Brit. J. Psychiat. (1967), **113**, 1115–1121

Experimental and Phenomenological Approaches to the Problem of Hallucinations in Organic Psychosyndromes*

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The study of the form and content of hallucinations remains a fascinating and intriguing one to all who are interested in psychopathology. In our present state of knowledge it provides the basis for experimental approaches to the aetiology of hallucinations. This paper is a brief review of the relationship between experimental and phenomenological approaches to the problem of hallucinations associated with organic cerebral lesions.

1. *The form of hallucinatory experiences*

Hallucinations appear in diverse forms as well as in different sensory modalities. Classical studies in this field were primarily concerned with the careful delineation and description of the various types of hallucinatory experiences. Thus, Esquirol (1838) is usually credited with having first made the distinction between illusion and hallucination, whilst Baillarger (1846) separated hallucination proper from a variety of psychic experiences which might today be categorized as schizophrenic thought disorders, certain obsessional thought disorders, imagery or pseudohallucinations. When Karl Jaspers produced the first edition of his *General Psychopathology* in 1913, he could already draw on a voluminous psychiatric literature dealing with the phenomenology of hallucinations. Jaspers, following Kandinsky and Müller, made clear-cut distinctions on phenomenological grounds between hallucinations proper and imagery. For Jaspers, hallucinations are perceptions that spring into being in a primary way and are not transpositions or distortions of any genuine perception as are illusions. Hallucinations have all the qualities of percepts, and in this way are again quite distinct from imagery or from the special forms of imagery which have been called pseudohallucinations.

Phenomenological Definition

It might be pertinent at this point to mention briefly the criteria by which Jaspers distinguished percepts or hallucinations from imagery. Perceptions—as also hallucinations—are of concrete reality, they have the characteristics of objectivity, they appear in external objective space, are clearly delineated, and stand before us in a detailed fashion, their sensory elements being full and fresh, the colours vivid; they are constant, are retained unaltered, are independent of will in that they cannot be changed voluntarily, and are passively experienced. In contrast, images are figurative; they have a character of subjectivity, they appear in inner subjective space, they are not clearly delineated and are often incomplete, their sensory elements are relatively inadequate, they are dissipate and have to be recreated, they are dependent on the will, they can be conjured or deliberately altered and are produced with a feeling of activity.

Closer examination of the criteria laid down by Jaspers reveals that these are pertinent particularly to visual experiences, and that certain of the criteria are themselves extremely complex notions. For example, by "concrete reality" Jaspers means "what is real", what we have *concretely perceived*. In contrast with imagery, or imagining, perception has a quality not determined by the particular sense organ, but is rooted in the actual mode of what is sensed, which is something absolutely primary and constitutes sensory reality. Such immediate certainty of reality has to be distinguished from reality judgment, which is the result of a

* A paper read at the Clinical and Research Section of the R.M.P.A. Annual General Meeting, Sheffield, July, 1966.

thoughtful digestion of direct experiences. These are tested out against each other; only that which stands the test is accepted as real, and hence only that is "real" which is commonly identifiable and accessible to others and not merely a private and subjective matter (Jaspers, 1962, pp. 94–95).

The differences cited above between imagery and perception are, however, by no means clear cut, and, as Jaspers points out, there are forms of imagery termed pseudohallucinations in which the image appears fully projected in front of the subject, often in vivid sensory detail, and yet remains a subjective experience. Jaspers, nevertheless, believed that imagery and pseudohallucination hardly ever merge into hallucination proper.

Experimental Studies

If imagery and hallucination proper are phenomena of fundamentally different orders, it is of vital importance in any consideration of "the hallucination problem" to know whether this can be substantiated by experimental methods as well as by phenomenologically informed reflection and introspection. Such experimental studies are remarkably few in number; many workers investigating "hallucinations" have failed to recognize that a fundamental issue exists at all, or have blindly accepted that the experiences ranging from imagery to hallucination proper lie on a continuum. Galton (1883) showed many years ago that the intensity and projection of visual imagery varied between individuals and that there was a "normal" distribution in the degree of such qualities in the population. He postulated on the basis of anecdotal data that there might be a continuum between imagery and some varieties of hallucination. Klüver (1965), summarizing his views, considers that classificatory attempts have never caught up with the richness and variety of subjective visual and non-visual experiences, and that it is not surprising that many investigators have felt that they could not do justice to the enormous wealth of normal and pathological phenomena in the field of perception. He quotes as an example the experience of Klein (1936), who had difficulty in describing and classifying the characteristics of hemianopic hallucinations in his patients. Klüver agrees that it is pointless to draw even finer distinctions, since they are merely an expression of the fact that the range from transient subjective phenomena to normal "objective" perception is tremendously wide, comprising many different levels of "reality" and many different states of consciousness.

