

OBSERVATIONS ON TAKING PEYOTE (*ANHALONIUM LEWINII*)

By SAMUEL W. FERNBERGER, University of Pennsylvania

The following observations were made on taking Peyote (*Anhalonium Lewinii*). The drug is one of the cacti frequently and popularly called Mescal Buttons. The chemistry of the drug is imperfectly understood, but the active principle seems to be one of the alkaloids.¹ The plant is found only in parts of the Rio Grande valley on the Mexican side. It is frequently used by the local Indians as part of their religious ceremonies. Within the last twenty-five years a rather widespread Peyote cult has grown up among the Indian tribes just west of the Mississippi basin, and this cult has reached as far north as Missouri at least. As a matter of fact, the use of the drug among the Indians has become so widespread that several of the states have taken active measures to try to prevent its use.²

The reason the Indians have made its use part of their religious ceremonies is that the eating of the drug is followed by the appearance of colored images. A number of cases are described in the literature, of which we mention two only as typical. Mitchell³ gives a very interesting account of his own experiences and of those of a friend. Mitchell's own experience appears to have been as vivid as any that is recorded in the literature,—whether or not owing to the well-known ability in verbal description of the late Dr. Mitchell, we cannot say. The friend had colored visions also, but apparently not so brilliant as those of Mitchell. The other report is that of Prentiss and Morgan, mentioned above. In all they report six experiments on five subjects. One subject submitted to taking the drug twice, in spite of what Mitchell declares: "These shows are expensive. For two days I had headache and for one day a smart attack of gastric distress. This came after the first dose and was most uncomfortable. The experience, however, was worth one such headache and indigestion, but it was not worth a second."

The summary of these seven cases seems to show most clearly that visual manifestations occur after ingesting the drug. Great individual differences are to be noted in the vividness, intensity, saturation, complexity and duration of the visual phenomena. In every case they are colored, and in every case the colors seems to be in movement and constant change. The manifestations may take the form of known objects or may be of abstract geometrical shapes. All subjects agree that the visions are obtained only with the eyes closed, and that they disappear when the eyes are opened even

¹For a description of the chemical reactions and physiological effects on animals, cf. L. Lewin. *Anhalonium Lewinii*, *Therapeutic Gazette*, 4, 1888, 231-237.

²For a description of the Peyote cult ceremony, cf. D. W. Prentiss and F. P. Morgan. *Anhalonium Lewinii* (Mescal Buttons): A Study of the Drug with Especial Reference to its Physiological Action upon Man, with Report of Experiments, *Therapeutic Gazette*, 9, 1895, 577-585. Also M. R. Gilmore. Uses of Plants by Indians of the Missouri River Region, 33d *Annual Report of the Bureau of American Ethnology*, 1919, 104-106.

³S. Weir Mitchell. The Effects of *Anhalonium Lewinii* (The Mescal Button), *British Medical Journal*, 2, 1896, 1625-1629.

in a darkened room. Several of the subjects note that visual after-images seem to be of longer than the usual duration. Most of the subjects also report a distortion of time, which seems very much prolonged; and in one case there was a distortion of visual space. Both Mitchell and Prentiss and Morgan believe that these visual manifestations are of cortical origin and are to be identified as visual images.

Thus far no reports by psychologists trained in observing mental processes have appeared in the literature. The one attempt is that of James,⁴ who remarks that he ate one button (obviously too small a dose), became ill, had no visions, and discontinued the experiment. It seemed worth while to try the experiment, if only to determine whether the visions are to be identified with visual memory-images. It has been demonstrated by continued introspection, both in and out of experimental settings, that I am almost entirely lacking in visual imagery. It therefore seemed probable that, if these manifestations are imaginal in character, they would not be present in my case.

The experiment was conducted at Clark University on February 27, 1920. I wish to express my thanks to Professor Edwin G. Boring for his kind assistance and suggestions during the course of the observations. The reports were taken down in full by a stenographer. During a large part of the experience I was lying on a lounge with my eyes blindfolded with black velvet. A total dose of 39 grams, amounting to six large buttons, was ingested. The dried buttons were chewed and swallowed. This was a lengthy affair, inasmuch as they were intensively bitter and very nauseous. The first dose of 13 grams was taken at 12 noon; 13 grams more at 12.30; and the final 13 grams at 1.30 p. m. During most of the observation I was bothered with stomachic aches and pressure in the abdomen, and later with continuous frontal and occipital headache.

By 1.06 p. m. I observed that, on closing the eyes, both positive and negative visual after-images seemed to be relatively more intensive and of longer duration than usual. About this time I reclined and bandaged the eyes. At 1.43 a spot of white light of low intensity appeared about the center of the horopter. From then until 2.58 there were intermittent color effects. Colors from violet to orange appeared, but seldom red. The colors were rarely of a high degree of saturation. Two spatial forms were present,—one in the form of an arc in the upper half of the horopter, and the other in the form of lines down the center of the horopter. The colors seemed to be in constant movement. They did not seem to be affected when I opened the eyes inside the blinders, which were entirely light-proof.

At 2.58 I removed the blinders. After light-adaptation had progressed, I discovered an inability to hold fixation on any object for more than an instant. At 3.07 I made a chance discovery. While smoking a cigarette, I observed that the lighted tip, seen in indirect vision, was relatively much clearer and more intensive and saturated in color than normal. This fact was verified; and it was very noticeable that colors in the periphery of the visual field had a more than normal degree of saturation and clearness. This did not appear to be true, at this time, of colors seen in foveal vision.

