

MESCAL VISIONS AND EIDETIC VISION

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It has been stated¹ that the discovery of the eidetic disposition ranks first among "the true advances of psychology in the last decade." Unfortunately, the investigator of eidetic phenomena who is not eidetically gifted is unable to observe the behavior of *Anschauungsbilder* for himself. Consequently the interpretation of certain statements repeated again and again by his eidetic subjects involves some difficulties. Now, according to W. Jaensch (13) *Anhalonium Lewinii* provides the possibility "bei Nichteidetikern Anschauungsbilder . . . zu erzeugen." So the writer took mescal buttons (peyote)—kindly provided by Professor S. W. Fernberger—with the object of producing experimentally phenomena that are, or are comparable to, eidetic images. The question was whether some of the characteristics of eidetic images as determined by experimental work in and outside of Marburg can also be found in mescal vision.² In the following account attention is paid both to the similarities and to some striking differences between mescal vision and eidetic vision. At the same time observations not bearing directly on eidetic problems will be discussed.

For purposes of investigation peyote has been used quite frequently. The peyote cult of many Indian tribes (see bibliography) gave impetus to a number of researches upon the physiological effects of the drug. Psychologists were, aside from obtaining descriptions of mescal visions, interested in sensorimotor changes, in the influence upon higher thought processes, and in changes of personality. Very infrequently, however, mescal experiments have been considered as means to elucidate more general questions of the psychology and pathology of perception. Here Knauer and Maloney (16) must be mentioned for their attempt to throw light upon "the mechanism of visual hallucinations" by means of experiments of this kind.

The following experiment was conducted in the Psychological Laboratory of the University of Minnesota on Oct. 18, 1925. I wish to express my thanks to Mr. C. Jacobsen for his help in experimenting and in taking down my observations. Practically the whole time between 11 a. m., (Oct. 18), and 2:30 a. m., Oct. 19, was spent in one of the rooms of the Psychological

¹O. Klemm, *Arch. f. d. ges. Psychol.*, 47, 1924, 223.

²Compare especially: Jaensch, E. R. (12). See also: (15).

Laboratory. After that I went home and slept restfully from about 3 a. m. to 11 a. m., Oct. 19. (As to dreams during this time, I recall only the fact that I was discussing a rather abstract philosophical problem with somebody.) The buttons were not chewed and swallowed in the Indian fashion, but 43 grm. were ground to powder. At 11 a. m. I put 13 grm. of this powder in a glass of water and drank it. Even taken in this way it was very nauseating. At 11:40 a second dose of 10 grm. was taken. I placed portions of teaspoon size on my tongue and washed them down with water. After this second dose I felt rather 'seasick.' At 12:20 I vomited. Soon hereafter the visions began. Aside from a slight frontal headache, dryness in the mouth and an occasional pressure in the stomach, I did not experience any bodily discomfort throughout the rest of the day. Since I was afraid that the 23 grm. of the first two doses would not be effective enough because of the vomiting, I thought of taking a third and even a fourth dose; but because this idea invariably caused nausea I limited myself to the previously described doses.

DESCRIPTION OF MESCAL VISIONS

The resulting phenomena were observed with closed eyes (blinders) unless special mention is made of the fact that the eyes were open. It may be remarked that I myself am neither *Eidetiker* nor do I possess vivid and complete optical memory-images of objects.

Concerning the visions obtained in this experiment the following general observations should be noted:

(1) Adequate descriptive terms are difficult to find. Most investigators emphasize the point that the phenomena defy all description. H. Ellis says, "The chief character of the visions is their indescribability" (6). This is due partly to the fact that forms and colors show certain characteristics not experienced previously in such a way, and partly to the transitoriness of the phenomena.

(2) The phenomena are frequently but not always localized at reading distance. Sometimes they are nearer or farther away. Movements may occur in all directions, but movements of approach and recession do not occur so often.

(3) The center of the visual field is often distinguished from the remainder of the field; there may be greater brightness, a different color or rotation while the remainder of the field is motionless (or vice versa). In the case of designs the center is often aesthetically the dominating part. Frequently, the field of vision is similar to the interior of a cone the vertex of which is lying in the center of the field directly before the eyes (or vice versa).