Be this as it may, it is still pertinent to enquire whether experimental studies have been able to throw any light on the question. Seitz and Moholm (1947) showed that there were only four other experimental studies prior to their own which were concerned with the hypothesis that hallucinations were exaggerations of mental imagery. None of these studies had been able to reveal any direct relationship between imagery and hallucinations, this being confirmed in their own carefully controlled work; indeed, their own studies revealed that there might even be a correlation between a deficiency of auditory imagery and the presence of auditory hallucinations (both in a group of schizophrenics and in patients recovered from an alcoholic hallucinosis).

There have since then been no further studies specifically concerned with the relationship of imagery and hallucination. Sedman (1964, 1966a), in a comparative study of imagery, pseudohallucinations and hallucinations proper in a group of psychiatric patients, demonstrated that there is a marked similarity between imagery and pseudohallucinations, both contrasting with hallucinations proper as regards their clinical correlations; and in another paper (1966b) he demonstrated that there is evidence on phenomenological grounds for regarding imagery and pseudohallucinations as phenomena of the same order, both contrasting with hallucinations proper. However, the question is by no means finally settled, and there appears to be ample scope in this field for further studies using all manner of techniques and approaches.

2. *States of consciousness*

So far I have discussed one particular aspect of the problem, namely the question of the forms of various perceptual abnormalities and the relationship between them. It is now possible to consider a second variable, namely the level of conscious-

ness of the subject at the time of the abnormal perceptual experience. This is a very practical consideration, for, in the main, hallucinatory phenomena appear in two types of psychiatric syndromes, firstly in organic cerebral illnesses in which there is a disturbance of consciousness, and secondly in schizophrenia where consciousness is usually considered to be clear. Before making any comparisons between the two groups, it would appear pertinent to examine the first group more closely, not only in relation to any alteration in consciousness but also in regard to the form of the hallucinatory experience, for it is concerning this group that most difficulties have arisen, although paradoxically this is the group about which we have most knowledge.

(*a*) Physiological Exceptional States

The half-waking state, a physiological state of altered consciousness, provides a field for investigation additional to that of experimental or pathological conditions. Various forms of psychic activity are frequently reported by subjects who experience the half waking state: in some individuals these experiences merge into dreams or conversely are immediately dispelled when the subject becomes fully awake, though they can often be recalled in considerable detail. The variety and relative frequency of such psychic activity has been reported on at length by McKellar (1957). Most workers tend to regard hypnagogic experiences as forms of imagery, though from the phenomenological viewpoint they may also be pseudohallucinations; indeed, the first usage of the term pseudohallucination by Hagen (1868) was to describe hypnagogic experiences. There is little doubt, however, that hallucinations proper may also appear in the hypnagogic state. There must be many factors contributing to hypnagogic phenomena, such as a disposition to experience the half-waking state, itself by no means universally present, fatigue, minor toxic factors, psychogenic factors, and the personality structure of the subject. Some factors are more constant, others more variable, but all contribute to the end result. The excellent studies of Freedman and Marks (1965) on visual imagery produced by rhythmic photic stimulation, for instance, have been able to demonstrate the relationship between different visual phenomena produced in various experimental situations, and also their correlations with certain personality variables.

Drug-Induced States

When, however, investigations of hallucinations were undertaken by means of hallucinogenic drugs, the many possible variable aetiological factors were often ignored, at least by the earlier investigators. Thus, mescal was looked upon as an hallucinogenic drug largely because of the auto-experiments of Weir Mitchell (1896) and Prentiss and Morgan (1896), but it could equally have been looked upon as a rather violent emetic if the auto-experiments of William James had been taken as an example. Few questioned why mescaline only produced "hallucinations" in certain individuals. Such omissions were continued in the early experimental work with LSD-25 and other synthetic "hallucinogens". The "model psychoses" were initially compared with schizophrenia, although the clinical resemblances between the two were limited. It was rather later that it was pointed out by Ardis and McKellar (1956) that the mental states produced by such drugs resembled much more closely the hypnagogic state, and that the experiences were phenomenologically varieties of imagery, and further that they were occurring in an undoubted state of altered consciousness.

