

FURTHER OBSERVATIONS ON PEYOTE INTOXICATION

By SAMUEL W. FERNBERGER
UNIVERSITY OF PENNSYLVANIA

WITHIN the last few years, Rouhier¹ has published the most complete survey of the nature and effect of the drug that is variously known as Peyote, Mescal Buttons and whose scientific name is *Anhalonium Lewinii*. In this summary, the psychological aspects have been least adequately treated. Rouhier curiously enough is either unacquainted with or ignores most of the American work in this field. Sometime before the appearance of this book, the author² published a personal record of intense peyote intoxication. Up to this time all of the psychological records mentioned only intensive and spectacular visual manifestations. The question arose as to whether or not these visual effects were central or peripheral in character—whether they had a sensory or an imaginal basis. The author, who normally is devoid of visual imagery, hoped to make a crucial test of this problem but the results were not as clear cut as might have been desired. There were very slight visual effects but, it is true, nothing like those described by Havelock Ellis, S. Weir Mitchell and others. What this observer did describe, which was mentioned for the first time in the literature of this drug, was a grave upsetting of space and time and an exceedingly rapid changing of the focus of attention. Space was extremely extended and time extremely slowed. The author believed that these effects had not been noticed before because former observers approached the problem motivated to observe visual effects only and so became interested in these to the exclusion of everything else. These descriptions of the visual effects by other observers, fit exactly into the later description of the rapidly changing focus of attention which the author described primarily for kinaesthetic experiences—largely sensory in character.

During 1930, Mr. Vincent M. Petrullo of the Department of Anthropology at the University of Pennsylvania spent the summer among the Oklahoma group of the Delaware Indians studying

¹ A. Rouhier, *Le Peyotl*. Paris: 1927, Dom. Pp. xii+371.

² S. W. Fernberger, *Observations on Taking Peyote*. *Amer. J. of Psychol.*, 1923, 34, 267-270.

the Peyote Cult which is widely practiced by that group. His full report of the ethnological aspects will eventually appear in the Publications of the Museum of the University of Pennsylvania. During this study, he made a number of observations of a psychological character which may be briefly summarized and which appear to be new observations in the psychological literature.

The best reporters of this group of Indians insist that visions may occur under peyote intoxication but that it has become considered socially admirable and desirable to suppress these visions and that, after some practice, this may be successfully accomplished. The informants also state that they are able to control visions when they occur, that is, to change the vision to that of any particular known object or to hold a vision that occurs in consciousness for a considerable time. Both of these statements are totally at variance with the descriptions of all previous observers of the visual manifestations. The Indians of the more conservative sort emphasize the *cleansing* effects of eating the drug, due in part to the vomiting which is induced but also, apparently, to the feeling of well-being which frequently accompanies the period of insomnia after the taking of the drug. Petruccio also reports that in the Peyote Cults investigated there is no actual, implied or even symbolic eroticism which marks these ceremonies off from practically every other known American Indian ceremony of any tribe or group.

In order to ascertain the validity of some of these reports, nine mature members of the faculty of the University of Pennsylvania submitted together to extreme Peyote intoxication. The experiment was a group one because it more nearly reproduced the situation in the Peyote ceremonies and gave the opportunity for suggestion of one observer upon another. The "meeting" was provided with drums and rattles and, during the latent period, the observers spent their time employing these and learning the Peyote songs of the Indian ceremony. All of these observers had training in introspection, were acquainted with psychological terminology and were of known imaginal type. Records were taken for each observer and subsequently each observer presented a final report of the period of insomnia. Those who acted as observers were: (1) Howard P. Becker, Instructor in Sociology; (2) Alfred I. Hallowell, Assistant Professor in Anthropology; (3) J. Alden Mason, Curator American Section, University Museum; (4) H. Sherman Oberly, Assistant Professor Psychology; (5) Vincent M. Petruccio, Instructor Anthropology; (6) Lin-

ton Satterthwaite, Jr., Assistant Curator American Section, University Museum; (7) Jeremiah P. Shaloo, Instructor Sociology; (8) John K. Shyrock, Lecturer History of Religions; and (9) Donald R. Young, Assistant Professor Sociology. These nine observers will hereafter be known by number.

The Peyote buttons were prepared in the Indian way by being boiled in water for about 1½ hours and both the buttons themselves and the infusion was ingested. The record of the dosage and of the imaginal type of the observers appears in the following table. For the dosage the number of buttons and the number of cups of infusion are given separately.

