, as to why certain psychic functions remain fairly constant and are only little affected by marked changes in the "actual biological condition," whereas hallucinatory phenomena and the hallucinatory process undergo marked fluctuations. It is of interest in this connection that similar fluctuations seem to be characteristic of the performances of patients with visual agnosia. For example, the patient may be able to recognize certain details or general relations on one day but not on the next, or only under certain conditions; he may be able to do it spontaneously but not at will, or vice versa. At any rate, the factors responsible for these fluctuations in hallucinatory symptoms cannot be clearly defined at present.

Mourgue (57) has advanced the view that they are due to a dysregulation of the normal relations between the vegetative system (in the sense of Kraus) and the cortex. The hallucination, according to his view, represents an invasion of the world of "instincts" into the "sphere of orientation and causality"; it is not a "morphological" but a "secretory" disorder (in the sense of Mourgue and von Monakow) indicative of disturbances in the

normal relations between the "vegetative" or "instinctive" sphere and the cortex. Mourgue is not surprised that fluctuations and oscillations in hallucinatory symptoms represent the normal state of affairs, since the hallucination is essentially not a static phenomenon but a dynamic process, the instability of which merely reflects an instability in the conditions of its origin. Although the value of such concepts as "sphere of orientation and causality" and "sphere of instincts" for actual research may be questioned, there is no doubt about the importance of vegetative mechanisms for hunger, thirst, sex, sleep, and affective states. Furthermore, it appears that further information on factors influencing the excitability of the vegetative system (electrolytes and lipoids, hormones, colloidal balance, etc.) will be of far-reaching significance for the problem of hallucinations.

Research in the field of hallucinations has been dominated by two chief interests. Either the investigators have been interested in the structure of the various phenomena commonly classified as "hallucinations" or they have studied the hallucination as a "symptom" in an aggregate of other symptoms. For investigative work, it matters little whether we start from the phenomenology of hallucinatory experiences or from "syndromes with hallucinatory elements," since any thorough analysis will lead to a study of many related factors.

The hallucinatory constants that we have described are characteristic not only of certain aspects of hallucinations but also of a variety of other phenomena. The existence of these constants suggests some constancy in the underlying conditions. Other aspects of hallucinations and the hallucinatory process itself are often characterized by instability and fluctuations, and it is the task of future research to deduce the occurrence of these fluctuations from the nature of the underlying mechanisms. No one would have thought a short time ago, Mourgue points out, that there ever could be any connection between tetany and the subject of hallucinations. And, we may add, no one would have thought of electrolytes and hormones in connection with hallucinations. Ultimately we are not interested in hallucinatory constants per se but in the conditions producing them. There is no doubt that the study of these conditions will be significant for the analysis of certain disease processes and the exploration of fundamental reaction systems in normal individuals.

The phenomenological approach finally leads to the study of certain syndromes and general reaction systems in the organism; the study of "syndromes with hallucinatory elements" finally leads to an analysis of the hallucinatory phenomena. Only by studying the whole complex of symptoms in mescaline intoxication, includ-

ing the hallucinatory symptoms, has it become possible to recognize mescaline as an agent for the production of "experimental psychoses," and only in such a way have psychiatrists recognized the symptomatological similarity between mescaline intoxication and the acute phases of schizophrenia (3, 4, 7, 8, 22, 47, 76). No matter what the symptomatological relations may be, the "mescal psychosis" is produced by a well-defined chemical substance and not by hypothetically assumed toxins, "metatoxic intermediaries," and the like. It seems that psychotic symptoms resembling those of mescaline intoxication appear not only in the course of the schizophrenic disease process but also under other conditions. Serko (73), for instance, described the "unusually interesting psychosis" of a patient whose symptoms were strikingly similar to those produced by mescaline. In view of these findings, it is unfortunate that at present so little is known about the biochemical processes involved in mescaline action.

To complete the picture of the total effects produced by mescaline, we should mention some facts that have a more particular bearing on the study of normal and abnormal personality. It was found, for example, that posthypnotic suggestions may influence mescaline-produced hallucinations and that, in turn, posthypnotic sensory deceptions may become altered under the influence of the drug (59). A patient with spontaneous hemianopic hallucinations declared herself *blind* for the duration of the mescalinized state (1). A patient who had not heard "voices" for half a year heard them again while under the influence of mescaline (89). Other investigators have used mescaline for more frontal attacks on problems of personality. They have been interested, for example, in the reactions of different personality types, different races, and mentally subnormal individuals and in the possibility of obtaining "confessions" during the intoxication (2, 4, 39, 47, 48, 59). The results suggest that mescaline investigations cannot be considered the royal road to "the hinterland of character" and that the chief value of this drug lies in its effectiveness as a research tool in the solution of some fundamental problems of biological psychology and psychiatry.

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THE EXPERIENTIAL TYPEWRITER

TIMOTHY LEARY

IN EARLIER PAPERS, (1, 2, 3), we have stressed the importance of the astonishing statistics about the nervous system and the potentialities of consciousness. For us these neurological numbers take on the meaning of mantras.

THE HUMAN BRAIN
RECEIVES
ONE THOUSAND MILLION SIGNALS
A
SECOND

OR

WE POSSESS
BETWEEN
TEN AND THIRTEEN
BILLION
BRAIN CELLS

OR

EACH BRAIN CELL
IS CONNECTED
(ON THE AVERAGE)
WITH TWENTY-FIVE THOUSAND
OTHER CELLS

During an ecstatic experience triggered by psychedelic foods and drugs we are tuned in to some of this astonishing neural activity. Billions of signals are being registered, decoded a minute. Thousands of energy languages are operating each minute. Each level of energy defines a level of consciousness.

Almost all of this awareness is blocked from the level of symbolic consciousness which comprises routine awareness.

We can't describe it for many reasons.

First of all we don't have the words or symbols for it.

Secondly, it all happens too fast to describe verbally, even if we did have the words.

We can think or speak at the rate of three words a second. That means that one-thousand-million-minus-three registrations cannot be communicated.

When you ask a psychedelic subject what is happening, he can't tell you. He looks at you blankly or he gasps: "Wow!"

The communication problem is like this. Suppose we put a subject in the front seat of a roller coaster and we sit next to him during the dizzy ride. As the car plummets down the first gasping descent we ask him, "What do you see and feel?" By the time we have said the second word, the car has flashed down into the black descent and is screeching around a turn. As the car starts to pull up the next incline he says, "What did you say?" When we repeat the question he looks at us blankly. "Well, it happened too fast. I just can't put it into words." So the next time we prepare the subject. We tell him that in the middle of the hurtling ride downward we are going to ask him about what he sees and feels. It still won't work with words. As he rackets down the descent the most he can stutter is, "Ooooh. Lights . . . and . . ." By this time he is around the dark bend and heading up. "It's just too fast for words," is about the best you are going to get.

Now the action of the cortex is perhaps a million times faster and more complex than reactions to a roller coaster ride. And that's why you should never ask a subject during an LSD session what he is experiencing.

Now suppose we install a recording gadget on the roller coaster. Lets imagine twenty buttons which the subject will push to record his reactions. One button is for "fear" and another for "thrill" and another for "lights" and another is for "sick" and another is for "dizzy." Then we train the subject for hours in the code system until he gets to that point of automatic proficiency of the touch typist who can rattle off copy without thinking of what she is doing, banging out seventy words a minute while thinking about the dress she is going to wear tonight. Then we strap the subject's hands to the dials of the twenty-button recorder and send him down the roller-coaster ride. He can now give us perhaps twenty to a hundred codes a second which we pick up on a polygraph (i.e., a multipen recorder attached to the sending keys).

That's the experiential typewriter and that's how it's used and why such a device is necessary to record psychedelic experiences during the session.

THE EXPERIENTIAL TYPEWRITER

The communicating device known as the Experiential Typewriter was designed by Dr. Ogden Lindsley of the Harvard Medical School and William Getzinger, electronic engineer with MIT's Lincoln Laboratory.

Certain requirements had to be met: the device should allow for touch typing of messages by subjects lying or sitting in darkened rooms. The keyboards had to be separate and the keys had to be engineered to fit the structure of the hand and fingers.

The recording had to be set up so that a separate finger-movement had to be made to register an experience. It was anticipated that during high points of sessions subjects would lose contact with the instrument and might hold down a key for long periods. To avoid this eventuality, each time the key is depressed a mark is made on the polygraph, but if the key is held down no further impression is recorded until the key is released.

Mr. Getzinger's description of the four major parts of the typewriter is as follows:

1. *Twenty-pen Recorder*

a. The registration of reactions is accomplished by an Esterline-Angus Operation Recorder with the internal wiring modified so that operation with pulsed D.C. is possible. This recorder can only be used with the Experiential Typewriter, unless it has been rewired internally. (Instructions for restoring the internal wiring to its previous state are inside the recorder).

b. An accessory kit contains a bottle of red ink, a pen-filler, an inkwell filler, and spare tips for the glass-tipped pens.

c. Esterline-Angus Event Recorder Chart 1720-X is suitable for most situations, because it has no special time markings, but does have a grid for the 20-pen recorder.

d. A multi-wire cable attached to the recorder is terminated in a plug which fits the smaller of the two recepts at the rear of the console. The black and white pair of wires in this cable carry 115 V.A.C. when the recorder line-cord is plugged into a wall socket supplying 115 V.A.C. Do not attempt to operate this device on anything but 115 V.A.C.

2. *The Console*

a. The console has a sloping front panel. The purpose of the console is to provide a convenient location for a transformer to supply low voltage for the keyboard and signaling lamps, to provide a control center for handling any additional devices or circuits that may be added later, and to provide a location for a signaling lamp and push-button, a lamp intensity adjustment, and a phone recept.

b. The toggle switch powers the transformer that provides 28 V.A.C. for the lamps. When operating properly, the jeweled red lamp indicates power is available for the keyboard lamps. The 115 V.A.C. input to the transformer is fused at the rear of the console.

c. The pointer knob at the center of the console provides 5 stepped voltages to adjust the lamp brilliance. The brighter the lamps, the shorter their life. At brightest, lamp-life expectancy is about 500 hours. At next brightest, about 3000 hours, and longer for dimmer positions.

d. The phone recept connects with a similar recept on the left-hand keyboard to allow spoken communication between keyboard location and console location. Sound-powered phones could be used, but they are not supplied. Another possible use would have a microphone at the keyboard end and a tape-recorder at the console end.

e. The round button on the sloping panel energizes a lamp in a similar button on the left-hand keyboard, and vice versa, thus allowing simple visual signaling between keyboard and console locations.

3. *Connecting Cables*

a. The 20-pen recorder has an attached cable that plugs in the smaller recept at the rear of the console. *DO NOT* plug directly into keyboard!

b. The dual cable with branches about six feet long connects the two keyboards to a single plug. The connectors for the two keyboards are different and so they cannot be incorrectly connected. The single large plug can be connected to the large recept at the rear of the console if it is desired to use the keyboards in close proximity to the console and recorder. Otherwise, the large plug of the dual cable connects to the recept of either of the two extension cables.

c. The two long extension cables provide a means of separating the keyboards from the console and recorder. One of these cables is about 30 feet long and the other about

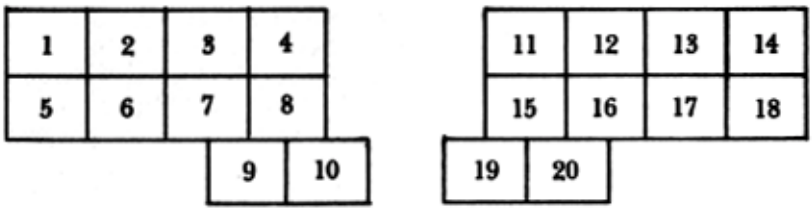
45 feet long. Either or both of these cables may be used between the console and the dual cable to the keyboards.

4. *The Keyboards*

The sketch below relates the keys on the keyboards to the numbered pens of the recorder.

FIGURE 1

Keyboard of the Experiential Typewriter



Left Hand Right Hand

a. There is a small opening at one narrow end of each key to allow insertion of symbol or color-sheet.

b. Two lamps are within each key assembly. Access to lamps is obtained by putting the end of a finger under the edge of the key and pulling hard away from the keyboard. Turn lamps *off* before attempting to remove or replace lamps. A standard #327 lamp, available at most electrical supply houses, is used. Each key assembly has four lamp sockets, but only the two containing lamps are wired. Lamps should be removed or replaced with the tong-like tool provided, with power off.

c. Each keyboard has a toggle switch to operate the lamps. The right-hand keyboard also has an unused toggle switch, which can be used eventually for turning most any device (such as the recorder or a record player) off and on.

The Keyboard of the Experiential Typewriter

The usefulness of the Experiential Typewriter depends upon the meaningfulness of the experiential language to be coded. The familiar office typewriter is coded in terms of the alphabet and can hammer out any word in the language. But such a device has little use in experiential studies. An experiential language must designate large areas of experience for which there are no words and then must provide more detailed categories within each broad area.

The experiential language should be able to cover generally all the terms now used in our denotational "external" language as well as experiences beyond the present vocabulary. In addition, the experiential language should be based as closely as possible upon biological and physical processes. The language should also be capable of coding the broad range of experiences which jumble together physical sensations and mental constructions—which we call hallucinations.

There are, at present, no linguistic systems set up to distinguish between internal and external, or to distinguish various levels of consciousness.

It is obvious, too, that at this primitive stage of our understanding of the levels of consciousness it is premature to design such a linguistic system.

At this point, *ad hoc* languages should be set up for each area of consciousness to be explored, for each session; for each raid into the uncharted.

As an illustration we shall now consider one such *ad hoc* linguistic keyboard for the Experiential Typewriter. The reader is urged to remember that this system is one of many possible codings of the typewriter keyboard.

We divided the two ten-unit boards of the typewriter into:

Game-concepts from conventional language: left-hand keys.

Hallucinatory, revelatory, and transcendental experiences: right-hand keys.

Experiential Modes Based on Self Games

The four upper keys of the left hand (numbered 1, 2, 3, 4 on Figure 1) are used to code the four basic modes of perception which concern the self:

1. Bodily sensations (e.g., pain, itch, tickle)
2. Moods and emotional states (safe-dangerous, pleasant-unpleasant, relaxed-active)

3. Interpersonal feelings towards others
4. Cognitive modes of perception

Each of these four broad areas of experiences can be subdivided into numerous categories. Bodily sensations can be referred to each sensory organ or zone of the body and game designations can be made—"stomach ache," "dizziness," "erotic feelings," etc.

Each of the four "self" keys can be expanded and when more elaborate forms of the Experiential Typewriter are feasible, other rows above the upper keys can be added for specific self categories.