Sensory Deprivation

Exactly the same criticisms may be applied to the production of "hallucinations" under conditions of so-called "sensory deprivation". Here, much of the earlier work has been discredited, and attention is now being paid to the predominant role of the changes of consciousness induced by such environments, to the many experimental variables, the personalities of the subjects, interaction variables and procedural variables. These have been summarized by Kenna (1962) and Reed (1962). The importance of some of these points is still a critical issue, Ziskind (1965) and Shurley (1965) being the main antagonists in regard to this. Ziskind recognizes that the symptoms arising in sensory deprivation experiments are partly dependent

on reduced awareness, but that this is not the sole explanation of their occurrence, for there may be periods of diminished consciousness when no symptoms appear. A second factor in bringing about such symptoms is the tendency to have various forms of imagery, latent dreams coming to consciousness in the temporary absence of alerting mechanisms, which allows their expression as "hallucinations". In this respect Ziskind considers the phenomena to be imagery or pseudo-hallucinations and not hallucination-proper. Shurley, however, remains sceptical of such an explanation: he still feels that reduction of sensory input is a direct factor, and that some of the physiological variables asserted as being related to arousal are at the best crude and unreliable measures. Shurley does not appear to make any critical distinctions between imagery and hallucination proper: "my study of imagery under many different conditions inclines me to believe that man is an actually or potentially hallucinating animal all of the time . . . " Clearly the results of Reed (1962), who was able to elicit in normal subjects in less than 40 minutes most of the S.D. phenomena reported by investigators using many hours or days of so-called reduced sensory input, tend to negate the reduced sensory input theory.

(*b*) Pathological Changes

There are certain pathological lesions which are classically associated with hallucinatory phenomena. Thus L'Hermitte (1920) and Van Bogaert (1927) described an hallucinatory syndrome "hallucinose pédonculaire" associated with lesions of the brain stem. This was originally thought to be due to the specific localization of the lesions, though L'Hermitte subsequently modified his views in this respect. Lesions in this region are particularly likely to produce alterations in consciousness owing to their interference with the reticular formation. The role of the latter in the production of hallucinations has been singled out in particular by Scheibel and Scheibel (1962). Likewise, studies on the hallucinatory phenomena associated with narcolepsy have been likened to those occurring in the natural half-waking state (Brain, 1939) and may be related to disturbances in the reticular formation. Thus, lowering of consciousness cannot be definitely excluded, indeed seems likely, and in general the reported experiences would appear to be forms of imagery or pseudo-hallucinations, though there are some case reports of transformations of such experiences into hallucinations proper (Coren and Strain, 1965).

Berger and Oswald (1962) have commented upon the occurrence of hallucinations in the periods of momentary drowsiness due to sleep deprivation, and in another paper Oswald (1962) has described the induction of illusory and hallucinatory voices akin to schizophrenic experiences in non-schizophrenic patients by causing them to listen to repetitive personal remarks. This was during a form of behaviour therapy; Oswald's patients were sleep deprived, but he claims that some of the experiences occurred whilst the patients were awake; however, the techniques involved (amphetamine, apomorphine, pilocarpine used as well as the psychological method) may well have induced a change in the level of consciousness, independent of the sleep-wakefulness continuum.

Epileptiform States

It has long been known that patients suffering from epilepsy may experience hallucinations in association with their attacks. These may be auditory and resemble those which occur in schizophrenia (Slater and Beard, 1963), whilst on occasions they may take the form of "inner voices". Thus Karagulla and Robertson (1955) reported that a patient experienced "evocation of thoughts" as part of his seizure pattern, and that this could be reproduced by direct cerebral stimulation; the thoughts had an "amorphous" quality and were not clearly formulated. In other patients in this series, more clearly formulated or "crystallized" thoughts, inner audible voices and external voices occurred, and were considered by the authors to lie on a continuum with the other experiences. The work of Penfield and his associates on the responses of human beings to intracerebral stimulation has attracted a great deal of interest in this context. If hallucinatory experiences occurred as part of an epileptic seizure, Penfield designated these "experiential hallucinations", and if such an experience could be elicited by

