MESCALINE HALLUCINATIONS IN ARTISTS

W. S. MACLAY, M.D., M.R.C.P.
AND
E. GUTTMANN, M.D., L.R.C.P. (EDIN.)
LONDON, ENGLAND

The various theories about the cause of hallucinations have been largely influenced by the material which the writers studied. Thus, Mayer-Gross formed his theory on observation of the fantom limb, Schroeder on observation of delirious states and Vogt on experience with electrical stimulation of the cerebral cortex. It lies in the nature of the subject that its study is based mainly on verbal descriptions, given by patients with more or less impaired ability to describe their experiences. It was realization of this drawback which made so attractive the study of hallucinations experimentally produced in normal subjects by drugs such as mescaline. Work by Mayer-Gross, Stein, Zucker and others has proved the fruitfulness of this study of "experimental psychosis."

Mescaline hallucinations are predominantly, though not exclusively, visual, so that a description of them by means of drawings and pictures could be expected to be somewhat more impressive, and perhaps more realistic, than a verbal account, which may be adequate for hallucinations of the auditory type but is liable to contain certain fallacies in describing experiences of the visual type.

As described in a previous paper,[1] patients' drawings were used in studying schizophrenic symptoms of the visual type; but with patients the scope of the procedure is limited not only by their impaired mentality but also by their ability or inability to draw. In an experimental study on normal persons, however, the subjects can be chosen with care, as was done in this investigation, in which it was possible to find artists who were willing to volunteer their services. They were given enough mescaline to cause hallucinations and were asked to sketch what they saw and then after the intoxication was over to make another drawing of their experience in retrospect.

This study was made with the support of the Rockefeller Foundation.

From the Mill Hill Emergency Hospital, Dr. W. S. Maclay, medical officer in charge.

1. Guttmann, E., and Maclay, W. S.: Clinical Observations on Schizophrenic Drawings, Brit. J. M. Psychol. **16**:184, 1937.

It is surprising to find so few illustrations of mescaline hallucination in the numerous publications on the subject. Two facts may account for this: one, the general laziness and inactivity which are produced by the drug; the other, the fleeting and ever changing character of the visions.

Some of the drawings obtained during these experiments are shown in this paper. They will illustrate what can be explained, if not proved, as being due to physiologic factors effective in the production of these hallucinations, at the same time allowing for and giving full value to the nonphysiologic (psychologic) factors at work. The fact that the subjects were artists not intimately known to the authors precluded any attempt to analyze in detail the content of the drawings.

According to Klüver,[2] mescaline visions are characteristically of three types: (*a*) tapestry, grating, lattice, fretwork, filigree, honeycomb or chessboard design; (*b*) tunnel, funnel, alley, cone or vessel patterns, and (*c*) spirals.

It is on the constancy of these phenomena that Marshall [3] based his conclusion that there must be a peripheral stimulus producing them. This theory is applicable in some cases but needs elaboration in others.

OBSERVATIONS

Figure 1 is the best example of the tapestry pattern in the collection; it was evolved by the subject from a hazy drawing made during the first hour of the experimental intoxication. Marshall has collected sufficient evidence to show that, under suitable experimental conditions, the choroid capillaries can be observed normally. Their appearance closely resembles the picture painted by our subject. Moreover, since the same pattern has been obtained from other subjects, it seems justifiable to assume that it was the choroid that was perceived and painted. In addition to the physiologic factors which Marshall used to explain the phenomena, it must be emphasized that with mescaline intoxication the after-images are particularly clear and impressive, even if the stimuli have been feeble (Mayer-Gross and Stein [4]), and that they may persist for abnormally long periods and may be projected on any background. This may explain how the artist was able to reproduce an image that may have existed only momentarily.

The origin of the design in figure 2 is probably similar. Without much imagination it can be interpreted as a picture of the eyeground with the retinal artery and its branches. It again is a normal phenomenon, becoming apparent under the influence of the drug. Apart from the physiologic factors described by Marshall and the intensification of imagery, increased introspection may play a part in the production

2. Klüver, H.: Mescal: The "Divine" Plant and Its Psychological Effects, London, Kegan Paul, Trench, Trubner & Co., 1928.