Experiential Modes Based on Cultural Games

The four lower keys of the left hand, (numbered 5, 6, 7, 8 on Figure 1) are used to code four broad categories of cultural games:

5. Awareness in terms of body-maintenance games, including sex
6. Awareness in terms of social-cultural games, including family
7. Awareness in terms of aesthetic-recreational games
8. Awareness in terms of intellectual-scientific games

There are, in addition, two thumb keys, set below the two rows of finger keys. The left thumb key (of the left hand) is used to code experiences of a religious-philosophic nature:

9. Awareness in terms of religious-philosophic games

The Negative Experience Key

The right thumb key (of the left hand) is a master key which can modify any other key on the board to indicate a negative experience.

10. Negative modification or interpretation of experience

The negative key is usually used in conjunction with a specific awareness key which it modifies. If the subject is experiencing in "body-game" modes and if the physical reaction is unpleasant than keys 1 and 10 are hit.

Transcendental and Transitional-Experiential Modes

The right-hand keyboard is devoted to transcendental and transitional states of awareness. Whereas the left hand simply attempts to summarize the major modes of conventional awareness for which there now exists a vocabulary, the right hand attempts

to define a new language for ecstatic experiences, that is to say, for experiences which stand outside current modes.

Following the model of the *Tibetan Book of the Dead* (4) we define two types of "trans-language":

Transcendental: This is pure process-awareness of biological and physical sequences with no imposition of any form or concept interpretations. Elsewhere these were defined as "DPI's," internal and external *direct process images* (2). In the terminology of mystical or phenomenological psychologies these modes of perception are called "pure being," "the mindless or ego-less state," "white light of the void," etc.

Western psychology does not provide a term for this direct state of direct biological awareness. The psychoanalytic notion of "pure primary process" comes closest to describing the swirling flow of direct process images (DPI's).

Transitional: We have elsewhere made the point (2) that perception, normal-consensual or abnormal-idiosyncratic, is the process of imposing an arbitrary game structure on the endlessly changing Rorschach inkblot of sensed energy transformations. When conventional concepts (for which we have terms) are imposed on awareness —then we are perceiving in terms of self or cultural games. The left-hand key-board is designed to summarize these modes of awareness. We have called these "LFI's"—*learned form images.* When you are aware of a chair, a tree, of your child's face, of the printed word, your consciousness is being structured by consensual LFI's. Education is the process of teaching the LFI's, of training the person to impose the tribally-designated LFI.

During states of altered consciousness the subject becomes aware of process-flow; of DPI's, internal and external. He has been catapulted through the LFI curtain. Neurologically, we suggest that the imprinted feedback loops of symbolic associations are disrupted by the awareness of previously screened-out DPI's.

At those moments when the subject attempts to impose LFI's, game structures, on to the tumultuous flow of process images, he is in a transitional state of consciousness. Transitional between fixed conventional LFI's and pure process images. The *Tibetan Book of the Dead* calls these Second Bardo apparitions. Our western culture has a variety of names for these states: visions, hallucinations, revelations, delusions, dream-states, hypnotic-trances etc.

In this version of the Experiential Typewriter keyboard we have designated four transitional states and two transcendental states.

The Two Basic Transcendental States

Our strategy is to base the new experiential language as closely as possible on physical and biological events. Thus as these energy sciences increase in precision and complexity the experiential language can expand with them. The two basic classes of transcendental images are coded in the upper board of the right hand:

20. Awareness of physical energy processes, phenomenologically labeled "void," "white light," "pure energy," "vibrations," etc.
19. Biological processes. Phenomenologically the subject experiences life energy directly and without imposition of any conceptual LFI.

We have deliberately kept these two categories broad and vague. At this time we just don't have the data to spell out more detailed concepts, and premature imposition of LFI's is the classic mistake in this area of understanding. Physical energy processes directly experienced (code 20) can be subdivided into endless categories which must be tied to scientific operations or measurements. Thus we cannot yet allow terms such as "divine illumination" or the Taoist "circulation of the light" quoted in *The Secret of the Golden Flower*. We expect that such experiences can be correlated with measurable space-time phenomena so that we can eventually talk (with consensual validation) about perceiving measurable energy transformations—plasmic, atomic, molecular, electrical, etc.

We are surrounded by energy fields which we cannot perceive and one step in the direction of expanding our perceptions is to develop a semantically valid language.

The experiencing of physical energy transformations sounds, at this time, like wild science-fiction or pseudoscientific occultism. While such conceptions can be abused by the familiar tactic of expressing subjective "truth" in terms of objective "fact," the familiar checks on such abuse must be preserved. By keeping the external-internal differentiation clearly in mind we can expand the languages of both and continue the process of attempting to correlate them, which is the classic goal of science and scientific semantics.

The Four Basic Transitional States

Transitional states of consciousness have been defined as the imposition of external game images upon the suddenly speeded-up flow of direct process. "Normal" perception is the labeling of still

photographs. Transitional awareness is the hurried, ecstatic or chaotic attempt to tack on static, ill-fitting labels to the kaleidoscopic dash of a speeded-up motion picture.

There are thousands of metaphorical classifications used to describe these perceptions. Every theory of human nature has its diagnostic language. We have settled on four general categories of transitional awareness; within these broad categories can be included most of the transitional states employed by other theories:

12. *Immediate sensory awareness* (without cognitive contact)

This category represents those states of direct awareness where the stimulus is so powerful, or the game-sequence is so compelling that the subject loses self-consciousness, forgets who and where and when he is, forgets even the game he is playing and becomes completely absorbed in the moment. The sense of immediacy can come in response to a stimulus—the pure sound, the candle light, the sensual or erotic quiver, the sunset, the repetitious cannonading of the surf. Consciousness is stripped of all ideas, all desire, all qualification. The sense of immediacy can also come as the ecstatic end-point of the game. The game-ecstasy. The complete ego-less absorption in the sequence. The athlete straining for the ball, the artist merged with his brush, the mother swept up in the movement of child-care. The Zen moment of the Haiku.

The lower-right thumb key of the right hand is used to communicate these states of awareness.

13. *Revelation*

Another transitional state involves a sudden intuitive insight into relationships previously never grasped. This category includes the creative experience, the intuitive flash so frequently described by scientists, mathematicians, artists and philosophers and now being studied by psychologists.

The revelation seems to involve a dramatic combination of elements from games previously separated. Old concepts and clichés suddenly come to life and "exist" in vivid relationship to the experience and to other concepts. The new meaning is felt; one becomes the new meaning.

The index finger key of the lower bank of the right hand is used to code revelatory experiences.

17. *Ecstasy-unity-liberation*

Thousands of terms crowd in upon us from hundreds of dialects attempting to recapture the exultant moment of ego-loss. Running through these terms is the notion of sudden ecstatic freedom from the weight of striving, the heavy mind, the enslavement

to identity and social role. There is also the sense of unity. When the mental differentiations are transcended the processes of life are seen to fit together, each in its place, all part of the unfolding pattern. "It all fits together." The ten-billion cell cerebral computer, for the first time since birth, is humming harmoniously, and more deliciously so, because added to the dance are all the memories, concepts, words, experiences of a lifetime. Neurological unity.

Such experiences are coded by the subject with the index finger of the right-hand upper bank.

These ecstatic moments are differentiated from the pure transcendental because in the latter there is complete submergence, loss of all social artifactual cognition, including that of self. The experiencer is lost in the process either internal or external. In the ecstatic-unity state there is a delighted awareness of self without desires, duties, ambitions. The self is seen as part of the complex unity. Similarly there is awareness of all other man-made as well as natural events. Similarly there is a unified awareness of concepts and artifacts. The awareness has not been broken down into swirling mosaics of cellular and wave visions which are characteristic of transcendental modes.

18. *Hallucinations*

As the grip of the imprinted, symbolic mind becomes weaker and the pulse of physical and biological processes resonates in consciousness, the sharp edges of learned form perceptions begin to merge with the process flow and hallucinations are registered.

As described above, neo-symbolic patterns develop. Familiar discrete sense modalities become scrambled together. Synesthesia. Sounds are seen; colors are heard. These sensory impulses are not so differentiated in the cortical network—it is the learned mind which separates the sensory modes.

Familiar forms dissolve into moving, dancing structures. Thousands of images swirl through consciousness each second. Objects which our learned perceptions had persuaded us were solid and fixed begin to vibrate and oscillate. Faces of friends become changed into godlike masks, heroic, futuristic, demonic, saintly countenances. Looking at yourself in the mirror your own face flicks through a hundred changes, infant, child, adult, aged man with beard.

LFI's merge with DPI's. Old remembered forms and concepts imposed on the new cellular dance.

When these new constructions appear in consciousness, key number 18 is depressed—middle finger, upper bank, right-hand keyboard.

The Recording of Internal (Eyes closed) Experiences

One of the most important descriptive categories for any experience, but particularly for visionary experiences is the distinction between internal and external. Eyes closed versus eyes opened defines one of the most basic determinants of experience. In working up a system description of a psychedelic session it is of central importance to have a record of when eyes were open and when closed. All of the right-hand keyboard modes—transitional and transcendental—can be experienced with eyes open or with eyes closed. Direct awareness can be of things around or processes inside. Revelations, unity-vision, hallucinations, biological and physical processes can be registered with eyes open or closed—and the quality of the awareness is much influenced by the simple factor: Are your lids shut or open?

This factor thus becomes an overall modifier of any specific experience. Just as the negative key (number 10) can be used to modify any mode of awareness, so with the eyes-open-eyes-closed factor.

11. *Internal modifier of awareness*

The left-hand key in the thumb row of the right-hand board is employed to signify an internal (eyes-closed) awareness.

THE USES OF THE EXPERIENTIAL TYPEWRITER

After a trained subject has over-learned the keyboard and has practiced sending experiences it is possible to use the typewriter in a wide range of empirical studies.

1. *Basic Recording of the Flow of Experience*

The subject can tap out the second-by-second sequence of experiences—ranging from the most banal thoughts to the most "far-out" visions and hallucinations. At the same time, if the observer keeps a running record of behavior and setting events it is possible to go back over the tape with the subject and reconstruct in great detail the experiential history of the session. At 3:17 when the Mozart record began to play, you murmured "Cairo, Cairo"; the typewriter tape shows you were punching out "revelation," "ecstacy," "eyes-closed." With these cues at hand the subject can then remember and even relive the sensations which flooded awareness at 3:17 of the session.

For the first time we have high-speed, non-verbal methods of converting experiences into language.

2. *Session Programming*

The typewriter console and keyboards have telephone sockets which make it possible for a person in another room to communicate with the subject. If the observer reads the typewriter and sees that the subject is not experiencing what he had planned he can immediately communicate with the subject and get instant feedback as to whether his intervention has changed the subject's consciousness in the direction of the plan.

For example, let us suppose that the subject wishes to experience revelations about Iranian poetry. The typewriter indicates that he has been hallucinating and has then moved to "negative mood." The session guide can then pick up the phone and remind the subject, "Hello, Frank, we are here with you. You've been having a rough moment. I'm going to read a Sufi verse to help you get back to Persia." The next readings from the polygraph indicate whether the subject has moved the needle of consciousness in the hoped-for direction.

3. *Extrasensory Perception Research*

The two keyboards are separated and extension wires make it possible to have one keyboard in one room and the second in another part of the building. We have used the device to trace patterns of telepathic communication. The simplest study involves having one person "sending" messages and the other receiving. The typewriter tape then picks up the flow of awareness from each person simultaneously and statistically significant correlations between the two can demonstrate the effect of communication. In using the present twenty-key recorder it is, of course, necessary to work with a ten-item vocabulary—since the keyboards must be the same and both subjects use the same experiential code.

4. *Physiological Studies of Consciousness*

The most exciting research prospect opened up by the Experiential Typewriter involves correlating experience patterns with neurological recordings. A second polygraph is used to record brain waves, circulatory changes, breathing alterations, etc. The two flow-patterns of data—one experiential and one objective-physiological are then collated. For the first time we have an experiential language which can flow along automatically and provide data directly comparable with physiological readings.

5. *Detailed Languages of Consciousness*

The keyboard of the typewriter presented in the preceding discussion is by no means fixed or standard. Researchers will, of course, alter the keyboard codes to meet the needs of different ex-

periments. Whatever the variables to be studied—personal or intellectual—the keyboard can be revised. The central methodological issue in research on consciousness is that it must be collaborative. You have to rely on the subject's ability and willingness to tell you what he is experiencing. The subject must agree to learn the keyboard and in most studies it would be expected that the categories of awareness would be within the range of the subject's interests. The day of the psychologist imposing his game, his roles, rules, rituals and above all his language on the subject is about over.

Example of Experiment Using the Experiential Typewriter

For demonstration purposes one subject, a 24-year-old-volunteer, was run on the E.T. for two one-hour sessions, on two separate days. First the code-system was memorized. A simplified scheme, using only ten categories and ten keys, was used.

PEN	KEY	CATEGORY
	Left Hand	*Self-Game Categories*
1	little finger	cognitive
2	ring finger	interpersonal
3	middle finger	emotional (moods)
4	index finger	body
10	thumb	negative modifier
	Right Hand	*Tran-Categories*
11	index finger	hallucinations
12	middle finger	internal processes
13	ring finger	external waves
14	little finger	void, white light
19	thumb	direct awareness

In this scheme, the left hand is used to code self- and social-game categories, the right hand transitional and transcendental categories. The first session was run as a control period, without drugs. The set was to meditate in silence. The second recording was made three hours after the ingestion of 250 gamma of LSD. Both sessions were run in a very small room; the subject lay on a mattress on the floor, hands resting easily on the two keyboards of the E.T. The console and recorder were in an adjacent room. The room was lit by one candle; actually the subject kept his eyes closed throughout both sessions.

Table (1) shows the results in summary form, with each period divided into thirds. It can be seen that although the total number of responses for the two sessions is equal, they differ in two respects:

1. the percentage of right-hand responses—6.4% *vs.* 66%
2. the percentage of negative responses—9.1% *vs.* zero

Although no statistical evaluation of results from one subject is possible, the figures do suggest that the E.T. can significantly discriminate drug from control conditions.

TABLE (1): *Summary of Data from E.T. (one subject)*

(a) *Control Period*

	0-20 mins.	20-40 mins.	40-60 mins.	Total
Number of responses	42	33	34	109
% right hand responses	7	3	8	6.4
% negative responses	0	15	15	9.1

(b) *LSD Period*

	0-20 mins.	20-40 mins.	40-60 mins.	Total
Number of responses	48	44	16	108
% right hand responses	62	71	81	66
% negative responses	0	0	0	0

In the control session, a few negative experiences were recorded; the subject reported that these were primarily unpleasant body sensations such as itches or cramps. No negative responses were registered in the drug session. The latter shows a marked drop-off of response in the last third of the hour. The subject reported drifting off into areas of reduced awareness during this time.

He was apparently no longer aware of the room, the E.T. and the task. Most of the right-hand responses occurred in the "direct awareness" category. The subject here reported being in a state of acute awareness of the tactile sensations coming from his finger tips.

