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Part I.—Original Articles.

*Recent Investigations on Visual Imagery, with Special Reference to
Hallucinations.** By T. H. PEAR, M.A., B.Sc., Professor of
Psychology in the University of Manchester.

It is difficult to give this lecture as a whole, for it is in two halves, the first dealing with normal experimental psychology, the second with psycho-pathology. I have seen few writings which bridge the gap between these two aspects of imagery. It is because this gulf may be spanned in the future that I chose visual imagery as a subject related to the interests of this Association.

During the last ten years we have learnt more of recent work in Germany. I wish to speak about one phase of that work to-day. For much of the impetus to thought about this subject has come from Prof. E. R. Jaensch⁽¹⁾ of Marburg, and his co-workers. A very good summary of his work has been given by Dr. G. W. Allport⁽²⁾, of Cambridge.

I will try to relate our present knowledge of normal visual imagery and of certain types of hallucination. Some years ago there was a tendency (by no means obsolete nowadays) to regard visual imagery as a unitary subject. One described a person as a visualizer or "visile" simply as one talks about him as able to see. But visualizers can be divided into many sub-classes. Their imagery may be separately classed according to its clearness, vividness, obtrusiveness, relevance, readiness, utility, etc. So to call a person a visualizer or non-visualizer implies a very crude classification.

These important divisions are necessary to classify true visual images of events which have occurred more than (say) a day ago.

(*) A paper and lantern demonstration before the Royal Medico-Psychological Association at the Quarterly Meeting held at Macclesfield on February 16, 1927.

Such images, to use a modern expression, show distinct " structuration " around a nucleus of interest. My visual image of St. Paul's Cathedral and yours are certain to be different, for my interest in that building and yours cannot possibly take identical directions.

For the clinician there is another important criterion of difference between images. You may be visualizers, able to picture things in detail, to make for yourself and to use mental diagrams or maps. Yet seldom or never have you mistaken one of these visual images for reality. But in the hospitals you will have met people who do. To the ordinary man this is not puzzling. He simply puts such visualizers into different categories. For him the man who mistakes images for reality is insane, and he who does not is sane—at least in that respect. Exactly what sane and insane mean in this connection he does not ask.

But this is not a satisfactory scientific division. For under certain conditions, many of us mistake our visual images for reality. We usually do so when we dream, though it is possible to recognize an image as such in a dream.

One class of normal image, while still seeming to us a product of our own mind, is apparently projected outside ourselves. Some persons, before going to sleep, see such images of quite a different type from the ordinary visual images of the day. They are called hypnagogic images. And it is important for any theory of the function of imagery that such hypnagogic images sometimes appear to be unconnected with the person's everyday life. That is, they seem irrelevant. Whether the psycho-analyst would regard them as irrelevant I am inclined to doubt.

An important psychiatric question is why in everyday life there is a very clear-cut distinction between visual perception and visual imagery. The solution of that problem is even more important for you than for the laboratory psychologist.

We will attempt to see some of the phenomena which illustrate the complexity of the relations between perception and imagery. In everyday life, though we make a very clear distinction between our percepts (our awareness of objects present to sense) and our images, they are interdependent.

In the *illusion*, or false perception, present and past experience are intermingled. Here is an example of a visual illusion. (Slide.)

The man looks bigger than the boy. Factors in this particular illusion are exaggerated perspective, making the man appear farther away, and knowledge that men are bigger than boys. Yet the visual angles subtended at the retina by the man and boy respectively are the same.

In Slide 2 the mind supplies from your past experience many details which are not present. Unless you were looking at this picture analytically, you would not notice the large number of omitted features.

But our visual perceptions are often interfered with, not by past knowledge, but by actual sensations resulting from recent experiences. When a passing motorist forgets to switch off his headlights, we who are driving in the opposite direction find that our perception of the road is interfered with by after-sensations from the dazzling glare. As with images, recent research has shown these after-sensations to be more numerous and varied than was formerly supposed. But it is important to remember that the after-sensation of vision is a real sensation, not an image. Underlying processes are going on in the retina as well as in the brain. The eye is still working, like a flywheel which continues to revolve after external power has been shut off.

A host of problems arise concerning a form of visual memory which is neither after-sensation nor ordinary visual image. It is called the eidetic image⁽¹⁾. It is a special kind of memory of an object, which some people experience after the object has been removed. It is not ordinary memory, for details which were not observed during perception are said to appear after the object has been removed.

Lastly there are the hallucination (an image of memory mistaken for a percept), and the true memory image. While the after-sensation and the eidetic image are bridges between perception and memory, in the true memory image there is often a striking selection and working-up of the details originally seen.