3. Marshall, C. R.: An Enquiry into the Causes of Mescal Vision, J. Neurol. & Psychopath. **17**:289, 1937.

4. Mayer-Gross, W., and Stein, O.: Psychopathologie und Klinik der Trugwahrnehmungen, in Bumke, O.: Handbuch der Geisteskrankheiten, Berlin, Julius Springer, 1928, vol. 1, pp. 427-507.

of this vision, but it is not proposed to discuss in this paper to what extent the instructions given and the experimental situation led the subjects to observe their experiences more carefully or how far the direction of attention toward visual experiences is an integral part of mescaline intoxication.

Figure 3 (original in color) illustrates photopsia and closely resembles colored scotomas, which Marshall was inclined to explain as peripheral phenomena. This

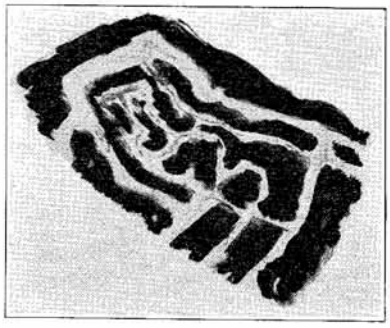

Fig. 1.—Tapestry pattern observed during mescaline intoxication.

Fig. 2.—Pattern resembling the eyeground, with retinal artery and its branches, observed during mescaline intoxication.

view is difficult to prove or disprove; phenomena like them are described both after peripheral stimulation, such as a blow or pressure on the eyeball, and after central stimulation, such as electrical stimulation of the exposed cortex. Experiences in other intoxications, such as chronic alcoholism and delirium tremens, show that a central alteration lowers the threshold for peripheral stimuli (this is generally assumed as the explanation of the fact that pressure on the eyeball causes photopsia easily in persons with alcoholism). A gradual transition between pho-

topsia, illusion and hallucination has been observed in persons with mescaline intoxication by Mayer-Gross and Stein, who emphasized the theoretic importance of this observation. In connection with the present paper, it points at least to a central component in the causation of phenomena as illustrated here.

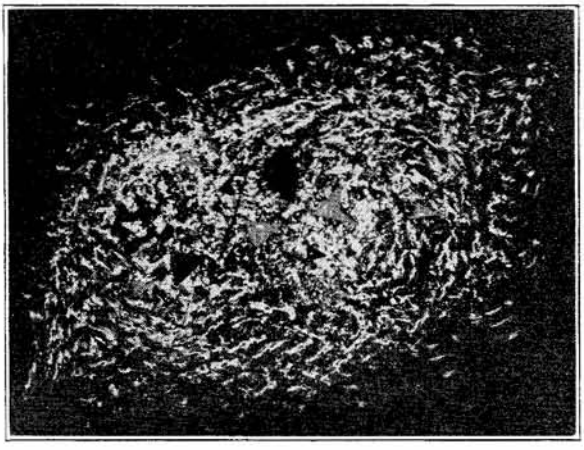

Fig. 3.—Photopsia during mescaline intoxication.

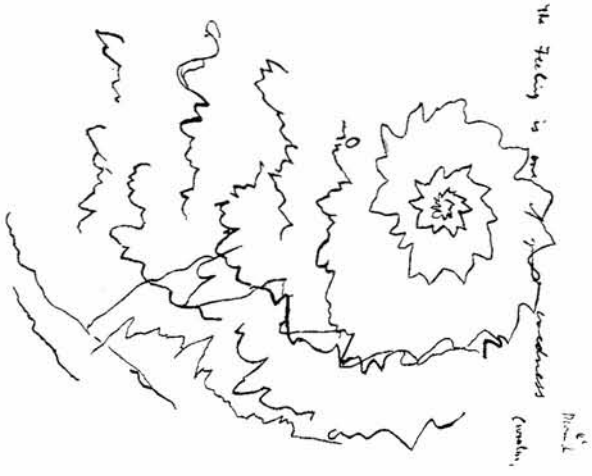

Fig. 4.—Spreading of zigzag lines (colored in original) seen during mescaline intoxication.

