

Dr. BLANDFORD.—Gentlemen, I rise with great pleasure to propose a vote of thanks to our President for his extremely interesting address. We can appreciate the time and labour which it has involved, and I am sure that it will be very valuable to us for perusal on future occasions. I am not going to discuss the address, and will only say I completely agree with the conclusions at which our President has arrived.

Dr. G. SAVAGE.—Gentlemen, it is my very great pleasure to second this vote of thanks to our President for his most interesting and satisfactory address. Reference was made to the fact of Dr. Blandford's and my own work not having an allusion to "paranoia." The omission on my part was due to the view I held, *viz.*, that it was an impossibility to make clear to others what was then so indefinite in my own mind.

Dr. RAYNER.—I wish to add my thanks to those which have been expressed to our President for having undertaken this Augean work, for it is nothing else. I agree with his conclusions, and we have only to look at the collection of tables he has put before us to see that "paranoia" is a possible cause of confusional insanity.

The PRESIDENT.—I beg to thank you very much, gentlemen, for the kind way in which you have received my address. I am afraid it may be looked upon more as a critical digest than as an original paper. It seems that there was considerable confusion on the subject, and I think I have shown that continental authorities are not at all agreed as to what they mean by "paranoia," and that this term should not be used as implying a primary intellectual disorder.

The Psychology of Hallucination. By W. H. B.
STODDART, M.D., M.R.C.P.

ALTHOUGH the psychology of hallucination does not enter largely into the literature of this country, it may be gathered from the writings of our English psychologists that most of them recognise in hallucinations, illusions, percepts, and ideas a family resemblance; but the points of dissimilarity among these processes have not, in my opinion, received their due measure

of consideration. I propose, therefore, to describe the ordinary psychology of these processes, drawing especial attention to their points of dissimilarity; and I will endeavour to show that, while their resemblance is mainly psychological, their difference is mainly physiological.

I will take up the subject from the very beginning. When you have an object before you—for example, a cigar—you have a percept of it; when you think of a particular cigar, you have an idea of it; when there is a pencil on the table, and it appears to you as a cigar, you have an illusion; and if you see a cigar on the table when there is nothing there, you have an hallucination.

Now, when you have a cigar in your hand, you experience sensations of pressure, warmth, brownness and, if you roll it between your finger and thumb, muscular sensations and perhaps a crackling sound. If you smoke the cigar, you may have sensations of bitterness or saltiness as well as a characteristic flavour appreciated by the sense of smell. These various sensations go to make up the percept “cigar.”

When you think of a particular cigar, have an idea of it, you think of it in terms of these, or of some of these, sensations of pressure, brownness, flavour, etc.; the sensations are in slight degree experienced. There are faint visual, olfactory, and tactile images of the cigar. Further, there may be faint visual and auditory images of the word “cigar,” as well as a muscular sensation about the mouth, similar to that experienced in saying the word, a so-called psychomotor image. Not all of these sensations will occur in any given individual; the particular sensations which contribute to his idea of the cigar depend on his ideational type.

There are three points to be noted at this stage:

First, these various sensations are not separately apprehended; they combine in the unitary idea or percept “cigar,” and it is only by psychological analysis that we have discovered that the percept or idea is constituted of sensations of various modalities.

Secondly, not all combinations of sensation will form a percept or idea; for example, the sense-qualities cold, red, high-pitched, sweet, and painful refuse to combine to form an idea.

Thirdly, perception and ideation localise an object and give it a shape occupying a certain amount of space. It follows

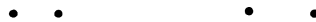
that our percepts and ideas are in reality but abstractions. We cannot perceive or ideate a cigar without giving it shape and placing it somewhere in space with an environment of its own; this environment is an essential part of the percept or idea. When we perceive a cigar as a "thing-in-itself," we make an abstraction from our general perception of space. The study of perception is therefore very little more than the study of the perception of space.

I will not weary you with a dissertation on space-perception, but there are some observations concerning it which I consider important to my present thesis and to which I must briefly refer. With Brewster's stereoscope, certain observations have been made which show that there is a strong tendency to combine different sensations in one idea. If two horizontal lines be placed in the stereoscope, one for each eye and one slightly above the level of the other, the two lines fuse into one midway between the levels of the original two. If, instead of the lines there are two circles, one for each eye and one slightly larger than the other, we see one circle of medium size.

This tendency to combine several sensations in one idea is constantly seen in institutions for the insane. For example, if a patient's attention happens to be directed to a bird in the airing court and at the same time he hears in hallucination a voice, he believes that the bird has spoken to him; the visual percept "bird" and the auditory percept of the spoken words combine to form one idea, or rather judgment—"the bird speaks." The tendency exemplifies what is known as the "unity of ideation."

Some further observations with the stereoscope demonstrate a *tendency to place ideational content in sensory experience*. If there be placed in the stereoscope (Fig. 1) four dots horizontally arranged, two for each eye, the two dots for one eye, say the right, being more separated than the two dots for the other

FIG. 1.



eye, there will appear (when such a slide is placed in the stereoscope) two dots, the right being more distant than the left. A similar effect is obtained if one dot be presented to the left eye and two dots to the right (Fig. 2). Or vertical lines may be substituted for the dots (Figs. 3 and 4).