At 3.22 the blinders were replaced, and the color-effects began immediately. During this period colored circles appeared, always spinning in a counter-clockwise direction.

At 3.48, over two hours after the final dose, a new series of phenomena became apparent. These phenomena were of such an unexpected sort and were so interesting that perhaps they have vitiated, to an extent, the observations. At any rate the blinders were not resumed and no further mention is made of retinal phenomena. These new phenomena had primarily

⁴W. James. Familiar Letters of William James, *The Atlantic Monthly*, 1920, August, 171.

to do with kinaesthetic sensations. At 3.48 I noted that dictation seemed to be very much slower than normal, although the stenographer assured me that my speech was as rapid as usual. At 3.54, when moving my shoulder, I was aware of clearer kinaesthetic sensations than I had ever known before in my experience. The muscular, and especially the articular, sensations were tremendously clear, but not more intensive than normal. This, in spite of the fact that I am of a kinaesthetic type and therefore used to attending to sensations of this modality. The blinders were then removed, and the parts of my body, seen visually, seemed to be very far away. I extended my arm and fixated the finger-tips, and then stretched the arm away from me. The hand seemed to move to a distance of at least ten feet. The stenographer moved her head and shoulders back a few inches, and she seemed to be drawing back many times that distance. This distortion of space was present for both monocular and binocular vision.

Experiences of this sort lasted several hours. During this period I was in what must have been very close to a state of dual personality. I was able to make perfectly rational and normal verbal judgments that were totally at variance with the immediately present sensory cues. I could say that a certain calendar was only actually four inches long although it appeared to be many feet. So far as one could analyze, the only conscious processes which would account for this state were a greater clearness of all sensations, but especially of those of a kinaesthetic sort. This would account for the distortion of visual space at least. If our judgment of depth is dependent on sensations from changes in parallax, then a great increase in the clearness of these sensations would give the illusion of magnifying visual space. Such an analysis would account for the magnification of kinaesthetic space as well.

My state, at this period, can best be described as a supernormally clear focus of attention (which, however, was very rapidly changing) with practically no background of consciousness. The increase in clearness was quite evident in sensory modalities other than the kinaesthetic. I was aware of throat-noises when a person a number of feet away from me swallowed; of color shadows in a magazine cover, and the like; in a word, of stimuli which are normally well above the sensory threshold but which usually pass unnoticed.

Accompanying this distortion of space was also a distortion of time. A given period of time seemed very much more extended than normally. Speech seemed slow. Walking became a ponderous affair. In walking I felt successively sensations from the muscles and joints involved. I became aware at each step, for example, of sensations due to the curling of the toes. If the clearness of the sensations accounts for the distortion of space, the very rapidly changing focus of attention would readily account for the distortion of time. We naturally and normally judge a period of time by the 'filling', by the number of processes that have claimed the center of attention. Under the influence of peyote this filling, for a given unit of time, is much increased, and so the period seems extended.

These reactions were of an unexpected sort and could not have been anticipated from a reading of the literature. They may have been due either to the fact that I am non-visual or to the fact that I took a larger dose of the drug than is elsewhere recorded in the literature. As a result we were quite unprepared to make sensory tests. Several tests of a rough sort were tried. Apparently my ability to judge brightnesses of greys was not enhanced. My after-images of the James waterfall and of the Mach spiral were normal. Stereograms were normal. An absolutely restful insomnia lasted throughout the night. I worked the next day without, apparently, any disastrously ill effects. It was at least forty-eight hours before the dilatation of the pupils of the eyes and other physiological effects had entirely disappeared.

The state I have just described seems more like that reported for hasheesh or *cannabis indica* than for peyote. The exception is that the illusions following the use of these two drugs are described as being accompanied by a 'feeling of superiority'. In the present experience I had a definite feeling of inferiority. Mitchell, however, reports the opposite: "Yet the sense of increased ability was so notable that, liking to test it, and with the commonsense belief in its flattery, I took up a certain paper on psychology, which a week before I laid down in despair. I grieve to say that it was less to be comprehended than ever."

The above experiment was made in an effort to determine whether or not the visual manifestations following the use of peyote are imaginal in character. In that respect the experiment was a failure. Visual colored manifestations occurred in my case in spite of the fact that I am normally almost totally devoid of visual images. These phenomena were, however, much less intensive and saturated in my case than would appear from other reports in the literature. The colored phenomena appeared only on a dark field, either with the eyes closed or with the eyes opened inside a light-proof bandage. The crucial test, as Mitchell has already pointed out, can be made only on a congenitally blind subject. Up to the present time I have been unable to induce such a subject to undergo the experiment. I shall be glad to supply the drug to anyone who can procure the proper subject.

Owing possibly to the fact that I took an especially large dose of the drug, I experienced a distortion of space and time not recorded for this drug but apparently resembling that obtained with hasheesh or *cannabis indica*. All sensations appeared to be greatly enhanced in clearness but not in intensity or, in the case of colors, in saturation. The state can be described as a very clear but rapidly changing focus of attention. The increased clearness seems to account for the distortion of space; the rapidly fluctuating focus of attention seems to account for the distortion of time.