(4) The visions cannot be influenced by 'thinking' and 'will.'

(5) Visual memory-images and visionary phenomena exist independently.

(6) All spectral colors can be observed. There is no indication that certain colors occur more frequently than others. Sometimes approximately complementary colors appear simultaneously or successively.³

(7) In the majority of cases the arrangement of objects in the optical field is symmetrical.

(8) The observation of the phenomena is accompanied by pleasant feeling tones.

As to the following description, it must be remembered that until 2:30 a. m., Oct. 19, upon closing the eyes visions could always be seen. Taking into consideration the rapid changes it is clear that only comparatively few observations could be recorded.

Protocol transcribed by Mr. Jacobsen.

12:30 noon. Clouds from left to right through optical field. Tail of a pheasant (in center of field) turns into bright yellow star; star into sparks. Moving scintillating screw; 'hundreds' of screws. A sequence of rapidly changing objects in agreeable colors. A rotating wheel (diameter about 1 cm.) in the center of a silvery ground. Suddenly in the wheel a picture of God as represented in old Christian paintings.—Intention to see a homogeneous dark field of vision: red and green shoes appear. Most phenomena much nearer than reading distance.

12:35. The upper part of the body of a man, with a pale face but red cheeks, rising slowly from below. The face is unknown to me.—While I am thinking of a friend (visual memory-image) the head of an Indian appears.

12:45. Wavy spongy ground of greenish black color.—Glowing coals turn into pin heads of brilliant white color.

1:05 p. m. Wonderfully cut deep red jewels constantly changing in size, shape, color and distance from each other. Sometimes covered with silvery or greenish drops. The whole very symmetrical. The design on a background the color of which changes frequently.—Try to see the experimenter, but: blue clouds, a church, the dim face of an old man on background, blue arabesques. The whole seen through a steel veil the meshes of which are constantly changing in size and form.

1:10. Bright yellowish sparks irregularly distributed in the whole field.

1:15. Beads in different colors. Colors always changing: red to violet, green to bright gray, etc. Color so bright that I doubt that the eyes are closed.—Yellow mass like saltwater taffy pierced by two teeth (about 6 cm. in length).

1:20. Eyes open: the pupils alternately dilate and contract in day light; difficulties in focussing objects. Closing the eye: arches in violet. Black quatrefoils with three corners. The fourth corner seems to be lacking. Impossible to 'get' the fourth foil: the quatrefoils begin moving to the

³Compare, however, W. Nägeli, *Über selbstbeobachtete Gesichtserscheinungen*, *Sitz. Ber. d. K. Bayer. Akad. d. Wissensch.*, 1, 1868.

left and disappear.—Silvery water pouring downward, suddenly flowing upward.—Landscape as on Japanese pictures: a picture rather than a real landscape.—Sparks having the appearance of exploding shells turn into strange flowers which remind me of poppies in California.

1:25. Again the quatrefoil. Cannot get the fourth foil.

1:30. Open the eyes for a few seconds, look at the experimenter and close them: positive after-image of the face of the experimenter. His hair turns into hair of a cat, his eyes get a bright yellowish color. Then the head of a cat (natural size); hereafter the whole field filled with yellow eyes. (No change in size of the eyes during the modifications.)—Then a brilliant blue wheel rotating in left upper field. Blue wheel turns into red sparks.

1:35. Spiral rapidly revolving in center of field drawn out away from me.—(Blinders taken off, eyes remain closed): field turns red, red jewel motive appears; jewels now very small (diameter perhaps .3 mm.).—Elephant (size as on picture) turned upside down.

1:45. Pheasant tails filling the whole field.—Red jewel motive.—Colored threads running together in a revolving center, the whole similar to a cobweb.—A number of silvery forms in the midst of the field.—Gorgeous vine leaves colored as in Fall, on violet ground.—Arabesques, ornaments, designs changing kaleidoscopically.—Feeling that eyes are open.

1:55. Scintillating gem (size of a nut) deep red in color in center surrounded by greenish dark ground.—Steel veil of gorgeous bluish-violet color.—Visual memory-image of red candy: field turns green.