These results, although crude and preliminary, indicate that the Experiential Typewriter can be used to distinguish sensitively between different states of consciousness and to record the flow of experience as it occurs.

Summary

A communication device—the Experiential Typewriter—is described, consisting of a twenty-key manual keyboard linked to a moving pen-recorder. Subjects are pretrained in a code of experiential categories. The recording paper then gives a moment-to-moment record of the flow of experience. The uses of such a device are outlined in 1) recording the flow of experience, 2) session programming, 3) ESP research, 4) correlation of experiential with physiological recordings, 5) developing languages of consciousness. Different codes should be developed for different kinds of experiential research. A code based on the *"The Psychedelic Experience"* and an illustrative experiment using a single subject are presented.

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The above paper is a chapter from a forthcoming book—*Tranart—The Communication of the Ecstatic Experience*, to be published shortly.

WHAT IS SCHIZOPHRENIA?

ABRAM HOFFER and HUMPHRY OSMOND

MANY OF THE CURRENT IDEAS about schizophrenia are wrong. Even the name is wrong. The term schizophrenia implies that something is divided or split. But the personality is not split into two or three separate personalities as in the *Three Faces of Eve*. There is, in fact, no split whatsoever.

The originator of the term, Eugene Bleuler, referred to a lack of connection between the thinking and the feeling of the patient. Many patients who have been sick for a long time appear to others to have a feeling, tone or mood which is not appropriate to what they are talking about. For example, a patient may be crying while relating a humorous incident. Even this splitting, however, is quite rare, and will become rarer still as early treatment becomes generally available.

The meaning of schizophrenia as popularly used by journalists and writers is also wrong. The adjective "schizophrenic" is becoming a part of our language to mean separateness, as in "schizophrenic nation," "schizophrenic attitudes," "schizophrenic politics." As used in this way it may impart some vague meaning to the reader, but it actually has no meaning in relation to the disease from which it comes.

An older term, *dementia praecox*, the precocious or parboiled madness, meant that patients early in life became mentally incapacitated. This concept, useful sixty years ago, is no longer correct or useful.

The word "schizophrenia," therefore, serves no useful purpose either in referring accurately to a symptom or a disease, and will some day be replaced by more suitable diagnostic terms, just as "fever" was replaced as a diagnosis by definite diseases.

Schizophrenia does not, as some claim, have a special affinity for the poor. It is a disease which is prevalent in all cultures and societies and is, as far as we can tell, fairly evenly distributed among all races of men, no matter where they are. It is found as

often among Africans and Europeans as among Eskimos and Asians.

Even the most enthusiastic supporters of the theory that schizophrenia is related to poverty have been able to produce only one study to support their claim, where it was found that there were twice as many schizophrenics among the poor. But since about one percent of a population will have schizophrenia in their lifetime, this is not a particularly remarkable finding and probably was due to many other factors which were not adequately studied.

Other investigators have not found any evidence to show that poverty breeds schizophrenia. The evidence instead is fairly clear that patients who do not recover from schizophrenia tend to drift downward to a standard of living below that of their fathers who do not have the disease. The reason for this is simply that the patients are unable to continue in their work or function effectively in their society. In striking contrast, neurotic patients may remain the same, drift below or climb above their parents' social station.

SCHIZOPHRENIA AND STRESS

Schizophrenia, in spite of popular belief, seems to have hardly anything to do with stress. Just as it occurs uniformly among all classes of men, so has it remained unchanged throughout the years, as unconcerned about man's varying fortunes as about the color of his skin and his religion.

Other diseases show remarkable fluctuations through history. Before sanitation was widely practised, epidemics of various diseases would sweep across the population and decimate man. Malnutrition followed the seasons. During the war starvation and disease were rampant.

Diseases due to bacteria, nutritional deficiencies, etc., have shown major swings in prevalence and incidence, and once this was understood simple measures were employed to reduce them drastically.

Chlorinating water destroyed typhoid and other diseases. Immunization eradicated smallpox and diphtheria, and polio vaccine promises to do the same for polio. Adding nicotinic acid to flour in North America has practically eradicated pellagra.

It can be said, in fact, that the first large-scale program of preventive psychiatry was begun, not by psychiatrists nor by psychologists, but by nutritionists. At one time nearly ten percent of the patients admitted to some mental hospitals in the southern states of America had a disease called pellagra, caused by a lack of a vitamin. The psychological symptoms of this disease resemble schizophrenia so closely that it is likely that many more patients

admitted as schizophrenics actually had pellagra. When nutritionists persuaded the United States government to add nicotinic acid to the flour consumed by its citizens, there was a major decrease in this disease.

But schizophrenia has remained remarkably unchanged. During war or peace, in periods of poverty or prosperity, it has continued to take its toll in a steady relentless manner.

Its constancy through good times or bad strongly suggests that stress has no relation to schizophrenia. But even this is not conclusive, for no one seems to know for sure what stress really is. Many articles in popular journals picture modern society as being particularly stressful due to its complexities. There is remarkably little evidence, however, that communities today are suffering more stress than those of 100 or even 1,000 years ago.

Primitive man, fondly believed to have been healthy, contented, and wise, was actually, according to medical history, diseased, discontented and ignorant. Perhaps that is why he had to seek refuge in religion and philosophy.

One needs only to read the novels of the mid-19th century to learn that our ancestors lived constantly with death, filth, privation, fear and pain. A large proportion of women died miserably in childbirth and a large proportion of men, worn out by struggle, died by the time they were fifty. No family was free of death. In fact, if pain and discomfort are some factors which cause stress, then our century by all standards must enjoy less stress than any other. Few can deny that modern societies are characterized by less pain, less illness and greater comfort than ever before.

All we can say for sure, then, is that if stress, whatever it is, does play a role in causing schizophrenia, it is not an important one.

STRESS AND THE SEX FACTOR

Stress also fails to explain the sex factor in this disease. It is estimated that its incidence among boys below the age of 13 is three to seven times higher than among girls the same age. If the stress theory is correct, one would have to assume that little boys are given three to seven times as much stress as little girls. Dr. F. Kallman has challenged psychodynamic psychiatrists to lower the incidence of schizophrenia in children by persuading parents to be as kind to their sons as they are to their daughters.

Between puberty and the mid-thirties, the incidence is about the same for both boys and girls. Stress theorists would now have to assume that stress on females had increased remarkably after the age of puberty to raise their incidence to equal that of boys.

One-sixth of the children who have a schizophrenic mother or father will have enough genes to make them schizophrenic. That is, out of 100 children who each have one schizophrenic parent, 25 will get it. If both parents are schizophrenic, the proportion is increased to 60 out of 100.

If a brother or sister is schizophrenic, another brother or sister has a 15 percent chance of having it also.

This does not mean that patients with schizophrenia should not have children. It is obvious, too, that sterilizing all schizophrenics would have very little effect in reducing the number of patients and should not be considered. The disease has shown a high-survival value through the centuries in spite of the fact that many schizophrenics have no interest in sex and many others were, until ten years ago, kept isolated inside mental hospitals. Today, thanks to new drugs, more schizophrenics are able to live in the community than ever before and we predict that the disease will, over a period of many years, affect many more people.

The New York Times, March 1, 1964, carried the following story:

BIRTHS WIDENING TYPE OF INSANITY
RISE IN SCHIZOPHRENIC RATE
CALLED ALARMING IN STATE

Professor Franz Kallman reported:

> A large-scale study in New York State mental hospitals has shown that within two decades the reproductive rates of schizophrenic women increased 86 percent, compared with an increase of 25 percent by the general population.
>
> Dr. Kallman warned that this rise, reflecting the difference between early handling of schizophrenic patients and modern treatment methods, might result in a steady increase of the serious mental disorder. He predicted that the birth-rate among schizophrenics might eventually surpass that of the general population.

We do not know whether the prevalence of schizophrenia should be suppressed, even if it could be. It is possible it is one of the evolutionary experiments not yet under control, and there is not enough evidence today to interfere with that great force in life. There is, however, a lot of evidence to indicate that in many ways people with schizophrenia, who have been cured, are healthier physically and mentally than their non-schizophrenic brethren. Schizophrenics appear more youthful, their skin does not crinkle as quickly, their hair retains its pigment longer and the fat under

their skin seems to last better. They have fewer allergies, can stand pain much better, and do not get medical shock as easily.

It may be, then, that if the evolutionary experiment works well, everyone will some day have enough of the desirable schizophrenic genes to make them more fit.

Parents who have schizophrenia, however, should learn what they can about it, and if it should occur in one of their children, seek immediate appropriate help. We hope that they will be able to do this more effectively after having read this book. Families which seem to have more than the expected number of schizophrenics should seek help early whenever one of them shows any sign of illness or of peculiar behavior.

PHYSICAL CHANGES—UNDESIRABLE

What, then, is schizophrenia? How can we tell when it is present?

There are physical as well as psychological changes in schizophrenia, some of which are undesirable and some of which are desirable. In general, the earlier the disease strikes the more severely it affects the body. If children become ill before their sensory organs reach full functional maturity, they may never develop normally. The organs themselves may be physically healthy, but their function and coordination may be distorted.

It is possible for skilled child psychiatrists to diagnose schizophrenia at the age of one month by the complete lack of muscle tone. Mothers who have had normal babies notice the queer feeling that, when picked up, their schizophrenic infants sag like limp dolls.

When schizophrenia occurs before puberty, the patients may be smaller in stature than non-schizophrenics, and often are narrow in the chest from front to back. When the left side is compared with the right side, there is found to be a deformity in shape.

When the disease strikes adults, many things can happen. Both men and women are then more susceptible to tuberculosis and are more likely to develop an infection if exposed to this disease. It is quite clear that tubercular lesions also heal more slowly in schizophrenics. This was an important cause of death in mental hospitals before they introduced modern methods of tuberculosis control. However, when modern control measures and proper treatments are used, the incidence of tuberculosis among schizophrenics is reduced, but not to normal levels.

It is not true that tuberculosis patients are more susceptible to schizophrenia. This proves that the sequence of events is very important, and it will be discussed later.

Another important change is the pronounced fatigue and listlessness which descends upon the patient. This occurs in all physical illnesses and is not peculiar to schizophrenia. The patient usually feels less tired on the morning after sleep, but becomes progressively more and more tired as the day goes on. Toward evening he is often much more psychotic.

Schizophrenic men may become impotent and show atrophy of the male gonads. Women may suffer changes in the menstrual cycle but this returns to normal if the disease vanishes. Both men and women tend to suffer a decrease in sex interest. Schizophrenic men occasionally become confused in their sex identity, possibly due to bizarre feelings. This led Freud to the erroneous belief that repressed homosexuality is at the root of all paranoid ideas. The vast majority of researches designed to test this point have shown that Freud's hypothesis is wrong.

PHYSICAL CHANGES–DESIRABLE

There are a number of tests which show that schizophrenic body fluids differ from those of normal people and those with other psychiatric illnesses. Schizophrenics as a result have desirable physical attributes which non-schizophrenics may well envy.

Schizophrenics are frequently very attractive physically. They tend to age and lose their hair color more slowly, and generally appear more youthful than their chronological age.

They are, furthermore, much freer of many of the physical complaints of man, and seem to be able to survive misfortunes which would kill other people.

Dr. John Lucy found that schizophrenics can take enormous quantities of histamines, the chemical substance which is responsible for allergies in some people. This resistance to histamine explains why allergies are rare among them. A. J. Lea, in a careful study, found one allergic condition in 500 schizophrenics. Other investigators have made similar findings. This is a characteristic of the disease itself and not the patient, for patients can and do develop allergies when they are free of schizophrenia. D. H. Funkenstein reported in 1960 on a group of psychotic patients who had asthma when they were not suffering from schizophrenia, but never had the two together. Rheumatoid arthritis is also very rare in schizophrenia. Thus Dr. D. Gregg reported in *The American Journal of Psychiatry* in 1939 that, out of 3000 autopsies on patients with psychosis, who died for other reasons, not one patient had any evidence of arthritis in their joints or bones. Doctors Nissen and Spencer found no cases of arthritis among 2200 psychotic subjects and Doctors Trevethen and Tatum in 1954 exam-

ined 9000 admissions to a general hospital: 80 had arthritis but not one had schizophrenia.

It has also been noted in mental hospitals that *diabetes mellitus* is an unusual occurrence. Both mental hospitals in Saskatchewan, with a total population of over 3000, have less than five diabetics. Dynamic psychiatrists have explained this by saying that patients who have one "defense mechanism," schizophrenia, have no need for another, diabetes. They have not yet explained in what way diabetes is a defense mechanism any more than they have explained schizophrenia as having a stress basis. It is interesting to note, however, that doctors continue to treat diabetes with insulin and not with psychotherapy.

Schizophrenics can suffer extensive burns, severe injuries, fractures and heart attacks, acute appendicitis and even self-mutilation with abnormal stoicism and detachment. While some people faint when blood is drawn, one schizophrenic patient cut his throat and bled so much that he required five pints of blood, with little sign of shock. Some have cut off fingers and hands without collapsing or appearing to be affected in any other way. They have been known to escape the shock symptoms usually suffered at the beginning of a perforated ulcer.

Some, of course, do go into deep shock and die, but others seem to benefit from shock when it does occur. One patient, a chronic schizophrenic with bizarre ideas and behavior, suffered very severe burns over a large portion of her body in a kitchen accident. She went into deep traumatic shock, and after a lengthy period of recovery, emerged completely clear mentally and able to return to her family.

This resistance to pain can be dangerous, for acute illnesses are often ignored until too late. Psychotic patients die more often from ruptured hearts than normals, without complaining of pain or giving other signs of severe difficulty.

PSYCHOLOGICAL CHANGES

It is impossible to catalogue and describe all the psychological changes which can occur in schizophrenia. Even if one could, it would be of little value, for the diagnosis of schizophrenia does not depend upon the counting of these symptoms.

There is no personality which is peculiar to schizophrenia. There is no particular type of personality preceding it and it does not impose a uniform type of personality on all patients. Schizophrenics represent all personality types. Opponents of biological theories of schizophrenia have used this as an argument, on the assumption that any biological disease would have the effect of

making all patients act the same way. This is a novel idea, since it is not true of any disease so far discovered. *Diabetes mellitus* does not produce uniform personalities any more than schizophrenia does, but no one argues that it is not a physical disease.

Only one personality is believed to precede the disease, and it has found its way into the literature as the schizoid personality. A schizoid personality is supposed to resemble schizophrenia and is usually applied to a person who is ingoing, introverted, quiet, and enjoys seclusion. It was believed that children who were shy and quiet by nature were pre-schizophrenic and parents of such children were advised by physicians to be concerned about them.

So strong was this assumption that much research money was spent trying to establish that schizophrenics would come largely from that group known as schizoid personalities. One such study was completed in Toronto, where an examination was made of a large number of school children from an upper-class section of society.