If there be placed in the instrument a line sloping to the right for the left eye, and a line sloping to the left for the right eye, we see a vertical line, the upper end being nearer than the lower ; the line slopes towards the observer (Fig. 5).

Fig. 2.



The above observations demonstrate a tendency on the part of the organism to attach *ideational content* to these groupings of sensation. The conditions of the first diagram are obtained when two marbles are placed horizontally in front of the eyes in such a way that the right marble is more distant than the

FIG. 3.

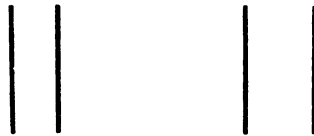
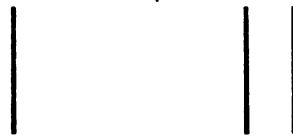


FIG. 4.



left ; the marbles appear when viewed with the left eye to be closer together than when viewed with the right. In Fig. 2 the near marble hides the distant one from the left eye. The same conditions are obtained when two sticks are placed

FIG. 5.



vertically in the ground in positions similar to those of the marbles.

The conditions of the tilted line of Fig. 5 are obtained when a pointer, such as the one I hold, is placed in front of and tilted towards the observer. To your left eye it appears to lean to the right, and to your right eye to lean to the left.

In Fig. 6 the small circle appears nearer than the large one, and in Fig. 7 the large circle appears to be the nearer. In

FIG. 6.

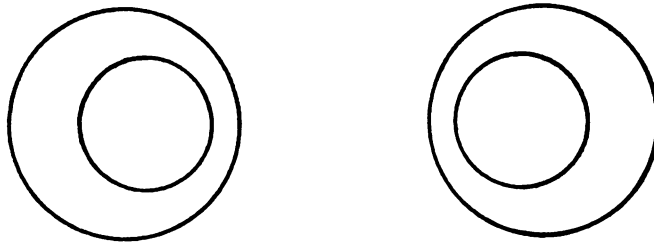
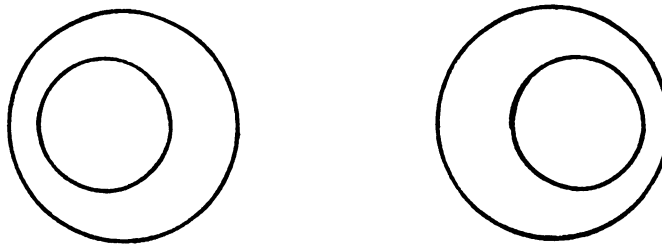


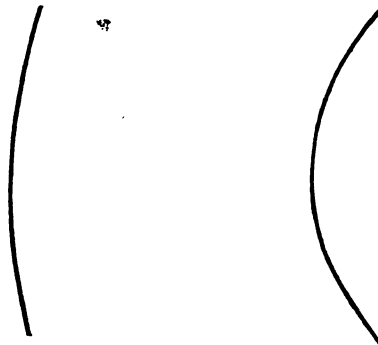
Fig. 8 the middle of the curve appears nearer than the two ends.

FIG. 7.



Figs. 6 and 7 are presumably assimilated to truncated cones; in Fig. 6 the cone is solid and viewed from above, in Fig. 7 it is

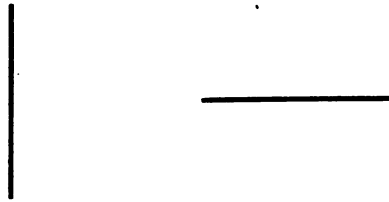
FIG. 8.



hollow and viewed from below. Fig. 8 is perhaps assimilated to a croquet hoop viewed from above and to the right.

If a stereoscopic slide be so constructed that the images presented to the two eyes are such as, in our perceptual experience of the external world, never occur together in such relationship, they refuse to combine, because it is impossible to place ideational content in them: for example, if (Fig. 9) a vertical line be presented to the left eye and a horizontal line to the right, the images do not combine to form a cross, but one of the lines crosses the other and obliterates it about the point of intersection.

FIG. 9.



If M be given for the left eye and W for the right (Fig. 10), a most puzzling result is obtained. Far from giving an unitary percept, the parts of the letters keep chasing each other out of the field. These are examples of "ideational rivalry."

The tendency to attach ideational content to images is further illustrated by some geometrical illusions. The angles of perceptual experience are, for the most part, right angles; there is consequently a tendency to assimilate all angles to right angles, and hence to over-estimate acute and to under-estimate obtuse angles.

When looked at with one eye so as to eliminate the true idea

FIG. 10.



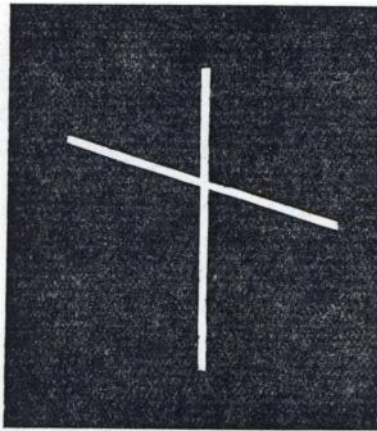
of depth gained by binocular vision, Fig. 11 appears as a vertical line in the plane of the paper crossed at right angles by a horizontal line passing through the plane of the paper, especially if an extremity of the latter line be fixated. The figure is assimilated possibly to a telegraph post crossed by a wire.

