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Effects of Experimentally Induced Psychoses on Artistic Expression

By G. TONINI and C. MONTANARI

As the years have passed by, the scope of studies on experimentally induced psychoses has become increasingly extensive. More substances have been found to be capable of inducing, in normal subjects, psychopathological symptoms, usually of the dissociative type, bearing a resemblance to those observed in mental patients. During the last ten years the most important of these substances, bulbo-capnine, mescaline and the amphetamines, have been joined by the amides of lysergic acid; one of these, LSD 25, is marked by the fact that it acts on administration of extremely small doses (*Stoll, W. A.*). There is an extensive literature describing the effects of these drugs, based on observation of the behaviour and recording of the utterances of the subjects intoxicated.

The conclusions arrived at by the various authors who have studied this subject are not identical, however; their physiopathological inferences have been reached along different lines of reasoning and are based on different types of experimental study. Disagreement prevails on two points in particular. One point concerns the relationship between the manifestations induced by these drugs and those observed in psychoses, especially schizophrenia: is there a true analogy between the clinical condition and that produced experimentally? The other important problem is concerned with the comparative study of the psychopathological effects of the above substances. Once a difference in the individual response to these particular toxic agents has been admitted, the question should be put

whether these substances might not have a specific pharmacological action.

The present paper was written with a view to contributing to the solution of these problems, especially by studying the pictures produced during intoxication with these drugs by a painter, G. S., head of the artistic department of occupational therapy attached to our Hospital. These pictures provide a concrete, visible material, which is perhaps more effective than written records, which, as they are largely based on introspection by the subject studied, are often subject to alterations induced by the mnemonic recall of the symptoms. For it is a fact that a work of art reflects a character, an ability to respond to one's environment or, conversely, to one's own mental life, so that it expresses every state of mind of the artist, however transient. In the work of art all essentially "mental" qualities are reflected, ranging from the most simple such as perception and psychomotor activity to the most elevated and complex qualities which determine the philosophy of life of the individual.

The experimental studies reported in this paper were done on a 30-year-old, physically normal subject, showing no evidence of mental abnormality. His character and temperament are exceptionally well-balanced, so that they do not appear to conform to the customary conception of the artist's personality. He is modest, simple and somewhat timid in his interpersonal relationships, possibly as a result of his rather difficult childhood; he has a very definite and personal style of painting, however. His way of feeling and manner of reasoning, which have also shaped his attitude to life, are slightly primitive. His instincts and emotions undoubtedly dominate his reasoning, without suppressing the latter, however; tuned to his surroundings, he is susceptible to every manifestation of life.

The experiments were always conducted in such a way as to allow the subject as much freedom as possible; he was not aware of the specific action of the drugs administered to him. He frequently drew spontaneously during the various intoxications, without having been requested to do so; the accompanying illustrations are reproductions of these original drawings which were in vivid pastel. The following drugs were administered in succession, at intervals of about a fortnight: mescaline sulphate, lysergic acid diethylamide (LSD 25) and monoethylamide (LAE 32), and d-desoxyephedrine hydrochloride (methedrine) alone and combined with mescaline or LSD 25 respectively.

We shall now present the records of the experiments.

Mescaline sulphate:

At 9.17 a.m. the artist ingests 0.50 g of the drug while at work. During the next two hours he shows autonomic nervous disturbances and restlessness, though continuing to draw. As time goes on, the subjects of his sketches become poorer, the artist reverting to the more common and automatic type of drawing, especially vases of flowers. For purposes of comparison, a vase drawn in the normal state has been reproduced in Figure 1.