Observer	Dosage		Imagery		
	Buttons	Cups	Visual	Auditory	Kinaesthetic
1	6	1	Excellent	Fair	Excellent
2	7	..	Excellent	Poor	Fair
3	7	2	Fair	Fair	Good
4	5	2	Good	Good	Good
5	3	..	Good	Excellent	Good
6	7	2	Poor	Fair	Excellent
7	5	.	Excellent	Excellent	Excellent
8	3	2	Good	Poor	Good
9	4	1	Poor	Poor	Excellent

All of these observers are of mixed type with No. 2 most closely approximating a pure visual type and 3, 6 and 9 most closely approximating a pure kinaesthetic type. For Observers 1 and 8 there is indicated a mixture of visual and kinaesthetic imagery and for 4, 5 and 7 a mixture of these plus auditory imagery—the most highly mixed.

Most of the observers came to the "séance" without dinner. By 7:30 P.M. Observers 3, 4, 6, 7, 8 and 9 has started eating Peyote, these observers taking the last dose not later than 9 P.M. Observers 1 and 2 started to eat the drug at 9 P.M. and continued to midnight. Observer 5 started to eat at midnight but, for reasons of assisting with the experiments curtailed the use of the drug very shortly afterwards. All of the observers, except No. 2, violently vomited one or more times during the evening. Most of the observers stayed until after 6 A.M. the next morning.

Perhaps the best way of presenting the data obtained is by the case method. Subsequently an attempt will be made to summarize the material presented.

Observer 1. The latent period for visual phenomena was three hours and five minutes after the first dose. Before this time he gave evidence of exhilaration to a marked degree and evidence of less than the normal susceptibility to fatigue. For example,

during this period, the observer beat a drum with his hand and with a free hand movement for more than a half hour with evident pleasure and entirely without rest. This observer, at a later period, shook a rattle with a free arm movement for over 45 minutes without stopping and he reported that he had nothing to do with the tempo. Observer 1 reported brilliant visual phenomena which could be obtained with the eyes open or closed. With the eyes open there was an observable enhancement of the visual sensory field and throughout this stage a very definite enhancement of the auditory sensory field as well. The visual phenomena could be changed to images of familiar objects at will but with difficulty. It does not seem worth while to describe actual visions of which so many have been already described in the literature. As usual they had great brilliance and rapid movement. This observer reported that no really good reds appeared in his visions. It was found that changing the rhythm of the drum beat seemed to have no effect on the rapidity of change of the visual phenomena. Time was reported as extremely slow. The visual phenomena had disappeared in about 2½ hours after their first appearance. This observer actively tried to get aphrodisiac reactions and completely failed during the period of intense intoxication. The very complete subsequent report of this observer indicates a continued exhilaration, loss of social inhibitions and less than normal susceptibility to fatigue. The enhancement of the visual sensory field continued for 10 hours after taking the drug. The observer dozed for 2½ hours early in the morning but never fell into a sound sleep. No feeling of nausea persisted to this time. The exhilaration continued greatly diminished throughout the next day and no fatigue was felt until the late afternoon—more than 36 hours after the last previous sleep. The anti-aphrodisiac effects continued for about 72 hours.

Observer 2. This observer gave reactions which were somewhat anomalous. Although he ingested 7 buttons, the only observable reactions were the usual dilation of the pupils, a marked exhilaration and a very evident anti-fatigue effect. At no time did this observer enough nausea to lead to vomiting. But at 4:30 A.M. the next morning he reports that he was still awake with "unlimited" energy. There was evident release also of the usual social inhibitions. He reports a constant "great activity" of mental processes. The situation is described as similar to mild alcoholic intoxication but without the "muddling" effect of alcohol. This observer also notes a strong anti-aphrodisiac effect of the drug. Although no visual phenomena appeared spontaneously,

he tried to call up visual images of colors alone and in combination and reports that these color images came more easily than usual. He also notes that his hearing seemed more acute than normal. This observer gives the direct introspection that the auditory sensations did not seem more intensive than usual but were clearer and more readily attracted attention. He retired for about 1½ hours toward morning but doubts if he slept ½ hour in all. He went through the next day without fatigue until, in the evening, intense fatigue was noted.

Observer 3. This observer had very severe nausea—vomiting four times from 8 until 11 P.M. but always eating more peyote after each spell of nausea. His latent period for visual phenomena was 3½ hours after the first dose. Before this time there had been nausea and the usual dilation of the pupils of the eyes. One of the earliest effects was the enhancement of the visual and auditory sensory fields. Quite early there was noted an apparent slowing of time. This observer reports the usual visual phenomena, never intensive but with rapid movement. Reds were never reported. Particular colors appeared in these visions upon verbal suggestion. It was found that visual forms could be controlled by suggestion as well but with a certain amount of difficulty. Once the visual phenomena were gone, this observer reports that time seemed very slow. In spite of extreme nausea, the observer was evidently exhilarated and uninhibited.