Using certain criteria, a small number of schizoid children were selected. Over the next few years it was found that childhood schizophrenia occurred more frequently in children who had not been selected as schizoid. A similar study in the University of Texas, Dallas, yielded similar results. A large group of children seen in a mental health clinic were classed into extraverted, introverted and ambiverted groups. Of these, the introverted ones would most closely resemble the schizoid people. Over a long follow-up period it was found that the introverted group produced less than the expected share of schizophrenic patients. In fact, out of ten subjects found to have been diagnosed schizophrenic, only one was classified introverted. Three were extraverted and six ambiverted. It thus appears that many introverted and retiring people have been needlessly annoyed by this error.

Since it has not been shown that schizoid subjects produce more schizophrenics than any other personality types, where did this idea originate?

It seems likely the idea came from the necessity of taking histories and the habit of mistaking the first signs of the disease for a special personality preceding it. This is another example of putting symptoms before causes, leading to wrong conclusions. It is as scientific as the procedures adopted by the wise men called upon by the king to determine why the wind blows. The wise men studied the problem for a long time without coming up with any satisfactory answers. It was observed, however, that whenever the wind blew the trees waved. It was, therefore, concluded that the trees' waving produced the wind.

The basic personality is altered by the disease. This is not

unique for schizophrenia, since it has been known for centuries that any illness alters personality. A subject with a painful headache may have at the time an irritable, withdrawn, seclusive personality which becomes relaxed, friendly, tolerant and outgoing again when the headache disappears.

The confusion on this point may be due to the characteristic way in which the disease begins. Most diseases give definite and unmistakable warning of their presence fairly early in their history. They have obvious physical manifestations which make it relatively simple for others to accept the fact that the patient has now become sick. If there is a personality change with cancer, for instance, it is understood that this is the result of pain and suffering and allowances are made.

But schizophrenia is often treacherous. It may come on so slowly and insidiously that, like watching the hourly hand of a clock, one sees no beginning or end of the movement. There is nothing definable that one can see, like the sudden loss of weight or unusual pallor, or feel, like a sharp pain in the abdomen. It makes its changes gradually where they are least noticeable, in a slowly-increasing personality deformation without any obvious explanation.

If one examines the clinical history of many patients, it becomes obvious that there were personality changes which included withdrawal, shyness, etc., long before schizophrenia was fully developed, or recognized. Perhaps this is why personality theorists have fallen into the trap of believing there is a personality which is predisposed toward it. In these cases, however, the so-called schizoid personality was the first sign that schizophrenia was present, and was a symptom and not a predisposing factor. The term "schizoid," then, has no clinical value and might well be dropped from usage.

WARNING SIGN

Since the personality of patients with schizophrenia differs as widely as the personality of subjects who do not have this disease, the psychological tests used to measure personality in diagnosis of schizophrenia have no value.

Many clinical psychologists favor Rorschach and other projective tests designed to determine whether we are fun-loving party-goers or sinister types harboring malice and ill-will toward our fathers. These tests have been useless in either diagnosing or helping to treat schizophrenia.

The Rorschach test was developed by Herman Rorschach about forty years ago. It consists of a set of ten cards, with a sym-

metrical ink blot on each card. The blot is usually black, but is sometimes red. The subject is supposed to look at it and tell the tester of what it reminds him.

What the patient says is interpreted by psychologists who have spent many months memorizing the significance of these comments and who have their own individual ways of analyzing the results.

The theory of this kind of test is that the blots act as a kind of magnet pulling clues to his basic problems from the subject's subconscious. These are supposed to provide the key to personality and diagnosis. Attempts to show that the Rorschach has some value have been singularly unsuccessful, but its use goes on and on.

There is one important unchanging characteristic of the disease to look for, and that is alteration in personality. Whenever there is a change in character, without an accompanying clear change in the environment and in the absence of physical illness, one may suspect schizophrenia.

This change is marked by a turning into oneself and an intensification or exaggeration of abnormal and asocial traits. For example, if a normal outgoing adolescent over a period of years becomes shy, seclusive, lonely and irritable, this is a serious personality change and parents should look for the cause. In a proportion of cases, they will find schizophrenia.

Change in personality, then, is the hallmark of schizophrenia. In order to evaluate the change we must know what the personality changed from, and must consider the age at which the change occurred. The easiest patients to diagnose on the basis of change are those who have reached the end of the developing years and have achieved stable personalities.

Schizophrenia is very difficult to diagnose in the first ten years of life. In fact, several decades ago it was believed that schizophrenia did not occur at all under the age of ten. Of course it does, but its diagnosis requires skill. Trained and skillful psychiatrists can even diagnose it at the age of one month, but these experts are extremely rare.

Several years ago a professor from Michigan, R. Rabinovitch, who was in Saskatoon, Saskatchewan, for a conference, remarked on the extremely low incidence of childhood schizophrenia in this province. It occurred, he noted, only one-twentieth as often as in Michigan, an interesting phenomenon in view of the fact that the disease in adulthood occurred so uniformly across all regions. He concluded that its low incidence in Saskatchewan children was due to the fact that there were too few psychiatrists there able to diagnose it. Undoubtedly the majority of schizophrenic children in his province were called behavioral problems or considered to be mentally retarded.

One reason for confusing schizophrenia with retardation in the young is again due to our habit of diagnosing symptoms instead of the disease. Human beings, animals and birds all have critical learning periods in their development. The song-learning period in birds, for example, is about a year. If a young male chaffinch is isolated from others of his kind at the age of three or four days, he doesn't learn the complete chaffinch song. But if he hears an adult bird singing before he learns to sing himself, he will in a year produce the song of his species, whether he is isolated or not. Similarly, there is a ten-day period just after weaning when mice learn to fight. If mice are kept by themselves at twenty days of age, they do not fight as readily in adulthood as those brought up in groups.

There is a critical period in human beings when they learn to speak, and in other ways prepare themselves for the learning which lies ahead. If, for some reason, they are unable to learn during this period, they may not learn at all.

If schizophrenia occurs under the age of ten, it will interfere with the learning process and the child's learning may be permanently impaired. Since we cannot distinguish a clear personality change, therefore, we take note of his failing school grades or his inability to keep up with others of his age. The inevitable diagnosis then is retardation, and the child is forced into the special place reserved in our society for that group of people, from which there seems to be no escape.

Personality in the next ten years of life is better established, but still unsettled. Therefore, schizophrenia becomes easier to diagnose, but the danger is great that the adolescent's illness will take a form which many will confuse with simply "adolescent behavior."

A large proportion of adolescent schizophrenics are called anxiety neuroses, adolescent turmoil or other such terms. When the disease first strikes during the second ten years of life, however, the patient has a better chance of recovery. The main difficulty here is that education is interrupted for several years as the disease develops, and during treatment and convalescence.

It is during maturity that schizophrenia is most readily diagnosed, for at this period of life, personality has more or less stabilized and change in personality can be determined more readily.

The only period during maturity when the diagnosis is easily missed is during the period after women have had their babies, when the illness is frequently mistaken for depression, and during the menopause when most illnesses are called involutional depressions. The final period of life when diagnosis is difficult is when old age or senility develops, for then many mental illnesses are confused with senile psychosis.

HOW THE CHANGES COME ABOUT

Since this book is not a textbook of psychiatry we will describe how these changes in personality come about. These are the psychological changes which occur so frequently in schizophrenics. They will be described under four main headings: (*a*) perception; (*b*) thought; (*c*) mood; (*d*) activity.

PERCEPTION—THE WAY THINGS APPEAR TO US

Inside every human being is a finely woven network of nerves which take messages from ear, eye, nose, skin and taste buds to the brain. Here they are worked upon by a vastly complicated system of chemicals, each with certain duties to perform, and various departments charged with the heavy job of advising different parts of the body what to do. There is an instant interpretation, which is telegraphed back to the parts directly concerned, whereupon the individual gets angry, excited, frightened, pleased, or in other ways acts appropriately in response, depending a great deal on his own personality.

This is perception. The five senses provide us with intormation we must have about our own bodies and the world around us if we are to survive. They pick up cues from other people; the tone of voice, the facial expression, the gestures, and these play an important part in how we get along with them.

In addition to the five senses there are other important senses, and one of these is the passing of time. Another is knowing where your hand is, or relying on your feet to perform certain jobs without any special prodding from you. In other words, in normal individuals perception is spontaneous, automatic and perfectly coordinated.

Suppose, however, something interferes with the way messages are taken to the brain and the individual receives a distorted picture. Still acting appropriately to the information received by the brain, he is now acting inappropriately to his situation. His judgment may then be impaired and he cannot think clearly.

Or suppose because of interference with messages in the brain one has to stop and think what one's feet are doing. Suppose when you are reading the words jump up and down, and you are so interested in what the word is doing, you forget to think about what it means.

Suppose you can no longer remember what your mother looks like unless you piece an image of her together, piece by piece, and then have to concentrate to hang on to it. Suppose you hear a voice telling you to go hang yourself. Suppose, because sounds are too

loud, you are distracted and can no longer concentrate on the simplest things, like watching TV.

All these things can and do happen in people, and they happen when the person has schizophrenia.

In schizophrenia the world and people in it have changed. Dr. Andrew McGhie and Dr. James Chapman in England have collected descriptions from various schizophrenic patients on how the disease has affected them, and find that disturbance in areas of perception and attention is primary in this disease. Normal conversation is disrupted. "When people are talking," said one patient, "I just get scraps of it. If it is just one person who is speaking that's not so bad, but if others join in, then I can't pick it up at all. I just can't get into tune with that conversation. It makes me feel open, as if things are closing in on me and I have lost control. Movements become slower because each one must be thought out." "People go about completely unthinking," said another. "They do things automatically. A man can walk down the street and not bother. If he stops to think about it, he might look at his legs and just wonder where he is going to get the energy to move his legs. His legs will start to wobble. How does he know that his legs are going to move when he wants them to?"

Or as another patient put it, "If I do something, like going for a drink of water, I have to go over each detail. Find cup, walk over, turn tap, fill cup, turn tap off, drink it. I keep building up a picture. I have to change the picture each time. I have to make the old picture move. I can't concentrate. I can't hold things. Something else comes in. Various things. It's easier if I stay still."

Schizophrenia can change one or all of our sensory modes, and this produces the bizarre thinking and behavior which is characteristic of the disease.

1. *Visual Changes*

The sense of vision is one of the primary senses and is trusted more than most of the others. The statement "seeing is believing" expresses a profound truth. Many changes in perception can occur as follows:

(i) *Changes in Color.* Colors may become very brilliant or, more frequently, lose their brilliance. Sometimes the whole world becomes a uniform monotonous grey. When this happens it is not clear whether the patient sees all colors, but has lost his normal emotional reaction to them, or whether he sees all colors the same. The patient during this period may be unaware the world is different. One patient realized her world had been dull and grey only after she suddenly regained normal color vision.

"Colors seem to be brighter now, almost as if they are luminous," one patient told Dr. Chapman and Dr. McGhie. "When I look around me it's like a luminous painting. I'm not sure if things are solid until I touch them."

Another patient said: "I am noticing colors more than before, although I am not artistically minded. The colors of things seem much more clear and yet, at the same time, there is something missing. The things I look at seem to be flatter as if I were looking just at a surface. Maybe it's because I notice so much more about things and find myself looking at them for a longer time. Not only the color of things fascinates me but all sorts of little things, like markings in the surface, pick up my attention, too."

(ii) *Changes in Form.* Objects remain recognizable but look different. This may lead patients to believe the objects are unreal, that is, that they have a new, unexpected and, therefore, unreal quality. Sometimes pictures are seen as having real three-dimensional quality. A house in a picture may appear to have the depth and perspective of a house on the street. On the other hand, three-dimensional objects may appear flat.

Angles may become distorted. Instead of lines going up and down or straight across, they may seem to be leaning over. Sometimes objects develop life-like qualities and pulsate, as though they were breathing. Words on paper may move up and down or sideways, and lines may appear to crowd together. Parallel lines or patterns on wooden objects or in floors may flow in and out as if alive.

(iii) *Misidentification.* The ability to distinguish one face from another depends upon being able to see properly. The slightest change in a face is enough to make it seem strange or different.

One male patient said people's shapes did strange things. Sometimes their faces were triangular or square. Sometimes their heads got larger or smaller. Sometimes one shoulder went up and the other went down. For this reason, he couldn't look at people for very long, but had to look away.

"But you're looking at me now," said the social worker.

"Yes, but you don't bother me," he said. "I'm used to you. In fact, you look rather funny."

If visual perception is disturbed the subject may lose his ability to recognize people. *The New York Herald Tribune* February 12, 1964, carried the following story under the heading, "Killer Says Voices Told Me To Shoot":

> When he came down the stairs he had unnatural feet, iridescent eyes and his fangs were showing. My voices told me to shoot him. Police said A had suffered a nervous breakdown after his father's death.

Clearly what happened was that A was very psychotic and suffering from auditory hallucinations. When poor young Mr. Burke came down the stairs A saw him coming down. Looking up at him could strongly enhance any failures in constancy, since it seems our perceptions are more stable along the horizontal plane.

Another patient had a similar misidentification with serious consequences. During a period of deep depression and anxiety he looked up and saw a young girl coming down the stairs. She seemed to be surrounded by a halo and looked like an angel. This psychotic man immediately fell in love with her. This eventually led to his divorce and to a prolonged period of extreme tension and unhappiness.

An elderly schizophrenic who had been sick for ten years knew she was married to Mr. Jones. But when asked if Mr. Jones was sitting beside her, she was unable to recognize him and denied it.

A male patient lost his ability to tell one face from another. All faces seemed the same to him, leading him to believe he was being followed.

Some patients notice changes in themselves when they look in the mirror and find these disturbing. One patient's chief symptom was that she saw bags and lines under her eyes. None of these was present but she could see them and this had a profound effect upon her. She became quiet and seclusive and refused to go out.

Some patients may also see themselves as being much younger or older than they really are and this leads to problems.

(iv) *Changes in Far Vision Perspective.* A common complaint of schizophrenic patients deals with the ability to orient themselves. Subjects who ride in cars become insecure and feel either that passing cars are coming toward them too closely when they are not, or that they themselves are too close to the ditch. Because of this, several patients stopped driving cars as their illness developed. These visual changes also make it difficult for patients to estimate correctly the size of people and objects far from them. Some see other people much smaller than they really are.

These changes send patients to oculists or opthamologists from whom they demand glasses. Most often the new glasses do not solve the problem, and a frequent symptom of schizophrenia, therefore, is a frequent change of glasses with no relief.

A common problem among sufferers from the disease concerns the ability to judge whether people are looking directly at them or not. The ability to decide whether one is being looked at depends upon a proper binocular vision and a very exact coordination of a variety of cues. If the area of the brain which judges convergence is not functioning properly, subjects would be inclined to see people as looking at them when they are not.

In a study involving schizophrenic and non-schizophrenic patients, we found that twenty-five schizophrenic patients were less able to decide whether an investigator was looking into their eyes than a group of thirty non-schizophrenic patients.