2:05. Moving rings in different colors.—In center bright light as coming from an electric bulb. Bulb seems to be incomplete. Then brilliant bluish form running through the field; seems to be incomplete in a certain way. In both cases unable to state what is lacking and how the impression of incompleteness arises.—Green sun (diameter about 3 cm.) in bluish dark field; no motion. Then revolving system of splinters of glass; system illuminated from within.

2:15. Homogeneous dark ground with bright patches in left upper field. Suddenly very intense bright light as if produced by an exploding shrapnel (apparently a few cm. distant from the eyes). Almost simultaneously jerky movement of hand to make sure whether blinders are on.

2:25. Darkish figures revolving around a center in a counter-clockwise direction. (Eyes open): streaks of green and violet on the wall. Then a drawing of a head changing into a mushroom (both of natural size). Then a skeleton (natural size) in lateral view turned about 30° to the left. Head and legs are lacking. Try to convince myself that there are only shadows on the wall, but still see the skeleton (as in X-ray).

2:45. (Eyes closed). Soft deep darkness with moving wheels and stars in extremely pleasant colors.—Nuns in silver dresses (about 3 cm. height) quickly disappearing.—Collection of bluish ink-bottles with labels.—Red, brownish and violet threads running together in center.—Autumn leaves turning into mescal buttons.—Different forms emitting intense greenish light.—Forms in different colors; contours often dark.

3:05. (Eyes open): the walls covered with squares (about 2 x 2 cm): shadowy dark contours. The corners of the squares: red jewels (three-dimensional). This design followed by similar mostly more complicated designs in various colors. Sometimes not sure whether the phenomena are localized at the distance of the walls.

3:20. (Eyes closed): on dark ground a red flag on pole waving to the left.—Designs as on rugs.—From now on the opening of the eyes does not neces-

sarily banish the visionary design. The designs seem to be localized on walls, on the floor, etc. The opening of the eyes does not change the magnitude of the forms.⁴

3:35. (Eyes closed): marvellous explosion of scintillating yellowish light mass in center of the field. (Diameter of exploding mass about 4-5 cm.) Very agreeable.

3:45. (Eyes open): impossible to look at the walls without seeing them covered with visionary phenomena. Various designs, then the upper part of the body of an Egyptian woman (two-dimensional, but natural size). (Eyes closed): a jewel design turns into dark background with symmetrically arranged golden sixes which move from the right to the left.

3:55. Strange animal (length perhaps 10 cm.) rapidly turns into arabesques. —Gold rain falling vertically.

4:05. On stationary background rotating jewels revolving around a center. Then, with a certain jerk, absence of all motion.—Regular and irregular, forms in iridescent colors reminding of radiolaria, sea urchins, and shells etc., in symmetrical or asymmetrical arrangement.—Shells illuminated from within radiating in different colors, moving towards the right, turned about 45° towards the right and somewhat towards me. A little piece in every shell is broken out.—Slow majestic movements along differently shaped curves simultaneous with 'mad' movements.—Feeling there is 'motion *per se*.'—Man in greenish velvet (height about 7-8 cm.) jumping into deep chasm.—Strange animal turns into a piece of wood in horizontal position.

4:15. (Eyes opened): visionary phenomena on the walls. Moving the eyes, I notice that the scotoma which I have in my left eye moves before the designs.

From 4:30 p. m. on various experiments were conducted. The visionary phenomena, however, lasted until retiring and could always be seen in the dark room with open eyes. Arabesques, ornaments, various geometric patterns were dominating. On the following day, Oct. 19, after a period of sleep, there was still a great sensitivity to colors, but visions could not be detected with closed or open eyes. On Oct. 20, 10 a. m., I saw one of the designs with closed eyes at the moment when the dentist began drilling one of my bicuspid.

EXPERIMENTS WITH REFERENCE TO EIDETIC VISION

We began with measurements of the size of after-images under conditions similar to those in eidetic experiments (15). A gray background (43 x 49 cm., Hering's gray paper 24) was placed at a distance of 50 cm. The head was fixed in a head-rest. Colored squares (Milton Bradley Company) were used as stimuli.