In his subsequent report he observed a continuance of the anti-fatigue effects for at least 36 hours. Anti-aphrodisiac effects were also noted by this observer. The primary after effect is incorporated in the statement of this observer that "A dose of Peyote seems to be equivalent to a good night's sleep".

Observer 4. The latent time for this observer was relatively short—some visual effects occurring in about 2⅓ hours after the first dose. The first effects were dilation of the pupils and marked exhilaration before this time. There was reported an enhancement of the visual and auditory fields and a marked slowing of time. Once, for example, when he was drumming very rapidly, he remarked that he was unable to increase the speed of the drum beat from a slow rhythm. This observer reports the usual visual phenomena but they are described as poor and the colors unsaturated. He was unable to control the color or form of these visions by suggestion.

The subsequent report indicates that the exhilaration and anti-fatigue effects continued for some hours as well as the apparent slowness of muscular movements. This was accompanied

by the continued apparent slowness of time. The rest of the night was spent in reading without sleep. By 8 A.M. this observer felt fatigue. One statement of this observer seems worth recording. "There were a few times, as indicated last evening, when I had colorful effects only with the eyes closed. When others described their effects, I could imagine them perfectly. To me, a great deal of the visual phenomena seem to be self-induced." Again anti-aphrodisiac effects are noted.

Observer 5. This observer took only one dose of three buttons and, shortly afterwards, self-induced vomiting so as to assist in the experiment. Certain effects were apparent however. Within two hours there was dilation of the pupils and obvious exhilaration. After a latent period of 5 hours, this observer reported visual effects with the eyes closed. These could be controlled for both color and form and they were more brilliant and more saturated than the usual visual images for this observer. The localization of these visual images was normal—before the eyes and projected to about 10 inches. All colors are reported but the reds are described as poor. The anti-fatigue effects continued for 24 hours. Anti-aphrodisiac effects are also noted.

Observer 6. This observer gave very complete reports during intoxication and also gave a very complete supplementary report. His latent time was relatively long—slightly over 4½ hours for the visual phenomena. He suffered greatly from nausea during both the period of profound intoxication and later. In the very early stages there was first the usual dilation of the pupils and exhilaration in spite of great nausea. This was apparently slowed even before he had the visual phenomena and later he describes time as simply non-existent. This observer obtained the usual color manifestations probably with more brilliance and certainly with more persistence than any of the other observers. They largely held the center of his interest once they appeared. He was impressed with the rapidity of color changes. "Very dynamic, moving every instant. In doubt as to color. Color changes too rapidly for accurate account. On the whole the colors are not highly saturated. On the whole the designs are geometrical in form and not of objects." These designs are described as two-dimensional only and are present only with the closed eyes. Good reds were not reported. During this period it was not possible for this observer to call up visual images of familiar objects such as his own desk. During all of this time there was also a heightened visual and auditory sensory field as well. At no time did this observer seem able to control, by suggestion, the form, color

or duration of his visual phenomena. As the intoxication began to wear off and the visual images were of less frequent occurrence, they would again reappear when stimulated by either the drum or the rattle beat. There was a definite anti-fatigue effect which lasted for nearly 24 hours. The visual phenomena seemed to persist to a very much less marked degree for about 20 hours. For 36 hours this observer reports a feeling of "detachment and indifference to my surroundings which seemed unusual".

Observer 7. The latent time for this observer was also about $4\frac{1}{2}$ hours for the visual phenomena which was relatively long. His visual phenomena were the usual rapidly changing geometrical designs but also visions of known objects, accompanied by an enhancement of the visual and auditory sensory fields. It was possible for this individual to call up normal visual images on suggestion and these seemed of more highly saturated color than usual. These effects persisted intermittently for about 18 hours. There was marked exhilaration and an anti-fatigue effect for this observer as well. Profound anti-aphrodisiac effects were also noted which continued for over 24 hours after intoxication. This observer reports that his visual experiences could only be partially controlled by suggestion as regards form. A suggested form would come to consciousness and then rapidly change to associated forms.

Observer 8. This observer left early and his observations are largely contained in a supplementary report. The first effect, after a latent period of about 2 hours, was a marked enhancing of the auditory sensory field followed by the visual sensory field as well. After $4\frac{1}{2}$ hours he had the usual visual phenomena with the closed eyes only which persisted for about $3\frac{1}{2}$ hours. His visions were almost entirely of objects (known or imaginary) with practically no occurrence of the colors in geometrical forms. These visions changed very rapidly, were vividly colored and could not be controlled by suggestion. This observer continually reports a split personality. Anti-fatigue and anti-aphrodisiac effects were also emphasized. There was also marked exhilaration.