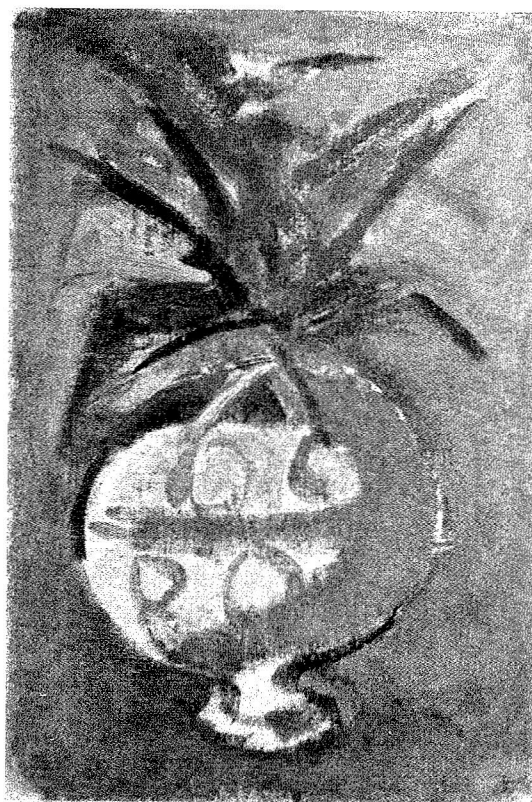


Fig. 1

The subject then experiences a sense of well-being, accompanied by a gradual detachment from his environment. His facial expression has changed markedly;

the features are tense, the eyes shining and fixed; his attitude, as expressed by the parted lips, is at once sensual and one of astonished contemplation.

At this point it would appear useful to refer directly to the original records, supplemented by some personal observations.

11.30 a.m.: Gradually, the agitation and restlessness disappear, to be replaced by a sense of well-being and pleasure. The colours seem very delicate to him and his own pictures impress him as being more beautiful: "Everything looks more beautiful in this state... the most pleasant colours are pink and sky-blue."



Fig. 2

11.40 a.m.: The subject holds in his hands some reproductions of pictures by Paul Klee, a painter whom he has always liked. He looks at them for a long time. "They arouse different emotions, but the colours are always the same." It is interesting to note that he concentrates mainly on reproductions of those paintings in which the German abstract artist, abandoning the narrating element, has come to devote himself increasingly to a merely stylistic and chromatic study. This preference is undoubtedly due to the present state of mind of the subject; it is also associated with the previously recorded impoverishment of contents.

12.00 a.m.: "I believe that now it will be difficult to explain what I feel, because visual attraction is too strong." While making this statement, he takes the pastels lying on the table one by one and places them side by side, regarding the resulting combinations for a long time. "More than anything else, I feel the urge to combine and compare colours...."

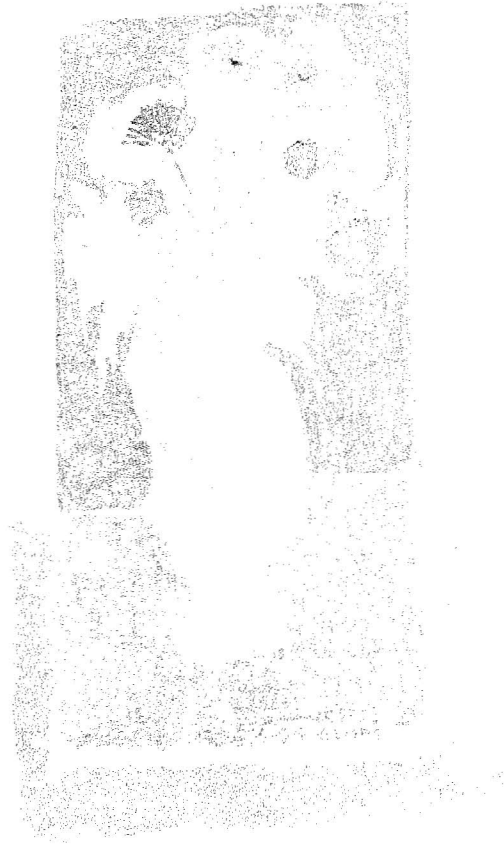


Fig. 3

12.15 p.m. He starts drawing again; it is still the colours that attract him, the subjects remaining unchanged. He also does some sketches in black and white, they are essentially similar to those done in the normal state, although the way in which he expresses himself in colours is somewhat different. The pictures most

characteristic of this stage of intoxication have been reproduced in the Figures 2 and 3. He then does a number of sketches which he does not take the trouble to finish. His movements have become very slow and he has difficulty in putting aside the colour he is painting with, as he would like to go on using it indefinitely. "Now I do not even take pleasure in combining colours, but only in the colour itself."

He then draws no more until evening, as his attention is diverted by psychosensory disturbances (hallucinations, illusions and synaesthesias), which absorb him to such an extent as to render impossible any spontaneous motor activity. In addition, he is unable to communicate with others and his surroundings are becoming increasingly remote and foreign to him. The autism and hallucinations now are occasionally accompanied by other disturbances of a schizophrenic type, such as cataleptic manifestations, attacks of unfounded anxiety, mental automatism, distortions and caricatural mental images of his surroundings and of other people.