During the experiment the gray background was covered most of the time with ever-changing designs in various forms and colors. Sometimes the paper assumed a cloudy appearance.

⁴Compare E. S. Conklin, (4). I do not know whether observations of this kind are in harmony with Conklin's and Jaensch's genetic explanations concerning the approximate constancy of magnitude and deviations from it.

When I tried to touch the slightly pulsating surface my finger seemed to come in contact with it about 20 cm. before the paper. This is a phenomenon surprisingly similar to that experienced by Gelb's patient W (9). The paper squares used to produce after-images were also covered with varying forms and colors. Sometimes the phenomena observed on the gray ground showed the complementary color of the square which I was fixating. In most cases, however, the colors were not complementary or even approximately complementary. The normal marginal contrast was frequently observed. The hues of the after-images seemed to be the same as for me under normal conditions. Frequently, the after-images were more deeply saturated. In most cases form and color of the after-images transformed into the visionary phenomena (16). A violet after-image which seemed to be identical in size with the original stimulus, rapidly turned into a violet circle, then into stars, etc., which became a part of the design that covered the whole paper. Under these circumstances the determination of the size of after-images was very difficult. In some cases the visions prevented the appearance of after-images altogether. In most instances, however, there was a short period during which an after-image with sharp contours could be seen. Thus its size could be determined (vertical measurements from the outside) before it shifted into the texture of the visionary phenomena.

For illustration we include some records:

TABLE I

<i>Color of stimulus</i>	<i>Size</i>	<i>Distance of exposure</i>	<i>Time of exposure</i>	<i>Size of negative after-image</i>	
orange	5 cm	50 cm	10 sec.	measured at 50 cm	5.3 cm
orange	5 cm	50 cm	10 sec.	"	5.2 cm
yellow	5 cm	50 cm	10 sec.	"	5.7 cm
orange	5 cm	60 cm	40 sec.	"	5.3 cm
yellow	20 cm	150 cm	10 sec.	measured at 25 cm	3.6 cm
yellow	20 cm	150 cm	40 sec.	"	3.8 cm

The values obtained are about the same as for me under normal conditions. This implies that: (1) Emmert's law seems to hold (slight deviations); (2) there is the frequently observed enlargement in the isodiastatic constellation (Zeman). The approximate constancy of size in various distances as found in eidetic experiments was never observed under mescal or in the normal state. It was, furthermore, impossible to localize the after-image definitely at a given space, as can be done with the *Anschaungsbilder* of certain persons (15). The after-images move with the eyes, while the visionary phenomena seem to be stationary (16). It is to be noted that the changes as to color and form in the after-image, which we observed so frequently, are also found in experiments with *Eidetiker*.

In experiments with simultaneous exposure of two 5 cm. squares (either side by side or 5 cm. from each other), two distinct after-images in the complementary color could be seen. A mixture of these squares was not possible. (Sometimes *Anschauungsbilder* can be mixed under the same conditions.) In experiments with monocular exposure (30 sec.), a faint complementary after-image could be seen with the other eye.

I completely lacked the ability of certain *Eidetiker* to see colors spontaneously. The 'intention', the 'will' to see, *e.g.* blue, had apparently no influence. The gray background showed nothing but brilliant jewel and pearl designs in constant motion. Thus a comparison with eidetic experiments in which it was possible to operate with colors which were produced intentionally, cannot be made.

When the paper squares were exposed behind a reading-glass, the removal of the square resulted in seeing an after-image of the size of the stimulus. Simultaneous removal of square and reading-glass did not change this result.

Pictures of animals (cut out of paper: donkey, tiger, etc.)⁵ were exposed individually before the gray background for 15-40 sec. After removal I tried to see the picture with open eyes. In no case was I successful; only visionary phenomena covered the ground. The same was found when silhouettes were taken as stimulus material. With the eyes closed, I observed sometimes certain details in the color of the stimulus. They became, however, very rapidly a part of the visionary designs.

The instruction of the experimenter to 'see' a rabbit on the gray ground could not be carried out, though "brilliant red jewels, crabs turning to snakes, green flames" could be seen. The rabbit could not be seen with closed eyes either. Then I tried other animals, but in vain.