Observer 9. The latent time, before the visual phenomena appeared, was about 3 hours for this observer. Before this time there was marked dilation of the pupils and evident exhilaration in spite of marked nausea. This observer remarked that he had "never felt worse or had a better time". At first the visions were of geometrical designs, intensive and highly saturated but rapidly changing. This observer reports that the designs could be brought to consciousness or eliminated by suggestion. For

example, in one case, he had a brilliant vision and said to himself "This would look nice as a peacock feather" and at once the form changed to that of a peacock feather. These visions were apparently affected by the drum and rattle rhythms. For example, he reports the entire field covered with an unsaturated colored film which breaks up into intensive points of the same color at each sound of the drum or rattle. A marked slowing of time is recorded. When listening to the report of another observer, this subject reported that his visions changed continually to correspond to the report. At another time, he tried to suggest images to another observer and found that he, himself, was having the visions he was attempting to suggest. These phenomena were reported as always flat and entirely without perspective. There was a very marked anti-aphrodisiac effect which continued for over 24 hours. The anti-fatigue effects persisted for 18 hours. It is of interest to note for this observer that, during the period of profound intoxication, he believed that the visual phenomena were largely ordinary visual imagery attended to more closely than usual. He subsequently reports: "I have tried to bring back the same kind of color effects I described to you but *without the slightest success*. I remember distinctly some of the colors and patterns from Friday night but I cannot see them."

Discussion. These reports settle certain points with regard to Peyote intoxication but also raise a number of new problems which cannot be settled from the data presented here. Certain effects are constant and certain others seem of highly variable occurrence. On the whole the physiological effects seem more constant than the psychological effects. Thus the first noticeable effect for all observers was marked dilation of the pupils of the eyes, followed shortly after by marked exhilaration. The effect of this exhilaration was the lowering of social inhibitions. The lessened susceptibility to fatigue was marked for all observers. With few exceptions, these men rose early on Friday morning and did not sleep until the Saturday night following. More than half of the observers stayed together throughout the whole of Friday night—the night of the "séance". Several of the observers either played the drum or shook a rattle, both with a free arm movement, getting real enjoyment from the doing of it and for periods which would have led to painful fatigue under ordinary circumstances. In most cases this anti-fatigue effect was followed by a reaction and a much longer period of sleep than usual.

So far as the psychological effects are concerned, all of the

observers report an enhanced visual and auditory sensory field. Colors seen seemed brighter; noises seemed louder; the sound of one's own voice seemed louder than usual. Observer 2 reports that actually he does not believe that the colors and sounds were actually more intensive but that they came more readily into the focus of attention. Five observers (1, 3, 4, 6 and 9) report a marked slowing of time which was first reported in the literature in the solitary observation of the author.

The usual visual phenomena were reported by 8 of the 9 observers—only Observer 2 failing to obtain them. On the whole, the phenomena reported correspond in most respects to the large number of such reports that have already appeared in the literature. But in this respect there were wide individual differences in the reports. Observers 1 and 6 found that the visual phenomena occurred only when the eyes were closed or when the room was in darkness. Several of the other observers reported that the visions could be obtained with the eyes open but that they were enhanced with the closure of the eyes. Observers 1, 3 and 5 report that no good reds were ever noted; while Observer 9 emphasizes in his report some very good reds. Three observers (1, 8 and 9) report frequent visions of familiar objects and 5 observers (1, 4, 6, 7, and 9) report geometrical figures. Observer 8 emphasizes the fact that very few geometrical figures occurred. All of the 8 observers who had visual effects report rapid movement and change in the visual manifestations. Several insisted that the visions were flat and without perspective and several indicate egocentric localizations. Observers 1, 3, 4, 5 and 6 report that the colors were not intensive or saturated, Observer 6 characterizing them as being best reproduced with pastel water colors. On the other hand, the visual manifestations are reported as very brilliant and saturated by Observers 7, 8 and 9.

There seems to be no correlation whatsoever between either the frequency of occurrence or the saturation of the colors of the visions and the ability of the observer to visualize in normal situations. The two poor visualizers had both good frequency of visions, one (No. 6) apparently getting them most plentifully and for longer duration of any of the observers. Observer 3, characterized as a fair visualizer, had only fair frequency of the visual phenomena. Of the three observers characterized as good visualizers, one (8) had good frequency of visions and two others (4 and 5) had poor frequency. Of those characterized as excellent visualizers, two (1 and 7) had good frequency of visions and Observer 2 had none at all. If anything there would seem to be

something of a negative correlation between visualization and frequency of the Peyote visions.