The schizophrenic is liable to feel that he is being looked at long and more often than usual, when this is not so. The earliest symptom of schizophrenia may be the inability to lose the feeling of being watched. Recently a professor of biology sought a psychiatric consultation because he was continually and painfully aware that his students were watching him as he lectured to them. He was disturbed that, after many years of lecturing, this feeling was still present and much stronger than it had been. The urine test showed he was very ill with malvaria.

Whether people are looking at us or not, and how they look at us, produces an emotional reaction in most people and would, therefore, have a profound effect on the schizophrenic.

In a letter to Dr. Osmond, Edward T. Hall, Department of Political and Social Science, Illinois Institute of Technology in Chicago, wrote, "I think that the point about the schizophrenic not being able to tell when people are looking at him is very important. Its importance, as a matter of fact, has undoubtedly been overlooked. Recently, I have had my students doing experiments on eye behavior. . . . One of the first things I discovered was that my own feelings, about being looked at in certain ways that often caused me to be quite anxious, were actually shared by a great many people. I had thought that my own discomfort was due to a failure on my part in working through some old dynamism that laid buried in my past experience. This may also be so, but the data indicate that the reaction is a normal one and can be exceedingly painful."

He went on to point out that "dominant baboons can cause a younger baboon to scream with a pain at a distance of around thirty feet simply by looking at him." He concluded that if the schizophrenic's capacity to tell when people are looking at him is seriously disturbed, he could be in deep difficulties. He also had observed that "they use their eyes in a very improper way," creating hostility or anxiety in those around them.

In ordinary life there is a kind of visual exchange between one person and the other and the eyes are normally used to facilitate social relations. When people talk, they look at each other and look away again. They may look at a person's mouth, shoulder, the top of his head. They rarely look directly into each other's eyes except for short intervals, for being stared at makes many people uncomfortable. In fact, small children are often told not to stare.

Many animals are disturbed when they are stared at. A bore

can be temporarily halted or completely silenced by gazing straight into his eyes. Freud placed his patients on a couch because he disliked being looked at for hours on end.

The feeling of being watched or stared at, then, would be reason enough for a person to remain in seclusion.

(v) *Illusions and Hallucinations.* Schizophrenics do not, as we are told, "imagine" they hear or see things which are not there. They actually hear and see them. They have illusions because something has gone wrong with the way they perceive things and, therefore, they misinterpret what they are looking at. The coat hanging in a cupboard may momentarily look like a man or a bear.

Hallucinations are things, scenes, people, etc., which patients see but which other people do not see. Visual hallucinations can be anything familiar to everyone in everyday life, or may be fantastic visions of the kind seen during transcendental states or during experiences induced by psychotomimetic drugs like mescaline and LSD-25.

(vi) *General Comments.* Visual changes may range in intensity from very slight to very severe, and may endure from a hallucination of a single moment to hallucinations lasting many decades. The response or reaction of the subject to his visual changes depends upon many things. This will be discussed further on in this book when the comprehensive theory of schizophrenia is considered in Chapter IV.

Some psychiatrists try to distinguish between so-called true and pseudo- (not true) hallucinations. They accept hallucinations to be true when the patient sees any physical familiar object which no one else can see, and believes it to be real. Pseudo-hallucinations are said to be the same visions, but when the patient realizes them to be phantasms or visions.

If this were the only matter at issue, there would be no quarrel with these arbitrary definitions. But psychiatrists have used these distinctions to make diagnoses even more unclear and difficult, for it is now said that schizophrenics have true hallucinations and hysterics have pseudo-hallucinations. If the psychiatrist wishes to give the patient psychotherapy he will be tempted to call them pseudo-hallucinations.

Actually, diagnosis depends not upon the patient and his hallucinations, but upon the psychiatrist. If the latter thinks the patient has hysteria, he terms the hallucinations "pseudo"; if he believes the patient to have schizophrenia, his hallucinations are said to be true. The definition, therefore, is tied to the idea of the diagnosis. It would be scientifically better to drop these terms "true" and "pseudo" and merely say instead that the patient has hallucinations.

2. *Auditory Changes*

There can be fewer changes in hearing than in seeing. Sounds may be louder, or not as loud.

"It's as if someone had turned up the volume," one patient said. "I notice it most with background noises—you know what I mean, noises that are always around but you don't usually notice them. Now they seem to be just as loud and sometimes louder than the main noises that are going on. . . . It's a bit alarming at times because it makes it difficult to keep your mind on something when there's so much going on that you can't help listening to."

Sounds may become less intelligible and harder to locate. One patient, for instance, said that though he knew the sounds were coming from the wireless in front of him, they seemed to be coming from behind his back.

Very few schizophrenic patients are free from auditory changes. As a result, textbooks of psychiatry regard auditory hallucinations as a sign of a more serious disease process, while visual hallucinations are taken more lightly. However, the evidence to support these views is not strong, since psychiatrists fail to make careful studies of the visual changes which occur in schizophrenia. They don't see the importance of changes in perception. Perhaps, too, their preoccupation with patients' life histories leaves them little time for these studies.

One schizophrenic tried to get admitted to a psychiatric ward because he thought others were talking about him, yet knew this was not so. At the same time he had visual disturbances and he decided he must be getting sick again. He was refused admittance, however, and told to go home "because you are normal."

There are two excellent ways for psychiatrists to become conscious of perceptual changes in patients. The first is long and arduous. It involves many years of experience with psychiatric patients, during which each is carefully examined for these changes. The second method, a faster and more effective one, is to take one of the hallucinogenic drugs such as LSD-25, mescaline and psilocybin, and study these changes at first hand. We think most psychiatrists would profit from the experience, and their understanding of their patients would improve.

Auditory hallucinations occur after schizophrenia is well established. The changes appear to occur in order as follows:

a. Patients become aware of their own thoughts.
b. They hear them in their head.
c. They hear them as if outside their head.
d. They hear voices.

The hallucinations can be anything from voices giving orders and conversations with God, to music, unearthly sounds and buzzing noises. There is no way of predicting in advance what the patient will hear. This will probably depend upon his personality, the part of the brain that is affected by the body chemical producing these changes, and other factors. The voices may belong to people known to the patient, alive or dead. They may teach the subject, or hold conversations with him. They may make fun of him or give him orders such as, "Do not eat any more." Religious communications have been very common, but in recent years sexual comments seem to have become more frequent.

The nature of the communication is not as important as the ability of the patient to act, or refrain from acting, on the advice given him. The only exception is the case of the patient who came to the hospital in response to a voice which told her to.

A person may have the most vivid hallucinations, yet appear normal as long as he can refrain from doing what the voices tell him to, and telling others about them. One patient, a physically and mentally rugged individual, heard voices telling him as he shaved every morning, "Cut your throat, cut your throat." But he *knew* this was nonsense and carried on as if these voices did not exist.

This man had lost both legs in action in 1917 during the First World War and had made a splendid adjustment to this disaster. His schizophrenia did not develop until 1947, thirty years later.

One of the stages in treatment, therefore, is to convince patients not to tell others about their hallucinations.

3. *Changes in Sense of Smell*

Patients may become either more or less sensitive to odors. Since smell is an important factor in taste, any change in the former may lead to a change in the latter. The patient may become acutely aware of odors he normally did not notice before. Body odors may become exaggerated and unpleasant. Other people may smell strange. Consequently, patients may wash themselves excessively or insist that others do so.

Of course, hallucinations of the sense of smell can occur and in this case, patients will be aware of odors which are really not present. These hallucinations seem rare in schizophrenia but as questions about smell are not commonly asked, we really do not know. Patients will complain about them only when the changes are pronounced.

4. *Changes in Sense of Touch*

These changes seem to occur less frequently than in any of the senses described above. Patients may become more or less sensitive to touch. Usually they become less sensitive to pain. Decrease in touch sensitivity is generally not troublesome unless the patient's job depends upon a keenness of touch.

But an increased sensitivity can be very troublesome. The feel of a fabric can be exaggerated until it feels like animal fur. There might be bizarre sensations, like the feeling that worms are crawling under one's skin. Unusual touch sensations may be interpreted as having electricity applied to one's person, being stuck with needles and so on.

There may be increased or decreased sensitivity in the genital organs, resulting in sexual delusions.

Normal subjects commonly experience the feeling of being out of the body when they take LSD-25. This usually occurs when the subject is so relaxed he is unaware of his own body. The medical explanation for this may be that messages from the outside of the body to the brain are temporarily suspended, and the patient's "perceived body" is distorted.

"Perceived body" is awareness of the limits of one's own body. This is undeveloped in babies, but well defined in adults. It is likely schizophrenic children have defective perceived body images and so easily run into solid objects. Also, if the body image is diffuse, patients can invade other people's "personal" space.

In their research in Weyburn Hospital, Dr. Osmond and Dr. R. Sommer, research psychologist, found that there is a space surrounding each person which, if invaded by another, makes him very anxious. You have seen some people talking face to face, while others are at least a yard away. The extent of personal space around each individual is determined psychologically and by the customs of the society in which he lives.

If a young female schizophrenic loses the ability to judge body image, she may unwittingly get too close to men and so appear to them to be forward or seductive, with many undesirable results. Staring at another is a violation of personal space and makes one feel anxious. One may feel threatened or "dominated" if an individual we dislike gets too close to us in conversation.

Sometimes, in another disturbance of "perceived body," the subject who has taken LSD-25 sees his own body from the outside, as though he were on the ceiling looking down on himself, but this is rare. This also occurs with some schizophrenic patients. One patient was placed in a jail cell because of his asocial behavior.

During this incarceration he woke up one day and, hearing footsteps in the corridor, went to his cell door to look out. In the corridor he saw himself pacing restlessly up and down. He examined himself, said, "I must be crazy," and retired to his cot to finish his nap.

5. *Taste Changes*

In schizophrenia the proper balance of flavors is altered. Patients may become less sensitive to taste so that foods taste unusual. New tastes may occur.

The only dangerous changes are those which lead the patient to believe someone has tampered with the food. In our culture bitter things are often associated with medicines or poisons, and it is very likely that the common delusion of schizophrenics that they are being poisoned stems from the hallucinations that the food tastes bitter.

Dr. John Connolly in 1849 believed that many of his patients' delusions arose from disorders in taste perception. He reported many patients would not eat because foods had a coppery taste.

6. *Time Changes*

We will include time as one of the important senses even though there seems to be no definite organ which deals with it. It is likely time perception is a function of the entire brain which acts as a computer integrating all sources of information from the senses to estimate the passing of time; for example, the eye sees day and night, sun, stars and shadows. The ear hears different noises at different times of the day, while the body feels hunger and other sensations from bladder, bowel, fatigued muscles and heartbeats. All these impulses, taken together, help us to tell whether it is morning, noon or night.

This skill has to be learned, and time- or clock-conscious societies force their members to learn it more thoroughly than others, although no human is ever free of the need to know that time is passing.

Few people realize how important the sense of time passing is to them until they are deprived of external aids such as wristwatches, or unless they find themselves in a world where time has lost its normal qualities, such as in the world of LSD-25. Today, when so many new demands are being made on our ability to perceive the passing of time, we can imagine the havoc which would result in our daily lives if we suddenly found ourselves un-

able to judge, or be aware of, time passing normally. Yet schizophrenics are continually living with a distorted time sense.

Patients in mental hospitals are frequently disorientated for time, posibly due to the lack of external aids which other people depend upon. The sense of days and weeks passing is normally diminished when one is removed from one's daily occupation. People on vacation and patients in hospitals are more disoriented than they are at home. In general, calendars, daily newspapers and daily visitors help maintain orientation. But mental hospitals are not so well blessed.

One of our chronic schizophrenic patients was completely disoriented for time until the nurses were instructed to show her the calendar and daily newspaper and to ask her frequently the day of the week and the date. With these aids she soon became normally oriented.

In schizophrenia there can be very few changes in the sense of time passing, but their effects are very profound. In our research we have found that schizophrenics are more confused and muddled about time than any other patients except those in confusional states, for example, in senility or toxic states of other illnesses. They seem to be in long slow delirium, resembling the state normals find themselves in when they take LSD-25.

Time may appear to pass very slowly, as in the hour spent listening to a dull lecture. Time may pass very quickly, as in the three hours spent in an interesting chess game or in hours of love which fly by in minutes. Time may stop altogether when there is no sensation of time passing at all.

Some catatonic patients seem to be suspended in time. When they recover from their catatonia (the state suffered by some schizophrenics when they do not move or speak) they can remember things that happened around them, but not the order in which they happened. Time is normally sequential. That is, "today" follows "yesterday" and is behind "tomorrow." It would be very disturbing if this normal flow of time were reversed. This happened to one of our subjects who, when given LSD, found himself drinking his coffee before the cup was lifted to his lips! We have not yet seen this in patients but we have not made a particular point of inquiring about it. We do not doubt it does occur, but it is rare. The order of events in schizophrenia, however, can be confused.

The changes may be of short or long duration and one may follow the other. A patient may sit down for a few moments, stay there several hours and "come to" thinking only moments have passed. Schizophrenics alternate between periods of time passing slowly, and time passing quickly. When it is passing slowly, they may be depressed. When it is passing quickly, they may be excited

and elated. It is usually believed the mood sets the time sense, but there is no reason why the time sense cannot set the mood.

In fact, in hypnotic experiments which we will describe later, the mood was exactly correlated with the change in time passing. The slowing down of time movement produced depressed emotions. The speeding up of time produced euphoria, cheerfulness and even mania. When time was stopped, catatonia was produced.

It is surprising that so little attention has been paid to time perception in schizophrenia and its relationship to mood, even though this has long been a matter of general knowledge. It is also surprising that so little use has been made of this knowledge to develop diagnostic tests for schizophrenia.

Additional Notes on Perceptual Changes

It is impossible to describe all the changes which can occur in the whole range of perceptions, nor would it be desirable to do so. For one's attention should not be directed to the details of the changes, but rather to the fact that the changes are present.

For anyone to function normally, each sense has to be linked smoothly and easily to all the others. We make judgments on the basis of what our senses tell us. If anything goes wrong with any one of our senses, our lives at home, at work and in the community can be seriously disrupted.

Some people experience a phenomenon called "synesthesia" which may be normal for them, but surprising and frightening for others. In synesthesia some people see a flash of light at the same time they hear a musical note.

This commonly happens when one has taken LSD-25 or its related compound, mescaline. It also occurs in schizophrenia. One may feel a pain in the chest at the same time one sees a flash of light. This can be very disturbing to patients and can easily lead them to believe they are being controlled by magic, or by the influence of others. One patient kept getting messages from the planets. Some patients have a feeling of omnipotence and power.

The first responsibility, when changes do occur, is to diagnose the presence of schizophrenia. In order to do this accurately, the simple fact that perceptual changes are absent or present is most important, and when they are present, a diligent inquiry must be made before schizophrenia is ruled out.