It must be said in general that the drug did not create the ability some *Eidetiker* have to see intentionally 'meaningless' (squares, etc.), or 'meaningful' material (pictures, persons, animals), either with open or closed eyes. In all cases visual memory-images of the objects I intended to visualize were present.

In dealing with monocular and binocular estimation of distance under the influence of mescal, I started from an arrangement similar to that in Jaensch's horopter investigations: head in rest; distance of the three black threads from the root of the nose, 1 m.; distance of the threads from each other, 5 cm; occlusion screen 15 cm. before, and gray background 40 cm. behind the threads; the slit of the occlusion screen at the level

⁵See reproduction of pictures and silhouettes in (15).

of the eyes. In 15 trials the middle thread was placed at either 95, 100 or 105 cm. (5 times at each distance), the other two threads remaining stationary.

TABLE II

Mescal state:

Cm.	Monocular			Binocular		
	Near	Same	Far	Near	Same	Far
95	—	4	1	5	—	—
100	—	4	1	—	5	—
105	—	5	—	—	—	5
Normal state:						
95	3	2	—	5	—	—
100	—	5	—	—	5	—
105	—	5	—	—	—	5

Comparing the two series, there is no difference between binocular estimations of distance in the mescal and in the normal state. As to monocular estimation, the result is that, in general, in both states no differences of depth can be perceived. (Compare also (26), p. 83.)

It seems, therefore, that mescal could not influence the perception of depth under the above mentioned experimental conditions, in spite of the difficulties of observation: *e.g.* the threads sometimes seemed to move; the gray background was covered with visionary phenomena. It was found, moreover, that in binocular vision 1 or 2 cm. displacements of the right or left thread (98, 99, 101, 102 cm.), the middle and the other thread remaining stationary, were always judged correctly. The threads then were placed at the following distances: middle thread, 95 cm.; right and left thread, 100 cm. The experimenter moved the middle thread slowly backward. It seemed to be the same distance at 99.9 cm. When it was moved from 105 cm. forward, the same distance was reached at 100 cm.

The examination of geometrical-optical illusions (various modifications of Müller-Lyer, Zöllner, Poggendorff, Wundt, Kundt, Hering, etc.) did not reveal any differences between mescal and normal vision so far as the kind of illusion is concerned. With regard to the amount of certain illusions, measurements failed to indicate differences in this respect. Stereograms were normal (8). The filling out of the blind spot was performed under various conditions. Hering's "*Gesetz der identischen Sehrichtungen*" was frequently confirmed. Various contrast effects were observed. To illustrate: at 1:30 a. m., Oct. 19, I suddenly noticed a green shadow in peripheral vision: it was the shadow of my red pen holder. The color of positive after-images seen with closed eyes changed into the color of the visionary phenomena. Positive after-images could not be seen with open eyes if colored papers were exposed in day light. It

is well-known that some Eidetiker will get positive *Anschauungsbilder* under these conditions (time of exposure: 1 sec. or less, up to some minutes).