electrical stimulation of the cerebral cortex, he used the term "experiential response". The patient usually reported the latter as coming from his past, and although the phenomenology of such experiences is poorly reported (one major failing in Penfield's work) they may be a form of "memory images". In this context, Hoenig *et al.* (1962) have argued that the experiences reported by Penfield's patients are not "memories" but either hallucinations or illusions. From the information given, it is difficult to be sure: Penfield reported that, although there was a strong sense of immediacy in these experiences, none of the patients had ever confused the hallucination with reality, except perhaps for a moment. All had retained awareness of the operating room and the events occurring in it even during the time of the experiential response. For example, Case 22 said: "I see people in this world and in that world too, at the same time"; Case 2: "People's voices—relatives—my mother's"; he was asked if he also realized that he was in the operating room—he said "Yes" and tried to explain by saying it was like a dream. Case 3 saw robbers with guns, and his brother aiming an air rifle at him; the menacing robbers were like those he had seen in picture books. The interpretation of the word "to see" is open to question in such statements, but, alas, Penfield leaves us still wondering. Experiential responses could only be elicited from the temporal lobe cortex, and it must be observed that the accounts are based upon a highly selected group of patients all suffering from temporal lobe epilepsy. Not only that, but in a series of 520 patients (Penfield and Perot, 1963) actual experiential hallucinations had only occurred in 10 per cent. and experiential responses in only 7·7 per cent. A voice, voices, music or meaningful sounds was elicited from 16 different stimulation points in 24 patients, mainly limited to points on the lateral and superior surface of the first temporal convolution. Judging from the frequency of reports by these patients of a "dream-like" experience or unreality feelings at the time of the electrical stimulation, it seems likely that there was an accompanying change of consciousness akin to that which occurs with the spontaneous seizure. The facts suggest that an "hallucination" is not necessarily the direct result of stimulation, but may be mediated through an alteration in consciousness. Personality factors are probably very important in the production and reporting of imagery, as has been pointed out by Freedman and Marks (1965) in respect of visual imagery produced by photic stimulation, which also induced what the authors described as a "suspension of the generalized reality-orientation" (or "trance"), i.e. an alteration of consciousness. Information regarding the personalities of the subjects reporting experiential responses is not available in Penfield's work.

Parietal Lobes

Lesions in parts of the brain other than the temporal lobes may be associated with hallucinations. Critchley (1939) reviewed the literature up to that time, and concluded that, with occipital lesions the hallucinations are generally visual, coloured but otherwise simple, such as flashes of light, balls of fire, stars, etc., usually projected into the contralateral visual field, which is often a blind one. With lesions further forwards, the hallucinations are more complex and may appear in more than one modality. Here perusal of the literature reveals that, in most reported cases, the hallucinations are associated with periods of clouding of consciousness.

Deliria

I will complete my remarks on "organic" hallucinations by briefly commenting on the hallucinations which arise in delirious states. From the clinical point of view, we know that the form and contents of the experiences are not specifically related to the various aetiologies concerned. Studies such as that of Wolff and Curran (1935) have shown that the clinical picture is dependent to a striking extent on the previous personality of the subject.

Others, such as Schroeder (1936), Claude and Ey (1932), have taken the view that the clouding of consciousness is all-important, and would explain the visual hallucinations of delirium as being visual imagery, wrongly interpreted by the subject because of impaired judgment. Indeed, this is a cardinal question, whether all "organic" complex hallucinations are explicable in these

terms; and it is not surprising to find that theories of arousal or cerebral vigilance based upon neurophysiological models are now in vogue as "explanations" of hallucinations. The interested reader is referred to a paper by Scheibel and Scheibel (1962) and a recent paper (1965) by Hernandez-Peon, in which rather complex neurophysiological models are presented. The former paper re-introduces an older theory of Hoppe (1888) that the internal structure of the eye provides the material for "hallucinations", an idea which has also been recently incorporated by Horowitz (1962) in respect of imagery. Future studies along these lines are likely to be of considerable importance.

Having introduced some of these basic problems in the study of organic hallucinations, a future paper will be concerned with the application of such knowledge to the hallucinations which occur in states of apparently clear consciousness.

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(*Received 21 October, 1966*)