Briefly stated, a number of mental disturbances are observed, especially in the final stage of intoxication, which might undoubtedly be classified as symptoms of schizophrenia. The character of the subsequent psychotic development may, however, also be inferred from the pictures done shortly before the toxic manifestations reached a climax. Figures 2 and 3 display a mode of expression different from that used by the artist in the normal state. In addition to the vivid colour combinations and the pleasure taken in the colour itself, attributable to the sense of well-being during the initial stage of intoxication, these pictures also show signs of a marked change in attitude, both pictures are indicative of a tendency to carry diagrammatization to extremes. Though graceful, the colour-tone combinations suggest a concentration on style rather than on expression; the colour is carefully applied until it has become homogeneous and, observing the painter at work, the onlooker comes to realize that this "manner" is the result of an automatic tendency to revert to what has been done previously, a true perseveration. Also note the sharp spatial delimitation in Figure 3.

Lysergic acid diethylamide:

At 9.30 a.m. the subject is given 60 μ g of LSD 25, dissolved in a glass of water. Autonomic nervous disturbances appear within a few minutes; we shall not describe them in detail, as they are similar to those which occurred during the previous experiment; they persist for an hour and a quarter. It is not until the end of this stage that the state of mind of the subject appears to be changing in that a sense of well-being gradually sets in, accompanied by changes in the manner of drawing. The artist draws a group of goats, one of the subjects he has most often studied. He does a very clear sketch of this group, but in colouring it he unexpectedly reduces it to a blurred polychromy. Subsequently he is "dazed" for a short while and his speech is impaired. Immediately after he feels more active, however; to quote his own words, he feels "less bound, less imprisoned by the colours; I used to paint because I liked to combine colours, now I take pleasure in painting itself." And he rapidly and excitedly sketches a large number of flower vases, which drawings do not differ markedly from those done in the normal state.

His eyes are shining, his face is congested, his pulse is rapid. He shows every sign of nervousness, extreme excitement and discontent; he responds normally to the environment, however.

At 12.45 the subject lapses into a state of catalepsy, accompanied by negativism and maintenance of attitudes. When the experiment is over, he states: "throughout this period my thoughts were concentrated on finding a movement that would have allowed me to do something and, especially, on discovering the reason for having to do something, why I should have to move in order to do something". Well over an hour later this condition disappears as suddenly as it had been initiated and the subject starts painting again, passing readily from one colour to another. His



Fig. 4

stroke is very firm, the colours are determined and sure, the pastels are unhesitatingly set down on paper. A large number of pictures are done in succession. Figures 4 and 5 are two of a series of five pictures done at the end of this stage. One of these,



Fig. 5

the first, which has not been reproduced, represents a very graceful flower vase, with a few bright spots of colour against a dark background; the second (Figure 4),

a picture of a much larger vase, was completed within a few seconds; it gives the impression of being the result of a sudden outburst of impetuous aggressiveness. In doing the three other pictures, however, the movements of the artist have become slower; though delicate, the style is somewhat mannered. The facial expression of the artist is grave, as if he wished to express the great importance that appears to attach to everything he does.

The subject feels remote from everyday life and in regard to the patients walking in the adjoining courtyard he remarks: "I cannot see them in their true state; they look to me like ordinary people and I feel I am one of them."

At 2.30 p.m. the subject behaves and speaks normally. About ten minutes later, however, another psychomotor inhibition develops. Alternations of this type follow each other in rapid succession until late at night, although certain psychopathological features tend to prevail, lending a particular character to this final stage of intoxication. The following are some passages quoted from the records of the experiment:

7.35 p.m.: the subject hesitates, wastes time in choosing his colours. "As the colours will be clearly seen . . . I must stop to think for a few moments."

He then draws two or three highly stylized trees, which he afterwards proceeds to obliterate.



Fig. 6

"I am now acting automatically... I feel as if I were a thermometer of my mental state... I believe I am technically expressing the state I am in."

8.25 p.m.: he is still working on the same picture: "I feel just like one of my patients... I have an automatic tendency to draw these lines... this is the pleasure afforded by "superstructures"... I feel a strong urge to do this... I could go on until to-morrow morning... but I am not satisfied... I am thwarted at every turn." Saying this, he continues to obliterate the picture, which has to be taken away from him before it becomes unrecognizable (Fig. 6).