It was possible for me, however, to get positive after-effects of long duration with open eyes if the following arrangement was made: the stimulus material was placed before me in a darkened room and then suddenly illuminated for one second or less. Squares and other geometrical figures, pictures of animals, texts, etc., were used as stimulus material. Certain observations frequently reported by *Eidetiker* were confirmed. Some observations may be recorded. *Stimulus*: a text consisting of 4 lines pasted on cardboard. The words are unknown to me. *After-image*: positive; deep black letters on a paper of extreme brightness; the four lines very distinct; the spatial arrangement of the different words recognizable, but cannot read the text except the words "suffer at all" (correct). The form of the cardboard, and various objects on the table, can be recognized. The brightness on the table is so intense that I have to reassure myself that the light is turned out. *Stimulus*: a text consisting of 6 lines pasted on cardboard. *After-image*: positive; for a moment distinct lines with different words can be seen (unreadable); then the lines turn into rows of black arcades which are alike in form. *Stimulus*: the same. *After-image*: positive; 6 rectangles. *Stimulus*: picture of a tiger: yellow with black stripes and black contour. I do not know what picture is placed before me in the dark. *After-image*: my right hand holding the picture of the tiger; the texture of my coat, the shirt, folds on my thumb quite clear; the picture of the tiger itself in brilliant yellow with deep black contour and stripes. To the left my left lower arm, the hand at the key of the lamp, the lamp itself are seen. As to hue, form, voluminousness, the objects do not seem to differ very much from real objects. Finally the yellow of the tiger turns into a bluish color, the stripes and contour remain black. (During the observation of the after-image I held my hands and lower arms under the table. Probably owing to certain changes in the kinesthetic field, they seemed to be detached from me in a certain way. Thus my 'real' limbs and the limbs in the after-image seemed to be equally 'real' or 'unreal;' a confusing effect). *Stimulus*: contours of circles (colored paper, 2-5 mm. wide), squares, triangles, etc.; certain parts of the contour covered up by white paper. *After-image*: in all cases the form of the original stimulus is retained; no completion of form takes place. (Compare (26), p. 149.) *Stimulus* (monocular exposure): square or picture or candle. *After-image*: seen by the eye to which the material was exposed; opening of the other eye produced blinding effect, and increase in darkness while the stimulated eye still sees a distinct and brilliant after-image;

closing of the stimulated eye produced complete darkness. *Stimulus*: the same; the one eye exposed to the material, the other eye open, but covered by a screen. *After-image*: seen by the eye previously stimulated; no blinding effect in the other eye; closing of the stimulated eye produced complete darkness; no binocular effect of monocular exposure.

It is to be understood that the various after-sensations arising after short illumination in a dark room were soon followed by the appearance of visionary phenomena. They could be seen both with open and with closed eyes. The sudden illumination banished the phenomena in most cases completely for the time of the duration of the after-image.

The Marburg School has found that the application of disturbing stimuli (whistling, various noises, etc.) influence *Anschaungsbilder* in a definite way. Compare (3). The effect of various auditory, olfactory and cutaneous stimuli on mescal visions was tried. After the application of auditory stimuli I did not observe any change in the visions. It did not make any difference whether or not I expected the sound or noise. Upon application of olfactory or cutaneous stimuli the form of the visionary design as well as the saturation of the colors changed suddenly in some cases.⁶ In other cases there was no effect at all.

CHANGES

In different Sensory Fields. With regard to color vision, there was a general increase in brightness; most colors seemed to be more deeply saturated. These changes in brightness and saturation seemed especially noticeable in peripheral vision. Again and again, the 'optical attention' was attracted by objects in the peripheral field; e.g. a 'flame' in the right lower field (twilight) turned out to be a piece of paper in the waste-basket; the hitherto unnoticed reflection, in one of a friend's front teeth, of a gold inlay in the next tooth was observed. In foveal vision objects seemed to become loose and cloudy. It was strenuous work to fixate objects for a longer time. Sometimes they seemed to lose their solidity. Colors often showed those characteristics usually ascribed to *Flächenfarben* (film colors). Movements of objects were frequently observed. Looking at the radiator in the room, its divisions seemed to move rhythmically. Standing near a corner of the room, the walls, like yellowish clouds, seemed to move towards me. Mach's spiral appeared to be a black steel spring, lying on brilliant white chalk, performing slow contractions. A package of cigarettes on the table moved with a jerk. A black circle pasted on white cardboard: I tried to dip my finger into a deep hole. (Foveal vision! compare the

⁶See also (7).

above mentioned observation with the gray paper and Bühler, (2) p. 57.) During the evening, the room being illuminated by electric light, the white paper on which I was writing was yellow; the walls, ordinarily of a dull grayish-yellow, showed a deeply saturated yellow.

With regard to auditory stimuli, even noises caused by writing, swallowing, etc., seemed to be loud. Tones of my violin had a greater voluminousness than usual. Trying to strum a melody sung by the Indians at their peyote festivals I noticed that I could not keep time. With regard to organic sensations, I seemed to be 'beyond all desires.' I did not feel hungry or thirsty. From the evening of Oct. 18 until noon of Oct. 20, I ate only some slices of bread and some bananas. Even at 2:00 a. m., Oct. 19, I was wide awake; there was hardly any feeling of fatigue throughout the experiment, although there were times when I was extremely drowsy and disinclined to move. In general, frequently repeated gymnastic exercises seemed to be amusing rather than fatiguing. Walking was performed with remarkable ease.