I give but one more illusion to illustrate this principle. If an after-image be obtained of a right-angled cross placed horizontally in front of the eye, the shape of the after-image is changed when the eyes are turned upwards and to the right or

left, or downwards and to the right or left, as shown in Fig. 12. The explanation of this illusion depends on the perspective of a right-angled cross.

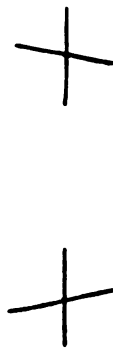
If such a cross be situated in each of the four corners of the

FIG. 11.



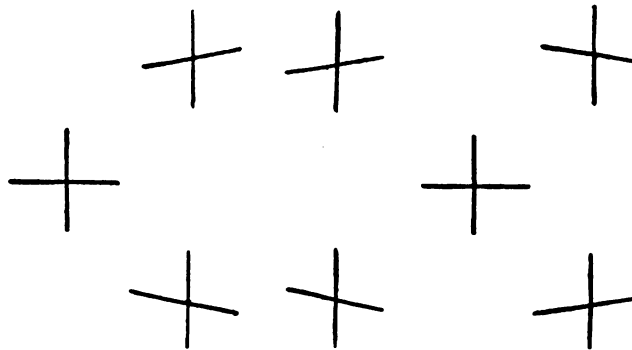
visual field, the perspective is that represented in Fig. 13. Now, "the brain" has nothing to do with after-images: it simply endows with ideational content the sensations which it ex-

FIG. 12.



After-images of a right-angled cross.

FIG. 13.



Perspective of a right-angled cross.

periences; and "the brain's" experience is that a line, in any of the four corners of the field of vision, which projects a horizontal image on the retina, is not really horizontal but tilted

away from the centre, as in the after-image diagram : hence the so-called " torsion " in the after-image of a right-angled cross.

For convenience, I continue to limit considerations to the domain of vision. Although visual images are aroused by stimulation of the retina, they are localised not necessarily in the neighbourhood of the eye, but referred to some situation in our environment. This fact has been magnified by some psychologists into a special faculty of mind, " eccentric projection," whereby our mental states are, as it were, thrown outwards into the world of experience; and it has been minimised by others, who say that visual sensations are not associated with eye sensations. In whatever way we regard this mental state, there is no doubt that we have a *something-there* feeling superadded to the crude sensations and that we place ideational content in them.

At the risk of repeating facts familiar to you all I have dwelt at some length with the phenomena of perception, because there is practically no psychological difference between perception, ideation, illusion, and hallucination. Still limiting consideration to the domain of vision, in each of the above processes, the angular gyrus is physically stimulated by the mediation of some tract of fibres (psychologically it matters not by what tract of fibres), and an image (a cigar-image, to keep to the original illustration) is simultaneously projected in the external world.

It therefore follows that the differences between perception, ideation, illusion, and hallucination are to be sought among the physical bases of these processes. The most obvious difference is that while in perception and illusion there is a stimulus to the peripheral end-organ (retina in the illustration I have adopted), in ideation and hallucination there is no such stimulus; in perception and illusion the stimulus to the angular gyrus arrives by way of the optic radiations, occipital lobe and occipito-angular association-fibres; but, in the case of ideation and hallucination, the stimulus reaches it by way of other association-fibres than the occipito-angular bundle. Confirmation of this proposition is afforded by the existence of visual hallucinations in the blind, auditory hallucinations in the deaf, etc.

Now, when a patient has an hallucination of vision there is a negative as well as a positive side to the process. The

positive side is that he sees the hallucination image; the negative is that he does not see objects in the neighbourhood of the image.⁽¹⁾

The obvious interpretation of the negative part of the process is that the neurons which normally conduct sensations from the retina to the angular gyrus are dissociated from one another (*perhaps* by the retraction of gemmules); but the same effect may be produced by the patient closing his eyes. Acute maniacs frequently keep their eyelids closed in order to encourage the formation of pleasant visions: in such cases, the dissociation factor is presumably wanting and has to be artificially supplied by the patient. Similarly, acute maniacs frequently keep their hands over their ears in order to favour pleasant auditory hallucinations: but, as you are aware, this is unnecessary in most cases. I have known two patients with whom auditory hallucinations were unceasingly present and to each of whom it was necessary for me to shout in order to make the patient hear my voice. Both these patients recovered and were not deaf when the hallucinations ceased.

As already stated, the positive side of the hallucination process is due to stimuli reaching the centre by way of association-fibres other than those by which sensations are transmitted from the peripheral sense-organ.

The hallucinated state is also favoured by the absence of sensations of other modalities than that affected. For this reason, hallucinations are most frequent during the darkness and silence of the night when small stimuli by way of association-fibres do not pass unheeded, but induce a physical state with which a correlative *something-there* psychical process occurs. The absence of other stimuli allows the affected sensory area to dominate consciousness. This principle is illustrated by the case of a lady who told me that during the delirium of typhoid she was afraid to close her eyes because, when she did so, she heard in hallucination horrible sounds proceeding from a discordant brass band: this occurred during the night. During the day the music was pleasant, and she would close her eyes in order to hear it. In this case, visual stimuli were sufficient to inhibit the auditory hallucination.