The spreading of colored zigzag lines, as illustrated in figure 4, is similar to that described by some patients with migraine, though the hemianopic distribution is not obvious, the flickering is firmer and the angles are less clear than in the usual fortification patterns. The zigzag lines, as illustrated, are seen by the artist as moving from the center to the periphery, but to the observer it is clear that there is only a short step from these phenomena to the repetitive patterns which have been described so often by persons with mescaline intoxication.

Engerth, Hoff and Pötzl [5] were able to demonstrate in cases of disease of the brain how repetitive simple photomas gradually develop into hallucinations of definite shape and content. The picture which shows these phenomena has already been reproduced in a previous paper.[6] A number of primitive repetitive scribbles found in the mescaline series resembled spontaneous drawings, usually known as "doodles," and cannot be interpreted with certainty as pictures of hallucinatory phenomena, but in a few the elaboration is clearly visible which changes elementary visual sensations into hallucinations. The artist who drew the castle and the houses (fig. 5 *A*) explained that he had seen them, though their shape and position changed persistently, but he also pointed out later that the style was similar to that of his previous paintings. Still more striking is the elaboration in the drawings of another subject, who did them during the period of actual intoxi-

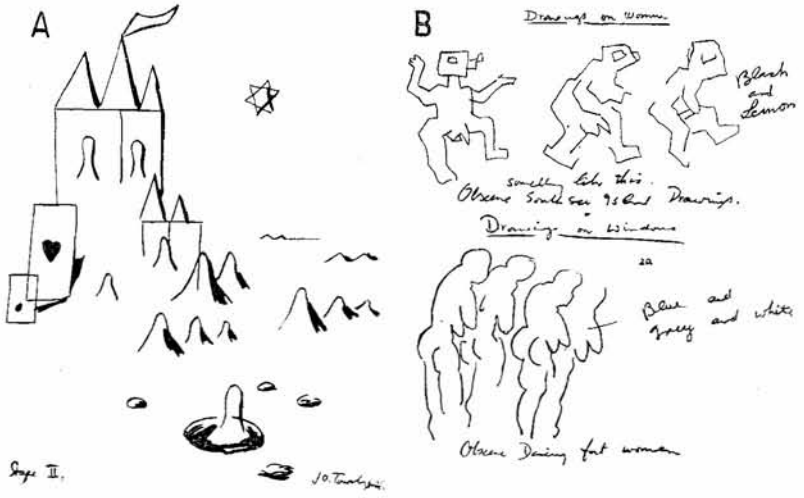

Fig. 5.—Examples of elaborate hallucinatory phenomena.

cation (fig. 5 *B*). Their particular content could be accounted for by the artist in psychologic—in fact psychoanalytic—terms, but the repetitive character can only be explained physiologically.

A few experiments carried out with these artists and a small number of other subjects demonstrated this tendency to repetition. The subjects were given four or five meaningless patterns, taken from Cattell's group tests, to copy and were asked to reproduce them from memory immediately afterward. This test was repeated, different patterns being used at various stages of the intoxication. Any mistakes that were made showed this repetitive character. Figure 6 demonstrates this in 3 of 4 instances.

---

5. Engerth, G.; Hoff, H., and Pötzl, O.: Zur Patho-Physiologie der hemianopischen Halluzinationen, Ztschr. f. d. ges. Neurol. u. Psychiat. **152**:399, 1935.

6. Maclay, W. S.; Guttmann, E., and Mayer-Gross, W.: Spontaneous Drawings as an Approach to Some Problems of Psychopathology, Proc. Roy. Soc. Med. **31**:1337, 1938.

Figure 7 illustrates another interesting phenomenon of mescaline intoxication. The artist observed that everything he hallucinated seemed to elongate itself in whatever direction he turned his attention. When he tried to draw the man's arm, it grew longer and longer and continued into the cathedral which he held in his hand. The cathedral continued into the spire, the spire into the cross and its ends into airplanes, which are given in an inset to the left of the main figure. The horizontal beams of the cross also show this tendency to elongation. It is interesting to

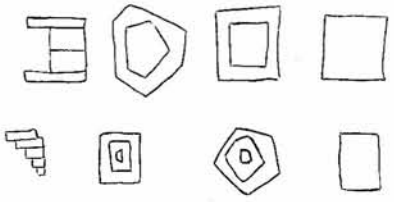

Fig. 6.—Demonstration of repetitive character of phenomena during mescaline intoxication.