It is important to know the kind of perceptual changes which are present in order to treat the subject intelligently. Very often a proper explanation to the patient will weaken the emotional effects of the perceptual change and make life simpler for him.

THOUGHT

We will not attempt to list all the varieties of change in thought which occur in schizophrenia. They may all be classified into two main categories: change in thought process and change in thought content.

1. *Changes in Thought Process*

By process of thinking we refer to the act of putting thoughts into words in a logical manner. Ideas follow one another simply and logically, and are appropriate to the time and situation. Random and stray thoughts do occur, but they are under control and do not interfere with the normal flow of thinking. Memory for recent and remote events is adequate and the timing of one's thoughts are in tune with, and appropriate to, the group engaged in the conversation.

Any major change in brain function may disturb or disrupt this normal flow of thinking. The following changes in thinking have been found in schizophrenia:

(i) *There are no ideas whatever: the mind is blank.* This happens momentarily now and then to all of us. Repeated momentary blocks of this kind are called blocking. But when there are minutes or hours of blankness, it is highly pathological. One patient was mute. After many hours of trying to get him to talk, he blurted out that he could not talk, for his mind was blank. When he was given a book to read, he was able to read it aloud perfectly correctly. The words on the page were properly registered on his brain and properly reproduced as words, but he had no thoughts of his own to put into words.

(ii) *The process of thinking may be slowed down.* This is found more frequently in patients who are severely depressed, whether or not schizophrenia is present, and may be related to a slowing down of the sense of time passing. One schizophrenic patient spoke extremely slowly, and answered questions only after prolonged pauses. When her sense of time passing was speeded up by hypnotic suggestion, she was able to respond much more quickly and speak more rapidly for several weeks.

The oposite of this, a marked acceleration of thought and speech, is also found in schizophrenia although it is more typical of manic states. This may account for the increased brilliance of many young schizophrenic patients when their schizophrenia is just beginning.

(iii) *Thought processes may be so disturbed that one thought*

is followed by another which has no direct connection with it. Thoughts may jump about at random. Bizarre thoughts may intrude and interfere with normal thought.

(iv) *Memory and recall may become so disturbed that clear thinking becomes impossible.*

Patients have described some of these changes to Dr. Andrew McGhie and Dr. James Chapman as follows:

> Sometimes I can't concentrate because my brain is going too fast and at other times it is either going too slow or has stopped altogether. I don't mean that my mind becomes a blank, it just gets stuck in a rut when I am thinking over and over again about one thing. It's just as if there was a crack in the record.
>
> I may be thinking quite clearly and telling someone something and suddenly I get stuck. What happens is that I suddenly stick on a word or an idea in my head and I just can't move past it. It seems to fill my mind and there's no room for anything else. This might go on for a while and suddenly it's over. Afterwards I get a feeling that I have been thinking very deeply about whatever it was, but often I can't remember what it was that has filled my mind so completely.
>
> My trouble is that I've got too many thoughts. You might think about something, let's say ashtray and just think, oh! yes, that's for putting my cigarette in, but I would think of it and then I would think of a dozen different things connected with it at the same time.
>
> My mind's away. I have lost control. There are too many things coming into my head at once and I can't sort them out.

These are some of the changes that can occur in thought process. They are frequently found in schizophrenia. They are invariably present in well-established cases but they may not be present very early in the illness.

Because the patient cannot control ideas or thoughts, or perceive normally, his speech is disturbed, leading some professionals to believe there is a "schizophrenic language." There are some writers in the psychiatric literature who even give the impression that they know and can even hold conversations in a schizophrenic language. This is another myth.

Dr. Osmond and Dr. Sommer tested patients in the Weyburn Mental Hospital, Saskatchewan, with the Word Association Test which was originally used by Sir Francis Galton in 1879. The test is completely objective and can be given and scored by an untrained technician.

Dr. Osmond and Dr. Sommer became interested in this question while studying autobiographies of mental patients. When

they compared these to books by former prisoners, they found that they could hardly read some prison books without a glossary because of the special language of prisoners. But there was no special language among mental patients. They felt this could explain the lack of organized social activity among schizophrenics, and the fact that schizophrenic patients did not organize mutinies, riots or protests.

In their studies with patients they found that schizophrenics not only had less in common in word associations than non-schizophrenic patients and normals, but that they did not understand one another's speech better than anyone else did. In fact, they found that patients were intolerant of the delusional and incoherent speech of other patients, and only paid attention when their fellow patients talked more or less normally. Patients sometimes complained about "crazy talk" by other patients and even walked out of meetings and group therapy sessions if there was too much of it.

They found that though the speech of schizophrenics may appear bizarre to us, they were actually responding to information received through their senses. Thus, rather than having a language of their own, they associate with their own associations to the words given them. Furthermore, as additional proof, a schizophrenic's associations to the same word may vary.

This leads us to believe there is no schizophrenic language, but that the schizophrenic's disjointed, rambling and often incoherent speech is another symptom of the schizophrenic process which has broken every line of contact with the world.

These are some of the changes that can occur in thought process. They are very frequently found in schizophrenia. They are invariably present in well-established cases, but they may not be present early in the illness.

2. *Changes in Thought Content*

Everyone has wrong ideas. Superstitions, beliefs in certain "miracle" foods, prejudices against groups, extraordinary belief in one's own abilities are examples of commonly held wrong ideas.

We may go along quite contentedly with these ideas for most of our lives, particularly if most people in our society share them with us. When our wrong ideas conform to ideas generally accepted in the community, we are not sick even though other societies believe they are abnormal. For example, enormous numbers of men believe in racial superiority, while enormous numbers of

other men believe this is a delusion. Yet the individuals who share this widely held belief are normal in their own society.

But at some time or another we may have to ask ourselves, is this idea true? Does it make sense? Is it normal to think that way?

We can decide for ourselves whether our ideas are true or normal by testing them. We can search for supporting evidence. We can compare them with the consensus of ideas in the community. We may then find our ideas are indeed wrong or different, but that we cannot help believing them. In that case we have to decide whether we want to keep our ideas even though they are wrong, or whether we want to change them.

If our ideas interfere with our jobs, with our relationships with relatives and friends and with our general effectiveness in our community, then we must examine them closely and decide either to take the consequences or to reject the ideas.

Many schizophrenics at one time or another in the course of their illness also have wrong ideas, but these are more extreme and may fluctuate. They may believe that someone has poisoned them or that they are victims of some community plot. This of course is not so, yet they may develop a long line of logical reasoning to explain why they believe this is so.

When he is well, the schizophrenic is able to judge whether his observations are true or not. But when he is sick his judgment is impaired. This, together with the changes in perception which characterize his illness, can lead to an infinite number of bizarre and unusual changes in thought. Again we must remind the reader that thought can be considered abnormal only if it differs markedly from the culture one is in.

We do not mean the kind of culture which refers to art or literature, nor do we mean a "cultured" person who is well versed in these matters. By culture we mean the total number of factors which have molded or shaped the person in which he has grown and lived. Westerners grow up in a western culture of competition and judging status and prestige by wealth and accomplishment. North American Indians had varying cultures, where status meant different things in different tribes. Thus, a paranoid whose thoughts may be bizarre in our culture, is normal in a community where everyone else's ideas are also more or less paranoid.

It is relatively unimportant to know all the kinds of content changes which can occur in schizophrenia. There is hardly any idea which cannot be imagined and undoubtedly these have been found among schizophrenics. But if the ideas become extreme and unusually different from the thinking of people around them, they may be a symptom of schizophrenia.

MOOD

Again few changes are possible, but these may vary. One may be depressed, normal in mood, too happy or completely lacking in feeling, that is, flat or uninterested. The mood may not be consistent with the thought content expressed by the subject in his speech, and in this case may seem inappropriate to the observer.

Depression is the most common change in mood.

Everyone at times is depressed, especially when one is sick, or frustrated, or has failed in some endeavor. In fact, it is so common that most people are convinced every depression must be the result of some failure, some reverse or some clear physical disease like infectious hepatitis (jaundice).

It is very difficult to convince many patients that the depression is primary and may occur in the absence of a precipitating event. Nearly all patients and most psychiatrists search ceaselessly for a reason and this search, which is so often fruitless and degrading, is aided and abetted by careless professional probing.

Depression is often the earliest symptom of schizophrenia, just as it is the first symptom of many other illnesses. Whenever depression occurs in a young person where there is no physical illness or other clear reason for it, schizophrenia should be suspected.

The depression (sadness) may come on slowly, endure for several days or weeks, and then vanish until the next episode. The subjects are then hounded by inexplicable moods of despair and irritability. When this occurs, together with clear perceptual changes, the diagnosis can be made early.

But when depression occurs alone as the first symptom, the patient is not so fortunate. It is likely he will then be diagnosed as a depression or an anxiety neurosis for many years. The unfortunate schizophrenic will then fall into the group of depressions who within ten years are clearly schizophrenic, or in the group who respond to ECT (electric shock treatment) or to antidepressant drugs with a gratifying change of mood but, to the horror of their doctors, now appear schizophrenic.

Meanwhile, many valuable years have been lost during which the patient could have been given specific treatment and spared useless therapies.

The period of depression may be followed by a feeling of euphoria, when the patient feels much too happy when all circumstances are taken into account. But these periods of elation are few. The usual story is to have periods of depression followed by periods of normality. If the moods are too short and follow each other rapidly, especially in young people, schizophrenia is very likely the reason.

During the early stages of the illness the depression is always appropriate to the patient's circumstances. This, too, makes diagnosis difficult since many psychiatrists wait for the depression to become inappropriate before they will entertain the diagnosis of schizophrenia. But this delay is very dangerous, for the disease becomes well entrenched and chronic before the mood becomes inappropriate enough to satisfy the psychiatrist. No research has come to our attention which shows how long it takes for a schizophrenic's depression to become inappropriate, but it must be several years.

The most common inappropriateness is flatness, in which the patient feels neither depression nor happiness. He feels no emotion at all and is completely apathetic. This can be a disturbing symptom for subjects who once did feel appropriately, but if it occurs very early in life, and has been present many years, they get used to it and eventually find it quite tolerable. It is probably easier to endure than the severe tension and depression which precede it.

Upon recovering, however, the ability to feel emotion often returns, and this too can be disturbing to patients. Dr. Hoffer and Dr. Osmond have often seen this happen in patients who were receiving adequate treatment with nicotinic acid. It is a mistake in this case to assume that the occurrence of anxiety and tension indicates the disease has recurred. It is on the contrary a heartening sign. The patient's tension can be easily controlled with anti-tension compounds or barbiturates, which can be slowly withdrawn usually after a month or so.

The flatness of moods is puzzling. It is very characteristic of schizophrenia but there are no adequate explanations for it. It is possible it is responsible for the inappropriateness of mood for, if a person can feel no mood, in time he will lose the ability to judge what his mood should be. Many schizophrenics compensate intellectually for their inability to feel emotions by observing others in a social and group situation, and role-playing the appropriate mood. If the others are sad or gay, they feel they must also be sad or gay and act accordingly. This is very hard on them and may lead them to avoid group situations.

One beneficial effect of this flatness of mood is that it probably keeps many schizophrenics from killing themselves. It is well known that many severely depressed people do kill themselves but it is not generally known that schizophrenics also have a very high suicide rate and it might even be higher if they did not have some flatness of mood.

Research in Saskatchewan and elsewhere shows that out of any group of schizophrenics, about 0.2 percent will kill themselves each year. If one started with one thousand fresh cases of schizophrenia, one would expect that two will die each year from suicide,

whether they have or have not received psychiatric treatment. The only exception we know of is the treatment program which includes nicotinic acid. Out of over three hundred schizophrenic patients treated adequately with nicotinic acid, who have been followed up in Saskatchewan for nearly ten years, there have been no suicides.

With the flatness of mood, therefore, it appears as if the disease itself acts as a poor tranquilizer. This will be discussed in a subsequent chapter. The only hallucinogens (drugs capable of producing hallucinations as in schizophrenia) which reproduce this peculiar mood flatness are adrenochrome and adrenolutin. These are two compounds formed from the hormone adrenalin which are probably present in the body, and which we think are somehow responsible for the disease process called schizophrenia. This hypothesis will also be discussed in the next chapter.

ACTIVITY

It should not be surprising that changes in perception, thought and mood should lead to changes in behavior. We will not describe these for they lead directly from the other changes. If a person feels he is being spied upon, it seems only natural he should take some action, either defensive or offensive.

We wish only to discuss briefly the common belief that schizophrenics are dangerous. They are, indeed, somewhat more dangerous to themselves than they would be if they were not schizophrenic, but they are not more dangerous to other people.

The risk of homicide among schizophrenics is no greater than it is for non-schizophrenics. Nevertheless, this belief is so well engrained it has until recently been an article of faith for mental hospital architects, society and even for nursing staff. This is one reason mental hospitals have been built like fortresses and jails. The best evidence that this is false is the fact that one or two rather small female nurses can herd as many as forty to sixty or more chronic schizophrenics.

There are, of course, isolated incidents of homicide. These result from certain delusions, especially when the hospital staff does not treat the patient appropriately. It is a general rule that a violent aggressive patient is a sign of poor psychiatric treatment. Most modern mental hospitals have done away with physical restraints, cuffs, guards, etc., with great success.

The behavior of schizophrenic patients is predictable when one takes the trouble to find out not only what they think, but what they perceive.

"What Is Schizophrenia" is a chapter in a book to be published in the Spring of 1966 by University Books Inc., New Hyde Park, New York 11041.

BOOK REVIEWS

SHAMANISM: ARCHAIC TECHNIQUES OF ECSTASY.

By Mircea Eliade. Translated by Willard R. Trask. Bollingen Foundation, distributed by Pantheon Books, 1964, 610 pages.

"What a magnificent book remains to be written on the ecstatic 'sources' of epic and lyric poetry, on the prehistory of dramatic spectacles, and, in general, on the fabulous worlds discovered, explored and described by the ancient shamans . . ." So ends the epilogue of this book. Meanwhile: what a magnificent book Prof. Mircea Eliade *has written!* It is addressed not only to the specialist but to the general reader:

"We have sought to present it [shamanism] in its various historical and cultural aspects and we have even tried to outline a brief history of the development of shamanism in Central and North Asia. But what we consider of greater importance is presenting the shamanic phenomenon itself, analyzing its ideology, discussing its techniques, its symbolism, its mythologies. We believe that such a study can be of interest not only to the specialist but also to the cultivated man, and it is to the latter that this book is primarily addressed . . . When it becomes a matter of entering so vast and varied a mental universe as that of shamanism . . . we are dealing with a whole spiritual world, which, though different from our own, is neither less consistent nor less interesting. We make bold to believe that a knowledge of it is a necessity for every true humanist; for it has been some time since humanism has ceased to be identified with the spiritual tradition of the West, great and fertile though that is" (pp. xix-xx).