Hallucination, then, depends upon two factors, diminution of sensation and disturbance of association. These factors vary inversely in the several conditions in which hallucination

occurs; for example, in the delirium of fever and in the excited stage of acute mania there is little diminution of sensation and great disturbance of association; in cases of nitrous oxide or chloroform inhalation there is little disturbance of association and great diminution of sensation.

Dr. Head has recorded cases in which hallucination was associated with the pain of visceral disease. I have no experience of such cases, but I presume that there was no diminution of sensation in Dr. Head's patients. I therefore suggest that in such patients the hallucinated state depends upon disturbance of association, that the continued painful sensations spread by way of association-fibres to distant sensory areas of the cortex, and so give rise to visual, auditory, and other hallucinations.

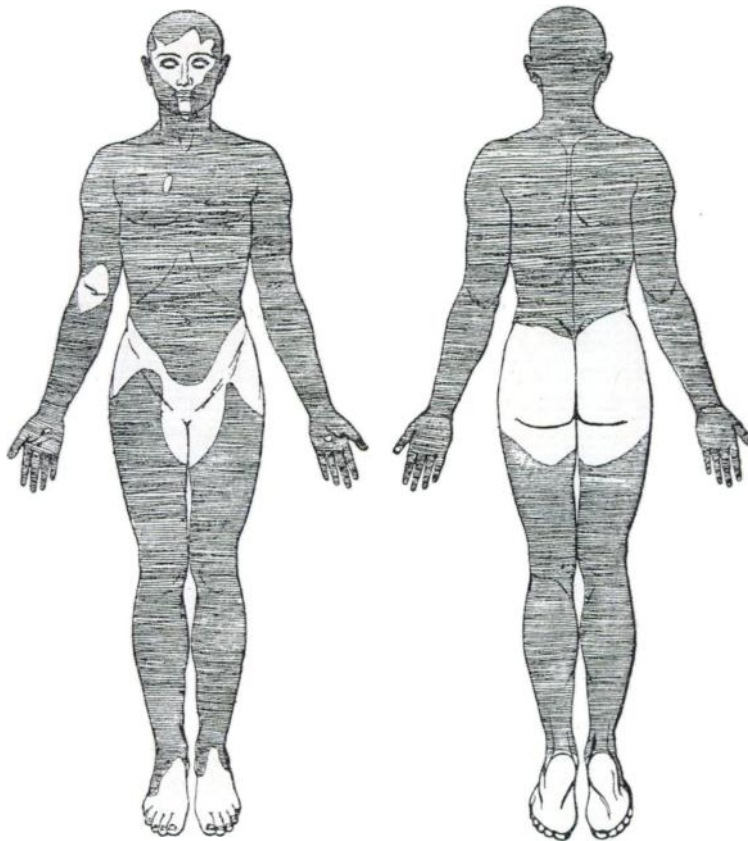
An hallucination to which I must make special reference is that known as the epigastric sensation. This is usually described by the patient as a sinking feeling about the epigastrium, but it may be a feeling of fulness or even of pain. I believe that many patients suffering from these sensations are erroneously treated for indigestion. Such sensations occur not always in the epigastrium, but sometimes in the umbilical region, in the hypogastrium, or even in the external genitalia. They are occasionally referred to the chest (sternal region), and probably such symptoms as "globus hystericus," "neurotic spine," "hysterical hip," and "hysterical shoulder" are of the same nature.

Such feelings appear to be more common than any other variety of hallucination. At Bethlem Hospital I recently took a census with regard to this point, and found that sixty-three of the two hundred and forty patients suffered or had suffered from such hallucinations, and of the remainder about twenty-five were unable to make reliable statements about the matter. Cases were excluded in which the sensation was due to indigestion or to constipation.

Now anæsthesia peculiar to the insane, has, as I demonstrated some five years ago, a characteristic distribution. You will be reminded of it by the following charts; they were obtained by mapping out on patients the areas insensitive to a pin-prick. Although I have reason to believe that insensibility to touch invariably accompanies insensibility to pain in these cases, I have found it necessary to use analgesia as my

criterion, because it is difficult to secure active attention in severe cases of mental disease. Further, many patients are unable to give verbal information about their sensations, in which case information must be obtained by noting the patient's gesture; tactile stimuli does not provoke gesture.

FIG. 14.