The same sort of relations seems to hold for the normal ability to visualize and the saturation of the colors in the visions. Of the poor visualizers, Observer 9 had good and Observer 6 poor saturation; while Observer 3, a fair visualizer, had also poor saturation. Of the good visualizers, Number 8 had good and Numbers 4 and 5 had poor saturation of the colors seen in the Peyote visions. Finally, of the excellent visualizers, Observer 7 had good, Observer 1 reported poor saturation of the colors and Observer 2 no visual phenomena at all. Certainly these results fail to show any relation between either frequency or saturation of the visual manifestations under Peyote intoxication and the normal ability for visualization of the observers. They leave entirely unsettled, therefore, the question as to whether these visual manifestations of Peyote intoxication are of central or peripheral origin.

The question of the effects of suggestion may be settled somewhat more satisfactorily in spite of certain individual differences. Observers 6 and 9 both reported that a change of the rhythm of the drum beat had an effect upon the rapidity of the rate of change of the visions and Observer 9 reported the drum or rattle beat had an effect on the form as well. The drum must be considered an elementary form of suggestion in this situation and, in the Indian Peyote ceremonies, a drum is beaten continuously throughout the night. Observer 1, however, notes specifically that he fails to find that the drum rhythm had any effect on the visions whatsoever.

Observers 3, 4, 5, 7 and 9—five of the nine observers and five of the eight who obtained any visual effects—report that the visions could be controlled in duration (rapidity of change), in color and in form by suggestion. This might be either auto-suggestion by the observer or verbal suggestion to the observer. Observers 6 and 8 report specifically a failure to control the vision in any way by suggestion of any sort. In spite of these individual differences, there seems to be little doubt that in many individuals the visual effects may be controlled by suggestion as regards duration, color and form. In this respect the reports of the Indians seem to be correct as against the reports of the previous observers who had contributed to this problem in the literature and who had all insisted that such control was impossible.

All of the observers note, in one way or another, what may be called a condition which approximates a split personality. At

no time did the visual effects have reality. In every case the situation was described as apparently a rational self (probably largely verbal in its imaginal background) alongside and distinct from the sensory and concrete visual imaginal self. The two did not mix—the visions remained more or less as abstractions. One interesting aspect of this split personality, which was a chance coincidence, may be an interesting lead toward interpretation of certain aspects of the Peyote ceremonies for social psychology and for anthropology. An Indian reported to Petrullo: "I am not shaking this rattle—God is shaking this rattle—I have nothing to do with it." Observer 1 volunteered the information: "I am not shaking this rattle—my arm is doing it—my ego has nothing to do with the control of the rhythm." The difference between these two statements is one solely in interpretation. It is easy to imagine, on such a basis of split personality, in which the rational self becomes detached and different from the sensory self, how a mystical religious interpretation of approach to the God-head may be so readily built up.

One unexpected and unforeseen result of this investigation is the evident strongly anti-aphrodisiac effect of the drug. This would again explain, for social psychology and for anthropology, the purely and totally unerotic character of the ceremonies of the Peyote cults so unusual to American Indian ceremonies. For every one of the observers, the anti-aphrodisiac effect of the drug was marked and continued, in most cases, for at least 24 hours after the period of intoxication. Efforts at erotic stimulation proved ineffective. In several cases physical automanipulation of the genitals failed to produce the usual physiological effect. The calling up of erotic images—visual and verbal—were equally ineffective.

The facts are plain, the drug is a strong anti-aphrodisiac. The data are unequivocal in this respect. The interpretation, however, is not so clear. The failure of the physical manipulation of the genitals points to a physiological basis for the effect. On the other hand, the failure of the imaginal production of erotic reactions might be given either a physiological or a psychological interpretation. It may be possible that these images—like all of the others in this condition of split personality—fail to lead to the usual result because they (as all other images) are abstracted from the ego or self or the rational part of one's conscious make-up.

In any case, it would seem that we have here the basis of explanation of several problems raised by the anthropological in-

vestigation of this group of Peyote cults. We have confirmed the ability to control the visual manifestations of Peyote intoxication as reported by the Indians and at variance with the published reports of other physiological and psychological investigators. We have demonstrated that the drug is a strong anti-aphrodisiac which would account for the totally, even symbolic, non-sexual character of the Peyote ceremonies. And we have hinted at the possible explanation of the belief in the approach to the God-head described by the Indians, in terms of the apparent split personality between one's rational conscious processes and the sensory conscious processes.