And yet, after having read this monumental work, I am not fully persuaded that the shaministic tradition is so totally alien to "the spiritual tradition of the West." Certainly Prof. Eliade is very careful to halt the discussion in certain places, and to suggest that here we enter quite a different realm from shamanism, perhaps that of religion in the official sense in which it is supposed to be understood in the West. But the break seems as formal, conventional and perfunctory as the occasional use of the word "tricks" or the prefix "pseudo" in connection with shamanistic feats that might be called "paranormal." On the whole, Prof. Eliade sidetracks any discussion of this topic, saying he is not concerned with the "reality" of such occurrences, only belief in them and the role they play. He uses something of the technique of the more sophisticated Jungians, concerning himself only with "mental" or "psychic" reality and leaving the cosmological interpretations to others.

Prof. Eliade also bypasses the question of the nature of the spirits. "All through the primitive and modern worlds we find individuals who profess to maintain relationships with 'spirits,' whether they are 'possessed' by them or control them. Several volumes would be needed for an adequate study of the problems that arise in connection with the mere idea of 'spirits' . . . But the study of shamanism does not require going into all this; we need only define the shaman's relation to his helping spirits . . ." (p. 6). Perhaps; perhaps not; perhaps "several volumes" would

hardly meet the case. But it is certainly a possible approach to write as if shamans were in touch with spirits, while disclaiming all ontological pretensions.

However, there are two central and crucial related points on which Prof. Eliade makes a definitive and unambiguous stand: he regards the shaman as the recipient of some valid, and valuable, cosmic revelation; and he does not consider him as being, in his capacity as shaman, a sufferer from some form of mental disease. "Psychopaths or not, the future shamans are expected to pass through certain initiatory ordeals and to receive an education that is sometimes highly complex. It is only this two-fold initiation—ecstatic and didactic—that transforms the candidate from a possible neurotic into a shaman recognized by a particular society" (p. 14). There can be "no question of anarchical hallucinations and a purely individual plot and dramatis personæ; the hallucinations and the mis-en-scène follow traditional models that are perfectly consistent and possess an amazingly rich theoretical content" (p. 14).

Prof. Eliade argues at length that, whereas the mental patient is an "unsuccessful mystic" (p. 27), the shaman is a highly successful and efficient member of his community: he is one who is not controlled by his illness but can control it; generally his presence is imposing, his health and versatility excellent, his intelligence higher than that of his milieu.

The problem of distinguishing between the phenomena of mysticism and those of psychopathology is one that faces any serious writer on the topic; and the author primarily concerned with the mystic is apt to dwell on the crucial *differences* between the shaman or the mystic on the one hand, and the insane or neurotic patient on the other. Thus, Dr. R. M. Bucke, who was a celebrated psychiatrist in his day, Medical Superintendant of an asylum for the insane, Professor of Mental and Nervous Diseases, President of the Psychological Section of the British Medical Association, and President of the American Medico-Psychological Association, emphasized in his *Cosmic Consciousness* (1901) how great was the gulf dividing a mental patient from a recipient of a great mystical experience. Again, Dr. Gerda Walther in the Preface to the second (1955) edition of her important *Phänomenologie der Mystik* describes how she took special pains to make actual observations on mental patients, so as to get first-hand experience enabling her to test the conventional assumption that the mystical is closely linked, if not identical, with the insane: and she, too, stresses that the differences are more important than the resemblances.

It may well turn out that when one is concerned with psychopathology, the similarities and the points of contact are the most important; after all, if Prof. Eliade is right, and the insane person is a mystic *manqué,* then a study of mysticism is highly germane to an understanding of mental illness; but when concerned with shamanism and mysticism the differences between the mystic and the psychopath have to be stressed, if a totally false picture is not to emerge.

Another very important point in a study of this field was made by the late Dr. R. R. Marrett, Rector of Exeter College and Reader in Anthropology at Oxford, in his Preface to Dr. W. Y. Evans-Wentz's "Tibetan Yoga and Secret Doctrines": "Now there is a certain point at which most of us, however dispassionately scientific in intention, are apt to refuse to take the other man seriously when he talks what seems to us to be nonsense. Thus disparaging terms, such as 'primitive credulity,' 'confusion of categories,' 'prelogical mentality'

and so on, come to invade accounts of the unsophisticated mind that to a corresponding extent are falsified; because science has no business to say 'wrong' when it merely means 'different.' Likewise, in dealing with the beliefs of our own peasantry we may hardly be aware of the implication of relative worthlessness attaching to our use of such a word as 'survival'; though its Latin equivalent *superstitio* might warn us of the danger" (p. xxii, 1958 edition). This pitfall is, on the whole, avoided by Prof. Eliade—although he does make the customary propitiatory offerings to the official Western *lares and penates*. But the bulk of the writing testifies not only to his care and erudition, but also to his respect and sensitive sympathy for the alien cultures he is presenting. He writes with the same *finesse* (in Pascal's sense) as did the late Heinrich Zimmer, and as Joseph Campbell does, with both of whose writing there could be a certain affinity.

What distinguishes the shaman from other "technicians of the sacred" (p. 297) such as priests and sorcerers, and from other mortals who are often believed to hold high positions in the world of spirits, such as heroes and kings, is his initiation into the realm of ecstacy; "A first definition . . . will be: shamanism = *technique of ecstacy*" (p. 4). In general, shamans have nothing to do with sacrifices, nor with regular worship, their principal function being that of "psychopomps"—a word never defined. They are experts and guides in the realm of cosmic dreams.

They perform the functions of spiritual healers, exorcists, intermediaries between the living and the dead, often also summoning the souls of the living. They guide the souls of the departed to the realms where they belong, and above all, the shaman is a mediator between "cosmic regions." "The shaman knows the mystery of the breakthrough in plane" (p. 259), this communication being possible and essential in the cosmology accepted by peoples with shamanic cults.

"The universe in general is conceived as having three levels—sky, earth, underworld—connected by a central axis . . . This axis [cosmic pole, tree, etc.] passes through an 'opening' or a 'hole'; it is through this hole that the gods descend to earth and the dead to the subterranean regions; it is through the same hole that the soul of the shaman in ecstasy can fly up or down in the course of his celestial or infernal journey.

". . . The symbolism of the 'Center' is not necessarily a cosmological idea. In the beginning, 'center' or site of a possible breakthrough in plane, was applied to any sacred space, that is, any space that had been the scene of a hierophany and so manifested realities (or forces, figures, etc.) that were not of our world, that came from elsewhere and primarily from the sky . . . Later it was supposed that manifestation of the sacred itself implied a breakthrough in plane" (pp. 259-60). Prof. Eliade's use of the words "not necessarily a cosmological idea" in this connection is instructive.

The tree symbolism is of great, virtually universal, importance as connecting the shaman with the "higher" and "lower" worlds, mediating his ascensions and descents. The idea of an original paradisal state also is almost universal: once upon a time all men were able to communicate with the world of gods and spirits; but some calamitous event, perhaps a sin or fall, debarred the bulk of mankind from these realms. But the shaman can live in both worlds, linking his fellow mortals with the sacred cosmic dreams of their society.

Other widespread cosmic dream figures are the bird, symbol of the divine messenger and of the liber-

ated soul, the horse, often eight-legged, who carries the subtle body of the shaman to its celestial trysting place, and the dog who defends the nether regions against intrusion.

Prof. Eliade lays great stress on the vocational element of shamanism. Even where shamanism is hereditary, a call from the spirit world is also necessary. There are isolated cases of shamans who became such because of a personal decision, but these are generally considered less powerful. The call from the spirit world is frequently highly unwelcome: the calling of a shaman, though a spiritually privileged person, is arduous, dedicated and often lonely; and the initiation ordeal, whether inflicted by the spirits or the tribe, is invariably painful in the extreme: it effects a sort of supernatural selection. Madness and even death may be the result if the shaman cannot endure his initiatory tribulations; but madness followed by death may also be the result of the refusal of a shamanic vocation. ". . . in primitive man as in all human beings the desire to enter into contact with the sacred is counteracted by the fear of being obliged to renounce the simple human condition and become more or less pliant instruments for some manifestation of the sacred (gods, spirits, ancestors etc.)" (p. 23).

Frequently there is a "hysterical crisis" at the onset of a shamanistic career, often followed by a period of roaming the wilds, and animal-like vocalization and behavior generally. This would appear to serve the function of divesting the future shaman of the social conventions of his tribe, though other elements enter, such as the symbolism of the sacred animal ancestor. Often also the future shaman "becomes absent-minded and dreamy, loves solitude, and has prophetic visions and sometimes seizures that make him unconscious" (p. 19). Thus, morbid phenomena accompany the onset of the shamanic vocation, but these have to be mastered and controlled, and a period of training, usually by other shamans, precedes full initiation. The symbolism and the experience of mystical death and rebirth, of ascent into higher, and descent into lower, worlds as parts of essential shamanic experience are universal.

There is a particularly interesting brief section on "Contemplating One's Own Skeleton" (p. 62), an exercise which seems widespread among shamans. It ends: "Everywhere, we find the will to transcend the profane, individual condition and to attain a transtemporal perspective . . . a certain recovery of the very source of spiritual existence, which is at once 'truth' and 'life'" (p. 64).

The idea that the magician can leave his body at will is "a strictly shamanic notion" (p. 415). One of the features of the shamanistic on which Prof. Eliade lays considerable stress is the achievement of "inner heat" which "forms an integral part of the technique of 'primitive' magicians and shamans: everywhere in the world acquisition of 'inner heat' is expressed by a 'mastery over fire' and, in the last analysis, by the abrogation of physical laws—which is as much as to say that the duly 'heated' magician can perform 'miracles,' can create new conditions of existence in the cosmos, in some measure repeats the cosmogony" (p. 412). Numerous examples of fire-walking, fire-handling and fire-swallowing are given. "A similar rite consists in walking on a 'bridge of swords.' It is believed that the spiritual preparation before the ceremony makes it possible to walk on swords and fire unharmed. In this case, as in innumerable examples of mediumship, spiritism or other oracular techniques, we encounter an endemic phenomenon of spontaneous

pseudo-shamanism, which is difficult to classify but whose most important characteristic is *easiness* (p. 456).

Another power universally attributed to shamans is that of being able to fly (p. 477), and Prof. Eliade associates the bird symbolism, that so often features on the shaman's costume, with the ubiquitous reports of levitations in connection with shamans, mystics, mediums, yogins, fakirs, alchemists and saints. "Magical flight is the expression both of the soul's autonomy and of ecstasy . . . This myth of the soul contains in embryo a whole metaphysics of man's spiritual autonomy and freedom; it is here that we must seek the point of departure for the earliest speculations concerning voluntary abandonment of the body, the omnipotence of intelligence, the immortality of the human soul . . . The point of primary importance here is that the mythology and the rites of magical flight peculiar to shamans and sorcerers confirm and proclaim their transcendence in respect of the human condition" (p. 480).

There are several important references in connection with levitation, in particular Olivier Leroy's *La Lévitation*, Paris, 1928, whose outstanding example is St. Joseph of Cupertino. A less well-known example is that of Sister Mary of Jesus Crucified, an Arabian Carmelite nun, who "rose high into the air, to the tops of the trees . . . 'but she began by raising herself with the help of some branches and never floated free in space'" (p. 482). In this respect her experience parallels that of a yogi photographed by an informant of ours in front of his own house in India: the yogi put a cloth-covered stick on the ground, put his hand on it, and was then seen to rise into the air, his feet leaving the ground until he was floating in the horizontal position in which he was photographed. He explained that he required the stick to steady himself, so as not to float away. (The photograph and details were published in "Psychic News," August 1957, p. 1).

If clairvoyance and prophecy are added to this catalogue of shamanistic activities, it will be amply clear how very close is the parallel between shamans and mediums, though by and large the role of the shaman is more active: he creates songs, language, poetry, dances, music, mythology, claims which could be made by but few mediums.

Prof. Eliade bypasses the great similarity with mediumistic and occultistic activities by repeated assertions that shamans, unlike mediums, converse with the spirits but are generally not possessed by them. I decline to believe that a writer as phenomenally well-read as Eliade does not know that mediumistic experience, just like shamanistic experience, ranges from converse with "spirits" to possession by and identification with them. In any case, he quotes Findeisen as an authority (12 entries) and he also refers to T. K. Oesterreich's book, *Possession*, though the references to the latter are very inadequate, not to say slippery.

Again, there is a statement that "Recent researches have brought out the shamanic element in the religion of the paleolithic hunters. Horst Kirchner [in 1952] has interpreted the celebrated relief at Lascaux as a representation of a shamanic trance . . ." (p. 503), and then there follow important and interesting supporting references, among them one to Findeisen's *Schamanentum*. And there is not one word in this connection about Dr. Margaret Murray, the only reference to whose "God of the Witches" (1934) is in a note, *en passant*, in connection with "helping spirits in European medieval sorcery" (p. 92). This is the only reference in the book to Margaret Murray: there is not even, and this is unpardonable,

a reference to her *The Witch-Cult in Western Europe* published in 1921. It was, of course, Dr. Murray's great and central contention that the witch cult in Europe was the continuation of the religion of the paleolithic hunters, a ubiquitous cult driven underground by Christianity, and persecuted nearly, if not quite, to extinction.

As soon as shamanism gets too near home, in time or space, whether in the form of mediums or witches, discretion becomes the better form of valor: there are special inquisitors, witch-hunters, witch-finders and their modern counterparts, privileged to deal with such matters, and woe betide the trespasser who crosses the sacred barrier! There are two references to Sir Wallis Budge (p. 487, 488) in connection with ascending to heaven by ladders, but no mention of Budge's crucial contention that the complex, highly sophisticated ancient Egyptian religion had its origin in the shamanism of the local tribes, closely resembling modern Sudanese beliefs: the Egyptian priests of Ra achieved the semblance of theological unity by the supposition that all the local deities were only facets or aspects of Ra (see *Osiris, the Egyptian Religion of Resurrection*, 1911), much as the mediæval Church used to convert local gods into saints (or devils).

Prof. Eliade (p. 435) draws attention to the great similarity between certain characteristics of Central and North Asian shamanism and Tibetan Lamaistic practices, and indeed a study of some of the relevant works certainly strongly suggests that the Lamaistic Buddhistic religion, too, was derived originally from local shamanistic beliefs and practices. This seems particularly clear from a study of Evans-Wentz's *Tibetan Yoga and Secret Doctrines;* see for example "The doctrine of the psychic heat" (pp. 172-209, 2nd edition, 1958).

It seems quite possible now to suggest the thesis that quite generally the great religious systems have local shamanistic roots, and that one cult gradually supplants and swallows the rest on becoming the state religion of some much larger unit than the tribe, such as an empire or a kingdom. So long—and only so long—as a religion can keep alive an element of the genuinely shamanistic, so long as it can put its members in touch with the world of cosmic dreams and produce enough cosmic dreamers, the religion lives. If and when it ceases to be able to provide, or allow, what Prof. Eliade calls "the breakthrough in plane"—it ossifies.