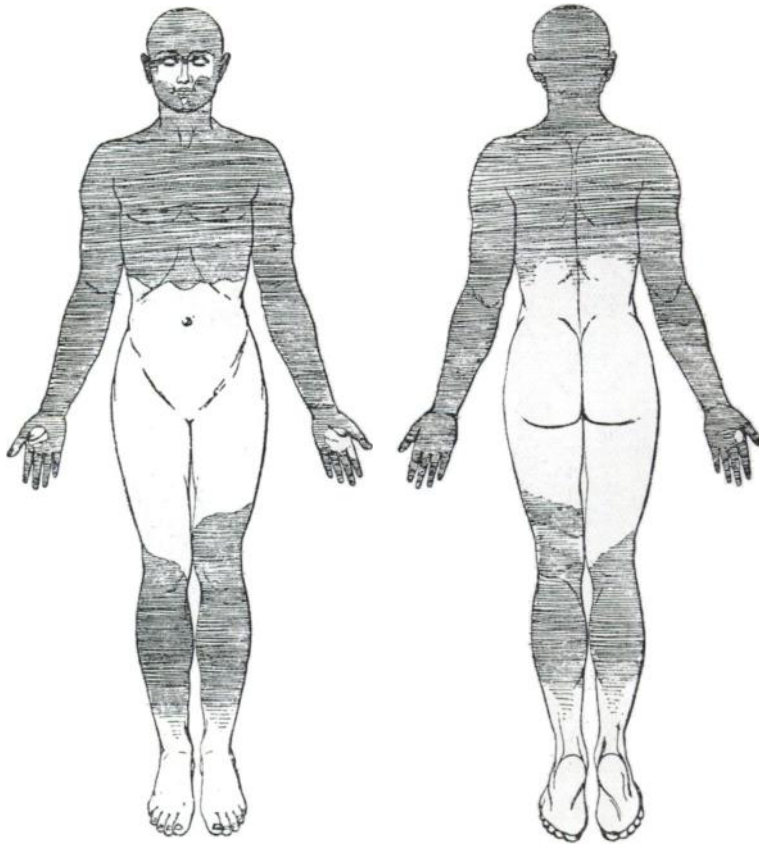
In this and the following diagrams the shaded parts represent areas of loss of sensation.

Fig. 14 is a chart of one of my Prestwich cases, a woman *æt.* 50, with melancholia of five months' duration, who came to me one morning, saying, "Doctor, something has gone very wrong with me in the night." She complained of a sinking sensation in the lower part of the abdomen, and I found that she had the anæsthesia figured in the diagram. Not the least

remarkable fact about the case was that the anæsthesia entirely disappeared in three days.

Fig. 15 is also from a female melancholiac, but her anæsthesia was more persistent. She was *æt.* 40, and also complained of abdominal uneasiness throughout her illness.

FIG. 15.



She had swallowed several pins, but I attach no importance to this fact; many patients swallow pins and appear to be none the worse.

Fig. 16 is from the case of a girl, *æt.* 18, in the *stadium debilitatis* of acute mania. She complained of a sinking sensation in the sternal region.

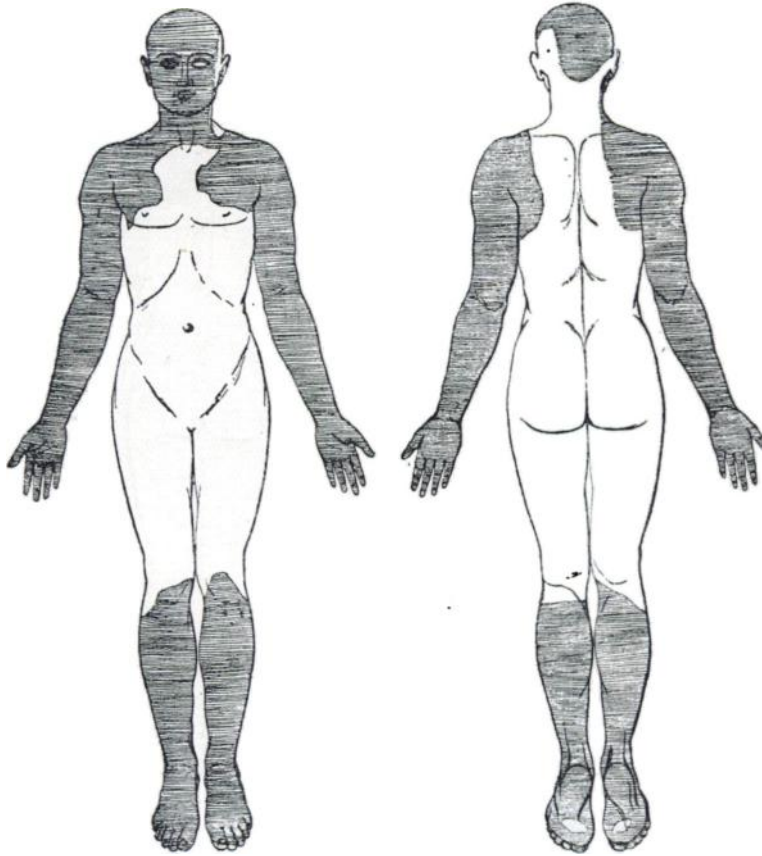
Fig. 17 is from a man, *æt.* 35, in a prolonged *stadium*

debilitatis following acute delirious mania. When his anæsthesia was charted he was complaining of pain in the left shoulder.

Fig. 18 is from the case of a woman, æt. 44, who suffered from the epigastric sensation and from hallucinations of vision.

All these patients, and many more who might be included,

FIG. 16.