The next picture is similar to that described above. Throughout the night he goes on drawing one line after another, looking for a long time at what he has done. The greater part of these pictures have no starting-point and do not allude to any definite subject.

Amphetamines:

Our artist was twice given 30 mg of methedrine intravenously. In both experiments the action of the drug persisted over a period of several hours. Its effects consisted in an increased ideational activity, an unusual expansiveness and an increased facility of expression. The most striking features of this last point were an unflagging excessive activity and a rapid passing from one subject to another. The artist, however, confined himself to making drawings, the form and contents of which did not differ from those done in the normal state. Administration of methedrine strengthens the ego, causing the subject to revise, correct and be overcome with enthusiasm when retouching or repainting certain pictures; the hand moves rapidly and unhesitatingly, the pastels are set down firmly on paper.

To complete this series of investigations, a similar dose of methedrine was administered, after a suitable interval, when the psychotic manifestations induced by mescaline (0.60 g orally) and LSD 25 (80 μ g intravenously) had reached their peak. The effects of these combinations deserve special mention. The injection of methedrine was followed by an initial stage, during which the psychotic manifestations increased and were prolonged to such an extent that the subject was unable to do any drawing or painting whatever, whereas a subsequent stage, during which the psychotic symptoms were less pronounced, was marked by changes in the style of painting as compared with the mode of expression following administration of mescaline or lysergic acid diethylamide. When mescaline is combined with methedrine, the form, contents and narrative element remain more or less unchanged, so that these pictures may be compared with those done in the normal state. The colours, however, continue to show the fairy-like quality characteristic of the pictures done after the administration of mescaline. Though sharply defined, the figures lack the contrast and retouching typical of those done in the normal state; this deficiency, if it may be defined as such, is offset, however, by the care taken by the artist in expressing himself in various colour combinations, which has possibly increased the freshness of the pictures. To illustrate this manner of painting, we have reproduced Figure 7, which is comparable to the other illustrations, although it is much less expressive, with a view to affording a better understanding of what is written in this paper about the fairy-like nocturnal landscapes, the "women under the awning" and the other pictures done during intoxication.



Fig. 7

Intravenous administration of 30 mg of methedrine within two hours after the intravenous injection of LSD 25, though increasing and extending the whole range of psychotic manifestations (synaesthesias, hallucinations, illusions, stereotypy, catalepsy, mannerisms, etc.), tends to induce certain qualities in the manner of painting (facility, rapidity) similar to those marking the pictures done on administration of amphetamine, although certain characteristics previously described as typical of LSD 25 are still seen. In this case the changes were also observable when the extremely severe psychotic disturbances, initially induced by the amphetamine derivative, had begun to disappear.

Lysergic acid monoethylamide:

The intoxication induced by LAE 32 passed without the subject having drawn any pictures.

So much for the description of the experiments. Unfortunately, the inclusion of a larger number of illustrations, which, better than any comments, would have contributed to a better understanding of our work, was not possible owing to the high cost.

Discussion

We administered various substances with a toxic action on mental functions (mescaline, LSD 25, methedrine and LAE 32) to a painter, who did various pictures in certain stages of intoxication. The greater part of these pictures differ from his usual manner of painting, especially as regards style. The states of more or less severe dissociation (a state of dazed blissfulness, of catatonic negativism, of irrepressible excitement) were seen to correspond with particular changes in the mode of artistic expression. The more severe psychopathological states, however, coincided with "silent" phases during which the artist was unable to do any painting. Thus the addition of amphetamine to mescaline or LSD 25 resulted in a prolonged paroxysm of mental disturbances, which prevented the subject from working. It was not until later that a state of excessive activity developed, which continued for one or two days and was probably sustained by the methedrine not yet eliminated from the body (*Richter* has shown how slowly phenylisopropylamine is eliminated from the organism); the pictures done during this period still retained the features characteristic of those done during the previous intoxications induced by LSD 25 and mescaline. Thus the elimination of these drugs is apparently delayed by the presence of methedrine.