The last 300 years have faced mankind with something quite new: with a secular cosmology which precludes any expression of religious experience, all cosmic dreaming, in terms of the officially accepted picture of the universe, at least without duplicity or subterfuge. This is a very unstable and a very dangerous state of affairs, and so long as it prevails "breakthrough in plane" is and remains either a hollow fiction or an unmentionable and perhaps even unthinkable experience.

Prof. Eliade has written a superb, informative and important book which (in full acordance with the discreet promise of the first word of the subtitle) at no point offends against the unwritten but iron-hard rules of anthropological convention. This inevitably entails certain limitations, certain unresolved half-contradictions, and the use of some words and phrases that deflect. The "cultivated general reader" to whom the book is ostensibly addressed will be kept on his toes trying not to lose the thread between anthropological technicalities and conventional niceties. A key paragraph occurs at the end of Chapter 13, "Parallel myths, symbols, rites," in which he discusses "aberrant shamanic practices," a topic introduced somewhat abrupt-

ly and ambiguously: ". . . we refer especially to rudimentary and mechanical means of obtaining trance (narcotics, dancing to the point of exhaustion, 'possession,' etc.)" (p. 493). This paragraph, the last one before the last chapter, "Conclusions," ends as follows:—

"We may ask, for example, if the aberrant aspect of the shamanic trance is not due to the fact that the shaman seeks to experience *in concreto* a symbolism and mythology that, by their very nature, are not susceptible of being 'realized' on the 'concrete' plane; if, in short, the desire to obtain, at any cost and by any means, an ascent *in concreto*, a mystical and at the same time *real* journey into heaven, did not result in the aberrant trances that we have seen [but these have, in point of fact, not been described at all, and the reader is bound to infer that he means all trances]; if, finally, these types of behavior are not the inevitable consequence of an intensive desire to 'live,' that is, to 'experience' on the plane of the body, what in the present condition of humanity is no longer accessible except on the plane of 'spirit.' But we prefer to leave this problem open; in any case, it is one that reaches beyond the bounds of the history of religions, and enters the domain of philosophy and theology" (p. 494).

Nothing, after all, must be changed. In the last resort, by means of a few inverted commas and italics, an ambiguity and a final hiatus, he relegates shamanic experiences to the realm of the unreal and delivers it, perhaps to its doom, into the competence of the philosopher and the theologian. Of course, if Prof. Eliade did not do this he would not be an accredited authority, since one cannot break the conventions *and* be an authority.

ANITA KOHSEN

[Reprinted from *Cosmos*]

PHANTASTICA, NARCOTIC AND STIMULATING DRUGS By Louis Lewin. New York: E.P. Dutton and Co. Inc., 1964. Pp. xvii + 335. $5.95. This English edition was first published in 1931 as a translation of the second German edition. The first German edition was published in 1924. The book was written for the general reader. It is an introduction to the lore of mood-affecting drugs. It does not deal with pharmacology, chemistry or psychology, and does not describe medical applications or laboratory experimentation.

The author, a physician, was a pharmacology professor at the University of Berlin during the decades around the turn of the century. Prof. Lewin made prolific contributions to the scientific literature of the pharmacology of natural products. He published monographs on peyotyl, kava-kava, and *Banisteria caapi*. His biography is outlined in a preface by Prof. Bo Holmstedt. This book does not quote sources, but references to the material described may be found in the author's textbook *Gifte und Vergiftungen*. Historical and anthropological accounts, and some personal observations, make up most of the book. Here and there the author makes predictions or states attitudes that stand up well in the light of present knowledge. He suggested the use of drugs that induce temporary mental derangement for the study of similar derangements arising from insanity. He believed that the discovery of such drugs by primitive peoples marked the beginning of scientific observation. He saw the resemblance of some drug effects to influences reported from the spiritual life. With regard to psychedelics, he stressed the primary role of personal predisposition toward the experience. He observed that most pharmacologically active substances have some effect on the

nervous system, what we would call behavioral toxicity.

The author divided mood-affecting drugs into five classes according to their gross mental effects: euphorica, inebrientia, hypnotica, exitantia, and phantastica. By phantastica, the author meant drugs giving rise to sensory illusion, not necessarily hallucinations. The term includes psychedelics.

About one-sixth of the book is about phantastica. Lewin held the view that internal visions were true subjective happenings, and experiences of inward perception. He quotes from the prophet Ezekiel, and mentions several mystics. He described phantastica as thaumaturgic substances, and reports the use of many different psychedelic plants by various isolated or primitive cultures for eliciting religious experiences.

The similarity of some drug hallucinations to those produced in fever was noted, and the author conjectured that even without external influences, the body might produce toxins that give rise to physical or mental disorder, or what we call psychosomatic effects.

The author did considerable pharmacological research on peyotyl alkaloids. *Anhalonium lewinii* was named in his honor. In discussing peyotyl, he quotes Sahagun, a contemporary of Cortez, regarding the nanacatl mushroom, and ololiuhqui, but he did not investigate them.

Sensory illusions and hallucinations are described in detail. There is extensive quotation from Beringer, a physician, who reported the subjective effects of mescaline in 1922. Lewin emphasized the unique relation of the drug experience to the individuality of the subject. He predicted that peyotl alkaloids would be used in research on brain physiology, psychology, and psychiatry, and that chemistry would play a leading role in this field. He predicted a rich harvest of scientific results from human experimentation, but warned that subjects would bias their reports by suggestion or by the desire to sound interesting.

He recorded the history of *Cannabis* usage in the Near East, Africa, and India. He described in detail the mild symptoms of hemp smoking, as well as some of the temporary psychoses and apparent addictions that occur among some users. He does not point out the obvious fact that the social environment of the hashish consumer gives the form to experiences.

The use of *Amanita muscaria* by Siberian natives is described. Superficially resembling mescaline, it differs in that violent excitation occurs, frequently leading to a temporary raving madness. He unkindly attributes mental inferiority and low intellectual standards to these adventurous tribesmen.

A number of plants of the family Solanaceae are described, including henbane, belladonna, and various *Datura* species. He assigned an important role to these drugs in demonology and witchcraft, suggesting that the terrifying and distressing hallucinations induced by these drugs may have been used often for criminal or political activities. Among primitive tribes, these drugs were used for ordeals and for working up excitement before battle.

The use of *Banisteria caapi* among the natives of the upper Amazon region is related. A strong resemblance to mescaline is noted, except for the vertigo and vomiting. Lewin reports one case of a man who experienced hallucinations from tincture of *Gelsemium sempervirens,* leading to addiction, insanity and death. Various plants are mentioned which are addicting to range animals, generally called loco weeds. He gives no evidence of hallucinations other than the intoxicated behavior of the animals. The fact that they are addicting is evidence against their classification as phantastica. The European

broom, *Saromanthus scoparius,* is reported to be addicting to sheep. Perhaps this relates to the rumor that Scotch broom, a common decorative shrub in the United States, may contain a mood-altering substance.

The few scientific observations and generalizations presented in the book are not contradicted by present knowledge, and it is a pleasure to read a book of this sort where the author is not trying to justify a pet theory. On the one hand, he seems to agree that Vital Energy existed as a distinct physical force, but on the other hand in explaining drug action he neatly summarized the idea of enzyme inhibition. To the present day reader, much of the book is obsolete. Many old drugs are no longer used, and very many new mood-affecting drugs are now known. Most of the substances mentioned by Lewin as crude plant preparations have now been isolated, identified, and synthesized. For the present day reader to form a fair judgment about psychedelic drug usage, a minimum amount of pharmacology, chemistry and psychology must be known, and none of this is to be found in Lewin's book. The absence of any reference to the contemporary psychological literature available when the book was written is a serious omission. No mention, for instance, is made of the introduction and withdrawal of cocaine from psychotherapy by Sigmund Freud. Not even the work of Lewin's contemporary researchers in pharmacology are mentioned. The technical obsolescence of this book would be more apparent if it considered a less esoteric topic—for example, if it were on nutrition.

The book was probably reprinted because of the present notoriety of mood-altering drugs, particularly LSD, as presented in the public press. Lewin himself stated that many persons had been led to addiction by reading popular accounts of drug research. The person with a vague wish to "turn on" would find very little encouragement in this book. The general impression implied is that drug experiences are dangerous and unpleasant, and indulged by savages and the mentally deranged.

Most knowledge of the mental dimensions of drug effects was reported long after this book was written. Also, the social context of drug experience and addiction has changed significantly. Far better introductions exist for the modern reader, many in less expensive paperback editions. There is very little in Lewin's book to prepare the reader for the "higher religion" of psychedelic experience that has burst upon us in the last decade.

ROBERT J. DUMMEL

THE STRUCTURE OF SCIENTIFIC REVOLUTIONS

By Thomas S. Kuhn. Chicago: Phoenix Books, University of Chicago Press, 1963. Pp. 172. $1.50.

An apparently arbitrary element compounded of personal and historical accident is always a formative ingredient of the beliefs espoused by a given scientific community at a given time. Normal science, the activity in which most scientists inevitably spend almost all their time, is predicated on the assumption that the scientific community knows what the world is like. Much of the success of the enterprise derives from the community's willingness to defend that assumption. Normal science, for example, often suppresses fundamental novelties. Nevertheless, so long as those commitments reflect an element of the arbitrary, the very nature of normal research ensures that novelty shall not be suppressed for very long. . . . When the profession can no longer evade anomalies that subvert the existing tradition of scientific practice—then begin the extraordinary investigations that

lead the profession at last to a new set of commitments, a new basis for the practice of science. Their assimilation requires the reconstruction of prior theory and the re-evaluation of prior fact, an intrinsically revolutionary process that is seldom completed by a single man and never overnight.

However, in the early stages of a science (e.g., psychology?) there are no such stable foundations . . . and different men confronting the same range of phenomena, but not usually all the same particular phenomena, describe and interpret them in different ways.

The characteristics of all discoveries from which new sorts of phenomena emerge include: the previous awareness of anomaly, the gradual and simultaneous emergence of both observational and conceptual recognition, and the consequent changes of categories and procedures often accompanied by resistance. Here (P. 63) a perceptual experiment is cited in which Bruner and Postman asked subjects to identify on short and controlled exposure a series of playing cards. Many of the cards were normal, but some were made anomalous, e.g., a red six of spades and a black four of hearts. The results showed that in certain subjects there was an intense resistance to the perception of the unconventional, accompanied sometimes by acute personal distress.

In science, as in the playing card experiment, novelty emerges only with difficulty, manifested by resistance, against a background provided by expectation. Initially, only the anticipated and usual are experienced even under circumstances where anomaly is later to be observed. The author then goes on to show why "normal science," a pursuit not directed to novelties and tending at first to suppress them, should nevertheless be so effective in causing them to arise.

Drawing his data from history, philosophy, and psychology, Kuhn argues that "normal science" presupposes a conceptual and instrumental framework or paradigm accepted by an entire scientific community; that the resulting mode of scientific practice inevitably evokes "crises" which cannot be resolved within this framework; and that science returns to normal only when the community accepts a new conceptual structure which can again govern its search for novel facts and for more refined theories.

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CORRESPONDENCE

Setember 30, 1965

DEAR SIR:

In Psychedelic Review, Number 6, 1965, Laing would remove from the schizophrenic the comfort which most normal people have in the thought that their psychedelic reaction is drug-induced and will terminate in a matter of hours. Few people who have experienced either the psychotomimetic or the psychedelic experience (except perhaps Laing) can convincingly delude themselves that these reactions can be reached at will as easily and predictably by contemplation of problems as by inhibition of certain molecules.

Laing's thesis is neither new, nor good, in the sense that Patterson has defined goodness as an attempt to better what is right. Laing's thesis is merely right if one belongs to that slowly diminishing, but articulate group, who in the face of overwhelming evidence cling to the Freudian belief that schizophrenia is not a disease ("The schizophrenic may, indeed, be mad. He is mad. He is not ill."), that no "organic lesion has so far been found," and that "madness of our patients is an artifact of the destruction wreaked on them by us and by them on themselves."

Laing has merely restated the

current obsessional thinking of the North American psychiatric establishment which has led to a remarkable series of follies of which family therapy is a recent example.

Laing uses the models popularly known to scientists of the mid 19th century but which have been improved within our lifetime. Thus he uses the term "organic basis" as it was used then. An organic lesion is usually a tumor, a break in the circulation, or something like that, and in this sense there is little evidence that schizophrenia is an organic disease. But there are a large number of molecular diseases where there are no "organic" lesions. No changes are seen in the microscope or on gross examination of the body's organs. The current model of molecular diseases cannot properly be lumped with organic models of illnesses unless one takes advantage of the wonderful flexibility of the English language and uses the word 'organic' in the sense chemists use it when they discuss organic chemicals, i.e. chemicals containing bound carbon.

In any event Laing seems remarkably naive and ignorant of molecular and genetic advancements of the past two decades. Recently in Oslo, Norway, at a meeting on the molecular basis of some mental diseases (schizophrenia, primarily) sponsored by NATO, there was a remarkable consensus that the molecular basis of schizophrenia was firmly established. The specific details of the biochemical pathology still must be spelled out but no scientist prepared to listen to evidence can continue to insist schizophrenia is not a molecular disease. This is not incompatible with our view; it is also psychological, sociological and even theological. For like the psychedelic reaction the molecular abnormality in schizophrenia merely sets off the train of events which are perceived and reacted to by a person in terms of his own life's programming. This concept cannot be strange to readers of this Review, who have themselves seen their own inner and outer world altered by a reaction triggered by a chemical. The same factors which lead to a psychotomimetic reaction in normal people probably lead to the psychosis features of schizophrenia, while the same variables which direct the psychedelic reaction may occasionally lead to the psychedelic reactions which were the basis of Christianity, of Alcoholics Anonymous, of Synanon, and of Schizophrenics Anonymous.

Society will not permit Laing to act the way he writes. For if the schizophrenic is not sick, he is indeed mad, and madness may take only two forms, (a) the madness of the devil and (b) the madness of the saint. The devils in our society are barely tolerated most of the time. Even our saints are often difficult to live with. If schizophrenia is madness, then Laing is incompetent to deal with it for he is not qualified by experience and training to deal with madness. Neither, as a psychiatrist, am I. If schizophrenia is madness, society will deal with it as it did during the days of the Inquisition when devils were driven from the mad in order to save their souls by methods which were generally approved of for many years. If schizophrenia is madness, Laing must give up his medical degrees since they are no longer of any value to him, and society has given him no special right (or responsibility) for dealing with madness and it had better be left with counsellors of the mad, ministers, rabbis and such like, who are much more conversant with saints or devils than are psychoanalysts.

Laing would take from the schizophrenic his right to be sick and remove from him all the goodness in society which is mobilized to help the sick become well.

A. Hoffer, Ph.D., M.D.

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