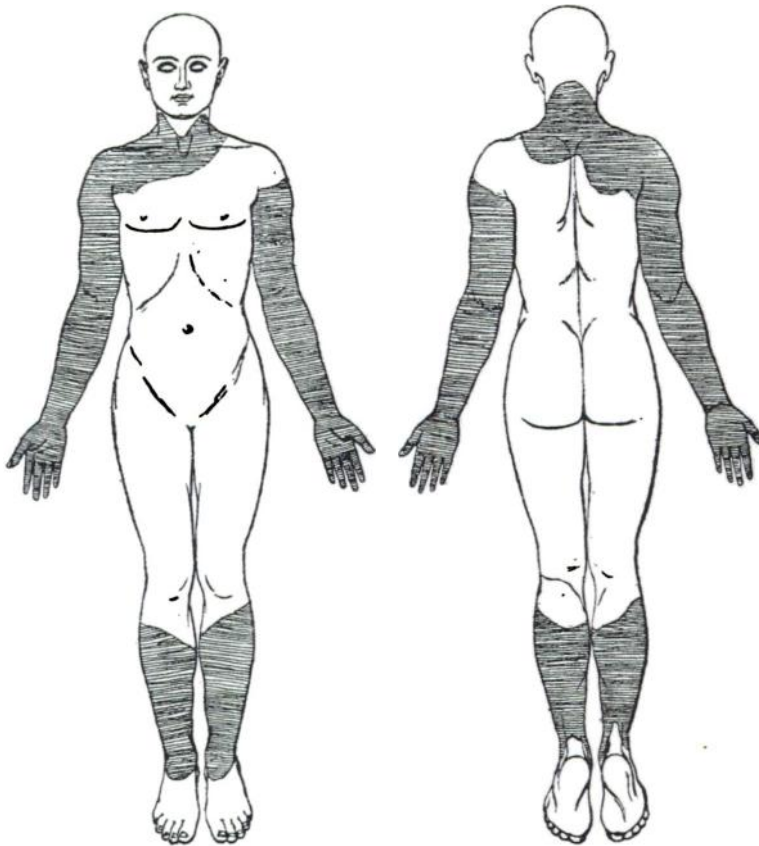


suffered from the epigastric sensation or from some allied type of hallucination; and it is invariable that patients presenting the above type of anæsthesia, when interrogated as to the presence of such sensation, answer, when able, in the affirmative; and its existence may be inferred in the remainder. Conversely, many patients having epigastric sensation tell us, on examination, that they do not feel a pinprick on the hand

so well as on the trunk. I therefore go farther and suggest that all patients having the epigastric sensation have more or less extensive peripheral anæsthesia, in some cases to a very slight degree, occasionally indeed so slight as to elude detection.

One patient, whose symptoms suggested such a view, was a

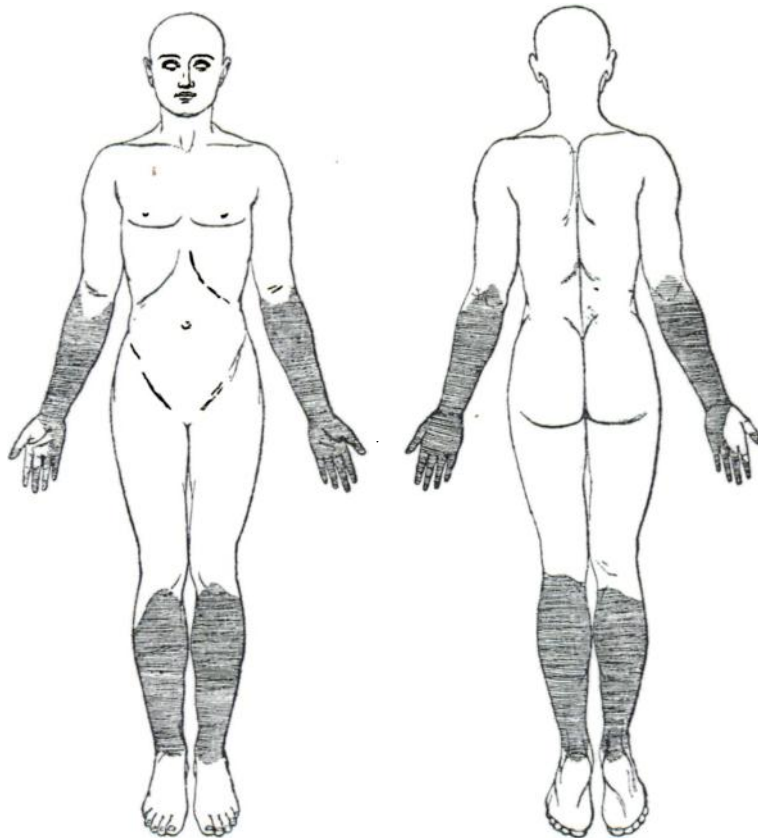
FIG. 17.



hypochondriac, who complained simultaneously of a “burning sensation” in the hypogastrium and of “loss of feeling” in the legs, but I was unable to detect by examination any objective loss of sensation in the legs. The conclusion is that epigastric and allied sensations arise in those cases in which, owing to some affection of the cerebral cortex, there is some loss of sensation in the peripheral parts of the organism.