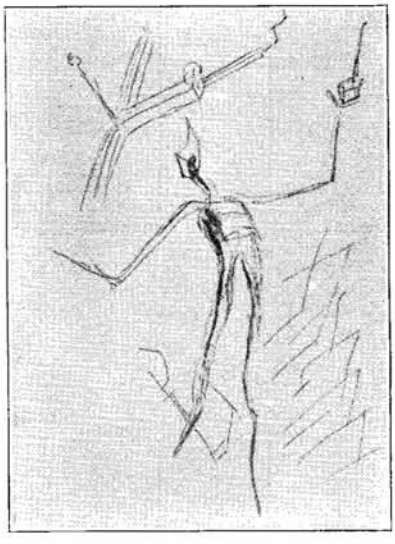

Fig. 7.—Phenomenon of mescaline intoxication illustrating elongation of point of interest.

see how the cathedral appears again on the head of the man, though it is not elaborated there. The artist stopped drawing because he was overwhelmed by the way in which the shapes continued indefinitely.

Again, it seems the only possible explanation that the comprehensible contents and their logical connection are superimposed on the physiologic phenomenon which interferes with the definition of visual perception. Many subjects describe how "everything fluctuates," and there are several drawings illustrating wavelike

movement in the visual perception. Figure 8 is interesting in that it was drawn the morning after the experiment and still shows the prevalence of wavy lines. These are entirely foreign to the artist's ordinary style but were marked in his sketches made during the intoxication, so that there can be little doubt about their causation by the drug. The wavelike structure in these sketches is also the best example of distortion of vision that our collection, incomplete in this respect, can offer.

Fig. 8.—Picture made the morning after the experiment, showing the prevalence of wavy lines, an effect of the mescaline.

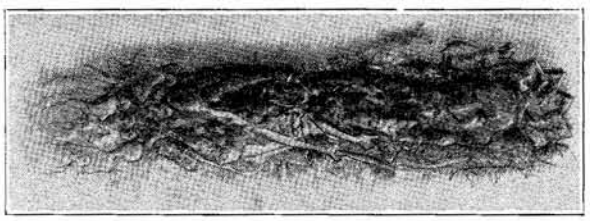

Fig. 9.—Illustration of the complexity of the phenomena during mescaline intoxication.

Figure 9 is the best illustration of the complexity of the phenomena; the artist tried to convey the impression of appearing and disappearing visions; he demonstrated the pareidolic type of illusion, seeing in the gray background shapes and figures of varying degrees of definition. When questioned, the artist said that he saw these pictures without active effort on his part; he did not change them, but they disappeared or changed their appearance when he tried to concentrate on them. He would have been unable to draw them during the intoxication, and it was only with difficulty that he could give this retrospective account in drawing.

COMMENT

These observations provide material for discussion of the two opposing views concerning the origin of hallucinations: the physiologic theories, by which they are regarded as the result of irritation of sensory centers or pathways, and the psychologic, by which they are regarded as projected mental images assuming an external sensory appearance when presented to consciousness.

All the pictures presented show features well known in the physiologic process of seeing or in pathologic conditions due to organic lesions of the visual apparatus. The first few pictures can be accounted for entirely in physiologic terms; in the later ones there are more and more features, the last picture almost representing the free play of fantasy.

In other words, the hallucinations during mescaline intoxication cannot be explained in either physiologic or psychologic terms alone. The fact of hallucinating and some formal characters of the hallucinations are so similar to physiologic and pathologic phenomena that they can be assumed to be physiologic in origin, but psychologic experiences determine the contents of the hallucination; for example, it can be said that the appearance and repetition of similar shapes are caused physiologically, but the facts that the subject sees women and not men and that the scotomas take on the shape of lotus flowers can be accounted for only in psychologic terms.

These observations on mescaline intoxication cannot be applied to other conditions without further study. In other hallucinatory states the relative importance of physiologic and psychologic factors may be different; the former may be more important in patients with gross cerebral irritation, the latter in patients in a hysterical twilight state. Further investigation is necessary to determine the factors which are responsible for their relative importance.