The eidetic image is related, in ways probably unappreciated at present, to the pseudo-hallucination. This latter is quite different from the true hallucination met with in the psychoses. A patient will describe the pseudo-hallucinations as vivid and worrying, but will insist, "I know they are not real; I know my mind is making them." His general attitude towards them is very different from that of the psychotic towards his hallucinations.

I will now endeavour to show examples of the phenomena which have been described. (The negative after-sensation of a simple geometrical coloured shape upon a background of different colour was then obtained.)

When, instead of simple geometrical figures, slightly more detailed objects are used (a black-and-white representation of a skull was shown), some people can see the details fairly well in the negative after-sensation, while for others they are blurred. Probably nobody could see as a negative after-sensation the manifold details

in the next slide shown (a silhouette containing ostrich feathers and other shapes with a multiplicity of minute detail.) Persons are found, however, who, after it had been exposed for about thirty seconds, could see such a picture not only in detail, but in its original colours or shading, *i.e.*, as a positive image. These "eidetic" images differ from after-sensations, even from positive after-sensations, in the complexity of the detail with which they appear. Yet this detail shows less structuration or grouping according to the observer's interests, than in the true memory image. Eidetic images are projected in space, *i.e.*, are truly seen. Often they fit the slanting or curved background upon which they have been projected. They may persist for long periods and return. But most interesting of all is that they frequently reproduce material which can have little intelligibility for the observer. Allport found, for instance, that a number of children were able to spell out correctly or almost correctly from their image the German word *Gartenwirtschaft*, which formed a part of this picture. The exposure of thirty-five seconds was insufficient to admit of learning of the word, especially since the picture was so rich in incident and lively detail, which the child had also to describe.

Miss Margaret Drummond (3), of Edinburgh, picked out from 34 training college students one or two who seemed to have the eidetic power in a marked degree. She showed them various pictures, including a Bernard Partridge cartoon from *Punch*. These persons showed eidetic powers to a remarkable extent.

What is the significance of eidetic imagery for psychological medicine? In Germany it was first found in school-children, and is comparatively rare in the normal adult person, educated under present conditions. In America the adult people who had eidetic imagery were often described by others as "queer." In children after 14 this tendency recedes. There is no doubt that the eidetic image exists, that it is associated with childhood, and that it occurs in adults who have retained a peculiarity of mind from childhood.

Many questions arise which have not yet been solved, *e.g.*, how far it is affected by race, age, occupation and systems of education.

The relation of eidetic imagery to the pseudo-hallucination is important. A patient who came under my observation for some time was greatly troubled by a complex and persistent pseudo-hallucination. It was so clear that he said, "If I look there, the picture begins there," indicating a point on the left, "and stops there," indicating one on the right.

It is interesting to notice that in his own conversation there were details which would have suggested eidetic imagery if one had known

of it at the time. He was anxious to understand his hallucination by familiarizing himself with the psychology of the matter. He was lent Galton's *Inquiries into Human Faculty*. The morning after he had read it he said that when he was in bed he saw a very big image in the darkness, of the chapter with its ornamental initial letter. At another time, when he was in charge of someone else, the doctor, during an interview, became annoyed; his face became red, and a blue vein on his bald head became prominent. The patient said, that long afterwards he could see that blue vein on the bald head. At one time, in explaining the functions of the brain to him, I had drawn a sketch showing the fissures and the various areas in an elementary way. When at night, during a sleepless bout, the eidetic (?) image of the brain-diagram was seen against the darkness, it reassured him as it had done in the day, and he went to sleep.

Eventually one of his complex pseudo-hallucinations was analysed along Freudian lines. Its constituents came from three different times of his life—when he was a small child, during youth, and during the war. Its scenery and furniture came from different parts of the world; in fact the whole hallucination was made up precisely in the same way as a dream. After analysis, which took three hours, the hallucination vanished.

Other problems which arise are whether the difference between the pseudo-hallucination of the psycho-neurotic and the complete hallucination of the psychotic is greater than was formerly thought. These eidetic images may occur when the mind regresses to a more childish state, and it may be that in the production of our dreams and of the images we see before sleeping, our mind has reverted in this way.

I can only here mention the problem of how far our modern systems of education and culture have educated us out of eidetic habits. It may be that the artist, the poet and the seer are seeing reality, not so much in a new way, as in a development of old ways which our particular type of civilization has discouraged.

(¹) *Die Eidetik und die Typologische Forschungsmethode*, Leipzig, 1927.—(²) "Eidetic Images," *British Journal of Psychology*, October, 1924.—(³) "The Nature of Images," *ibid.*, July, 1926.