The above data accordingly suggest the origin of epigastric and allied sensations. Consciousness is entirely derived from sensation, for in the absence of sensation consciousness does not exist. When, therefore, any part of the body becomes anæsthetic, consciousness is dependent on the sensitive remainder. In the patients now under consideration consciousness is

FIG. 18.



unusually dependent upon sensations derived from the region of the abdomen; other parts of the organism are more or less anæsthetic, and contribute little or no sensation to the content of consciousness. The abdomen and neighbouring parts thus demand a relatively large amount of the patient's attention and become the seat of abnormal sensations. They "have greatness thrust upon them."

This was well illustrated by the case of a girl in the *stadium debilitatis* of acute mania. As usual in this condition, there was extensive anæsthesia of the type which I have described; as a result the sensitive remainder dominated consciousness and the patient took to masturbation. (The habit, being started, persisted after the anæsthesia had disappeared.)

The principle which I am submitting is further illustrated by the epigastric aura of epilepsy. The first symptom of an epileptic fit is loss of consciousness; in consequence of this the patient falls. It is commonly said that he loses all sensation because he is unconscious. This does not represent the true state of affairs; the truth is that the patient is unconscious because he has lost all sensation: and I suggest that the loss of sensation begins at the periphery (arms and legs), and allows the epigastrium to dominate consciousness; hence the aura. I submit that the last event, as the patient falls, is loss of sensation in the abdomen. The principle which I have been enunciating is but a special instance of the hallucinated state being favoured by the absence of other sensations than those contributing to the hallucination.

By way of recapitulation consider the condition of an epileptic with that common visual aura, people circling round him from left to right in the room above his head. The patient is progressing towards complete loss of consciousness, otherwise complete loss of sensation. I submit that, during the aura, loss of sensation, the negative factor of hallucination, has already set in; the ceiling of the room in which the patient stands is no longer seen; and further, there is diminution of sensation of other modalities. The positive factor, disturbance of association, is demonstrated by the fact that he *sees* people circling round him in the room above.

The neural interpretation of these phenomena is that there is dissociation of neurons between the retina and angular gyrus; this prevents the patient from gaining a view of the ceiling above him. On the other hand, association is unusually active between the angular gyrus and other parts of the cortex cerebri, possibly on account of some irritating body within the neurons. The angular gyrus being thus stimulated, ideational content is attached to the sensation, and a visual image is projected of people circling round the patient's head.

In conclusion, gentlemen, I again ask you to compare per-

ception, ideation, illusion, and hallucination, having regard to the manner in which the cortical centre is stimulated in each process.

In perception, stimulus is transmitted from the periphery; there is neither *transcortical* association (to use Tanzi's word) nor peripheral dissociation.

In ideation, the centre is stimulated by way of association-fibres; but, again, there is no dissociation from the periphery. Observe, however, that peripheral association (non-dissociation) plays no part in ideation. The fact that I see a table plays no part in the projection of a faint cigar-image on the table: the idea is the result of stimulation of the angular gyrus by way of association-fibres.

In illusion, the centre is stimulated on the one hand by way of association-fibres, and on the other from the periphery; and the tendency to ideational unity combines the sensations aroused by the two sets of stimuli. Observe that the physiological difference between ideation and illusion is this, that the peripheral stimulus *does not interfere with* ideation, but that it is *necessary to* illusion.

In hallucination, as we have seen, there is transcortical association *and* peripheral dissociation. It will therefore be noted that the essential factor of hallucination is its negative factor. This is its essential difference from perception, ideation, and illusion.

There is no psychological difference between these processes. Physical stimulation of the ideational centre gives a *something-there* feeling, and ideational content in the *something-there* necessarily follows.

The psychological identity of these processes may become more obvious if I suggest a transitional state from ideation to hallucination. If, on a sleepless night, you try to induce the hypnagogic state by the classical device of watching sheep jump over a gate, transcortical association common to ideas and hallucinations supervenes. The closed eyes, the darkness, the silence supply a negative factor, and the sheep are more vivid than with the eyes open in the light of day; and as you fall asleep, as you lose sensation, they gradually assume the vividness of hallucination.

(¹) It must not be supposed that it is an easy matter to elicit this negative fact from patients. When questioned on this point, their answers are usually so

evasive that it is almost impossible to determine what they see and what they do not see, and it was only after some eighteen months' fairly constant investigation of this point that I finally became convinced of the negative side of the hallucinatory process.

DISCUSSION

At the Annual Meeting in London, July 22nd, 1904.

The PRESIDENT.—We have to thank Dr. Stoddart for this interesting paper on the psychology of hallucinations. It is a very difficult subject, and any work on it is most useful to the Association.

Dr. EDRIDGE GREEN.—I regard Dr. Stoddart's paper as of very great value. About fifteen years ago I made very similar experiments myself, with the object of proving that it was not necessary for images to fall on corresponding points of the retina to produce a combined effect, and the experiments which Dr. Stoddart has shown with the stereoscope bring this out most clearly and absolutely. I communicated a paper to the Royal Society on this subject, but the opposition I met with from physiologists, who insisted that the images must fall on corresponding points, led me to withdraw the paper. However, I am very glad to find it has been brought up again in such an extremely effective and absolutely convincing manner.