At this point we shall attempt to answer the questions put at the beginning of this paper. As regards the differences between the effects of mescaline and LSD 25, we draw attention to the inaccuracy of the conclusions arrived at by certain authors (*Fischer et al.*, *Matefi*), according to whom the former substance induces a psychosis of the catatonic and the latter one of the hebephrenic type. It is true that there is a difference in regard to many secondary features, but this difference is not essential as far as the fundamental psychopathological nucleus is concerned. This nucleus is chiefly characterized by autism and dissociation, symptoms appearing in both types of intoxication. In addition to this symptomatological unit there are differences in syndromes; these are attributable to the individual constitution of the subject and to the chemical nature of the drug employed. Our subject, for example, showed a predominance of psychomotor symptoms on the administration of either drug; administration of LSD 25 induced more marked catatonic manifestations. Without anticipating the results of comparative studies which we have done on a certain number of subjects, we claim that there are differences between the

effects of LSD 25 and those of mescaline. They are clearly reflected in the pictures done by our artist; in addition to the absence of delicate colour combinations following administration of mescaline, evidence of an automatism inclined to contemplation, intoxication induced by LSD 25 is characterized by a discontinuous course resulting in a variety of symptoms (Figs. 4 and 5).

We shall now proceed to the last question: does the action of these drugs induce schizophrenia? We believe the answer to be in the affirmative, although schizophrenia cannot well be reduced to a unified concept. Both from the artistic and from the clinical point of view, "schizophrenics" are capable of anything, ranging from the most unexpected abstrusities devoid of any logic or significance to behaviour, ideations and expressions that are evidence of a completely normal mind. Thus the paintings done by our schizophrenics include



Fig. 8. "The rain", painting by a paranoid schizophrenic.

some pictures which are definitely descriptive and coherent in addition to being original as regards subjects and colours (see Fig. 8).

Although it may be that in certain patients (such as the painter of the picture reproduced in Fig. 8), to quote *Jaspers*, "new forces emerge... which thrive on a pathological soil", this is not true of others, whose painting is confined to a play with styles, forms and colours, whereas the contents and narrative element are simplified to the point of disappearance.

In our opinion this difference in the artistic behaviour of schizophrenics is due to the intensity and, especially, the rapid course of the process of dissociation.

We believe that we are justified in concluding that the changes in artistic production induced by the drugs in the case reported can be interpreted in the manner described in this paper. The pictures do not contain any new elements in the creative sense, *but reflect psychopathological manifestations of the type observed in schizophrenia*. Although in art there are no tests by which to differentiate between normal and pathological states, a comparative study of the usual mode of expression and that described as resulting from intoxication induced by mescaline and LSD 25, as well as the parallelism between artistic activity and the symptoms of toxic origin, have increasingly convinced us of the dissociative character of the manifestations induced by these drugs.

Summary

A normal individual, a professional artist, was subjected to successive intoxication with LSD 25, mescaline sulphate and other drugs exerting a toxic action upon the mind. Changes in behaviour and in artistic production, usually running a parallel course, were observed. The paintings done did not contain any new elements in the creative sense; when done under the influence of these drugs, however, they reflected psychopathological manifestations markedly similar to those observed in schizophrenia.

The possible interaction between amphetamine derivatives and drugs with a dissociative action is also discussed in this paper.

Zusammenfassung

Bei einem psychisch normalen Kunstmaler wurden Tests mit LSD 25, Mezcalin und andern psycho-aktiven Substanzen durchge-

führt. Es traten meist parallele Veränderungen des Verhaltens und der künstlerischen Leistung auf. Unter Einwirkung der erwähnten Drogen enthielten die Malereien keine «neuen» Elemente im schöpferischen Sinne; sie zeigten aber psychopathologische Züge, die genau denjenigen entsprachen, welchen man in der Schizophrenie begegnet.

Die möglichen Interferenzen zwischen Amphetaminen und Pharmaka mit dissoziativer Wirkung werden diskutiert.

Résumé

Les auteurs ont soumis un individu psychologiquement normal, peintre de sa profession, à des tests successifs d'intoxication par le LSD 25, le sulfate de mescaline et d'autres substances psychoactives. Ils ont observé des modifications parallèles du comportement et de la production artistique. Sous l'effet de ces substances, les peintures ne présentent pas d'éléments nouveaux au point de vue créatif, mais elles reflètent cependant des expressions psycho-pathologiques très semblables à celles que l'on trouve chez les schizophrènes.

Les interférences possibles entre les drogues amphétaminiques et les substances à action dissociative sont également discutées.

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Fig. 2

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