In 'Gegenstands- und Ichbewusstsein.' Some alterations besides the sensory changes are to be mentioned. My state may be characterized, on the one hand, as one of enchanted contentment, in which I was happily observing the visionary world; on the other hand as restless and wide awake, being eager to taste thoroughly the unique experience. There was no conscious intention, however, to be forcibly attentive to the phenomena or to slight sensory impressions. A certain unwillingness to be intellectually active could be noticed throughout the whole day. At the same time there was a dislike to formulate my experience verbally for the sake of an experiment. Even the idea of being subjected to experimentation was unpleasant. To the experimenter I seemed to be very distractible. Introspectively there seemed to be a certain disinclination, rather than inability, to focus my attention on anything for a longer time. There were no difficulties in understanding some pages of a psychological paper, but the whole process was rather disgusting.

The distortion of time frequently recorded by other experimenters was also experienced; but in this experiment it was apparently not so strong as in other cases. After an unpleasant period of 'concentration' it was possible to make fairly accurate time judgments (*Cf.* 7). According to some investigators an enormous over-estimation of time is very characteristic. In my state it seemed most characteristic that the inadequacy of assigning durations was felt so keenly. A question of the experimenter concerning time was considered rather ridiculous. It seemed to me incommensurate to speak about the experienced abundance of phenomena in terms of minutes and hours. I re-

call that in the past a similar attitude with regard to time has arisen in situations with high emotional pressure, *e.g.* in periods involving danger to life.

One of the experiences (a most surprising one) of this experiment was that owing to certain optical changes in the external objects, movements of external objects, film colors instead of surface colors, etc., visions and external objects became phenomenologically similar. Besides this unification in perceptual respect there are other changes of the '*Gegenstandsbewusstsein*' and '*Ichbewusstsein*.' My body and its organs seemed to be most of the time non-existent or detached from me as a perfectly functioning machine. While speaking I seemed to listen to a speech apparatus. Getting up from my arm chair to move around, I seemed to walk on clouds. In a moment of exhilaration I was inclined to kick through the airy walls of my room with my foot, knowing at the same time that I was in a solid stone building.

In general, the line of demarcation drawn between 'object' and 'subject' in normal state seemed to be changed. The body, the ego, became 'objective' in a certain way,⁷ and the objects became 'subjective.' They became subjective not only in the sense that they behaved as visionary phenomena, but also in the sense that they gained certain affective qualities. A movement of the hand of the experimenter, a noise, a turning of the chair, seemed to be harmful and dangerous. Critically, I realized that the movement of a hand at 2 m. distance could not be injurious; but nevertheless the harmful influence of such a movement was felt directly. Somehow, the physical medium of the air, the difference between the bodies did not exist. I frequently felt that the experimenter meant me ill and I wished he would abstain from thoughts which could do me harm.

There is no doubt that these changes in '*Gegenstands- und Ichbewusstsein*' are comparable to those observed in schizophrenia. For the psychology of schizophrenia as developed by Storch, Schilder, and Kronfeld, etc., as well as for genetic psychology (compare Werner), mescal experiments might play a part in throwing light upon the genesis and pathology of the subject-object relation. And mescal seems especially recommendable, since it does not destroy the critical attitude of the observer.

SUGGESTED EXPERIMENTS

In closing, some further mescal experiments may be suggested. It seems desirable to test the effect of mescaline on: (1) a congenitally blind person; (2) a totally or partially color-

⁷Compare one of H. Ellis' subjects (7): "It was as if I had unexpectedly attained an objective knowledge of my own personality."

blind person; (3) various *Eidetiker*, especially on persons of the T-type; (4) persons of the T-type who lost the eidetic disposition after ingestion of calcium lacticum; (5) persons of Kretschmer's body-form types, to investigate systematically the changes in 'Gegenstands- und Ichbewusstsein.'

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