Dr. ROBERT JONES.—If it has taken Dr. Stoddart eighteen months to understand one part of his own paper, it will occupy me far more to take the whole paper in. I would corroborate what Dr. Edridge Green has said, that it is a very valuable paper, for up till now the pure pathologist has done nothing to elucidate hallucinations. It struck me that if we were able to educate several of our patients as to the exact physiology of their various hallucinations, we might be able to convince them of their error. I do not suggest we could do so with a large majority. We know, among our own patients, those whom it is absolutely impossible to convince as to the unreality of their hallucinations. Innumerable instances of this might be recorded, but I have been able to convince some patients of the hallucinatory character of their delusions; and in one notable instance a person was able to go and complete his term of service in a Government office; he was able to reason as to these and became convinced of their character as hallucinations. He relapsed, but he had been able to stay sufficiently long to get his pension, which was a very important matter for himself as well as for his family. Dr. Stoddart—if I have rightly interpreted his statements—said that the prominence given to hallucinations depends very much on the diminution of other sensations; and the converse carries some suggestion with regard to the special treatment of the insane. More especially does this aspect of it touch me, who am responsible for the management of a very large asylum, and repeatedly I experience qualms of conscience that there are a large number of patients who proceed to absolute chronicity or dementia in these large asylums, because one is unable to get at them individually. But if one were able to combat this diminution of sensation by rousing them through stimuli applied to the various sense organs, give them employment, and get at them, so to speak, by various forms of excitement, Turkish baths and so forth, as is more possible in the smaller asylums where there are fewer patients, and therefore greater possibilities of individual stimulation, these patients might perhaps be stimulated to recovery. I shall look forward to a later opportunity of going further into Dr. Stoddart's paper, as there is so much in it that I cannot do justice to on this occasion.

Dr. YELLOWLEES.—Dr. Stoddart, in this admirable paper, has directed attention practically, by these weird figures, to the loss of sensation so common with hallucinations. This recalled to me a patient whom I saw at the request of Sir William Gairdner, who had absolutely no surface sensation anywhere, not the least, but who was without hallucinations or delusions, and indeed mentally as well as any of us.

Dr. STODDART.—I thank you for the kind way in which you have received my paper. With regard to Dr. Edridge Green's remarks, I must disclaim originality on my part for most of these stereograms. Some of them were drawn attention to by Wundt some ten or twelve years ago, and Professor Titchener has added very largely to them of late. I think they conclusively prove that it is unnecessary

for images to fall on corresponding points of the retina for them to form a single image. Ideational content plays a very important part in this connection, and if, in one of those ideational-rivalry diagrams, you give two different percepts—one for each eye—and put them in such a position that it is impossible for them to form a unitary idea, they will not combine; but in figures of this kind it is not necessary for them to fall upon corresponding points of the retina to give an unitary idea. With regard to Dr. Jones's remarks about educating patients to understand their hallucinations, that is very difficult indeed; I have often tried. There was one patient especially whom I used to try to get to understand that experiment of Dr. Hack Tuke's that if, by pressing upon one eyeball, you can double an image it is not an hallucination. I tried it with this patient, who was very intelligent; and I tried to teach her that during the daytime images would be doubled by pressing on the eye. I told her to do so when an hallucination appeared. Whenever an hallucination appeared, however, she was too frightened. You cannot get patients to do it. As a matter of fact, a psychological experiment often comes in as a means of treating patients. I remember one lady who fell in love with some doctor at the Royal Ophthalmic Hospital, Moorfields. She never thought of him for about a year from the time she attended for her eyes, until indeed she began to go insane. Then she used to hear his voice and see him every morning when she woke up. I told her it would be permissible for her to listen to the voice with her fingers in her ears, and watch him with her eyes closed. She did this and the voice of the man went at once, and it never recurred. But some weeks later, she began to hear the voice of God, and I did not know how to get over that difficulty. I thank Dr. Yellowlees for his remarks. Cases have been pointed out to me which were said to have no sensation whatever; but on closer examination I have found that there is generally a little sensation in the feet and a little about the pelvis, just small areas. I have seen two or three cases of that kind. One I saw recently was an epileptic subject, in whom it was said that there was no place where he could feel. On investigation I found he had small sensitive spots. But the most interesting point about the case was that he had allocheiria; that is to say, on putting a pin into one of these spots he immediately put his hand to the opposite side. On putting a pin into one foot he put his hand on to the opposite foot. I should like to know if any member of the association has come across allocheiria associated with cerebral conditions. Of course in spinal conditions, such as tabes, it is extremely common, but this is the only patient I have had in whom allocheiria has been associated with a cerebral condition.

Histological Studies on the Localisation of Cerebral Function. (1) By ALFRED W. CAMPBELL, M.D.

AT the Annual Meeting of this Association held at Liverpool two years ago I had the pleasure of giving an account of the work which I was then doing, on the medullated nerve-fibres of the cortex cerebri, and I endeavoured to demonstrate that a comprehensive study of the form and arrangement of these constituents in the normal adult condition afforded a useful guide to precise localisation of function.

Since then the investigation has been extended in several directions. Other brains have been converted into serial