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EIDETIC PHENOMENA *

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An analysis of recent studies on eidetic phenomena shows clearly that during the last years the majority of investigators have been more interested in eidetic images (EI) as indicators of personality trends than in eidetic imagery itself. As a matter of fact, too great an emphasis has been placed on the relation of EI to personality; there is no doubt that an all-around study of eidetic imagery itself must be considered basic for investigations in the field of personality. Furthermore, we cannot be satisfied with the result that the examination of EI reveals certain *consistencies*; we must demand proof that the consistencies found so far are different from those of other subjective visual phenomena. Unless such a difference is demonstrated there is no hope of ever clarifying the relation of EI to personality and personality development. In general, it is to be regretted that in the experimental work recently published more attention has been paid to the Marburg hypotheses on "types," "memory-levels," etc., than to the problems involved in the methods for determining eidetic imagery.

In the following we shall concern ourselves chiefly with the experimental studies of the last four years; our last review published in this journal (59) covered the literature up to about the year 1927.† We shall first consider the work reported in the follow-

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† Since this review was ready for publication in December, 1930, it has unfortunately not been possible to take into consideration a number of recent publications; however, a list of the more important titles has been added to the Bibliography (*cf.* numbers 105-127).

ing three books: the *Ergänzungsband* 16 of the *Zsch. f. Psychol.* by E. R. Jaensch and others (40), the "*Grundformen menschlichen Seins*" by E. R. Jaensch and collaborators (39), and the *Beiheft* 43 of the *Zsch. f. ang. Psychol.* by Bonte, Liefmann and Roessler (5a). If we evaluate the experiments described in the first two books in terms of the hypotheses formerly set forth by the Marburg school it becomes apparent that the study of eidetic imagery is approached here from a new angle. In most of these experiments the subjects were adults. The main object was not an examination for EI but an all-around investigation of different perceptual and imaginal responses. The results gained on adults, then, were analyzed in the light of the facts previously arrived at in eidetic research on children. Jaensch holds that a certain "coherence" between "*Vorstellungen*" and "*Umwelt*," between thinking and object, is characteristic of the period of early childhood. In the course of ontogenetic development this close coherence which is indicative of an "integration" of psychic and somatic functions disappears in most cases. EI are merely *one* of the symptoms of the "integrated type" and, therefore, cannot be understood without reference to typological studies. It is maintained that the *form* of the perceptual and imaginal responses in adults "may be considered as the solidified, petrified product of functions which in the eidetic phase build up the perceptual world" (30). In various experimental contributions (40) the attempt is made to show that the "coherence" with the environmental world existent in children, has left—to use Jaensch's somewhat involved terminology—"coherence-petrifications in the permanent structure of perceptions" in adults.

H. Ruschmann (85) reports that not only EI, AI (after-images), and MI (memory-images) but also the perceptions of eidetic persons are influenced by "disturbing stimuli." She employed the horoptroscope (Jaensch's investigation of the *Kovariantenphänomen*, cf. 58, p. 165), the "angle- and step-phenomenon" described by Hoffmann, asymmetrical objects, and pictures in presenting visual stimuli. In some of the experiments the influence of disturbing (acoustic, optical, etc.) stimuli was quantitatively studied. It is concluded that sensory disturbances, introduced while perceiving, call into play central factors and reduce the effect of the objective stimuli. What is actually perceived, is in such case only partly determined by peripheral stimulation. It is pertinent to cite here Kiesow (57), who suggests that deviations from Emmert's law when resulting from the

application of disturbing stimuli have probably nothing to do with the activation of processes or phenomena on "higher" levels but with reflex movements of the eyes. That such reflex movements may also play a rôle in changing the perception of an object under the influence of disturbing stimuli is a point not considered by Ruschmann.

E. Mayer (73), in studying Jaensch's Kovariantenphänomen, deviations from the horopter and depth-perception in stereoscopic experiments with non-eidetic adults, found that upon a decrease in illumination the measurements taken were similar to those previously obtained from eidetic children under normal illumination. The instability of perceptions supposedly a characteristic of the "eidetic phase" in childhood was also demonstrated in non-eidetic adults under the conditions of twilight-vision. In twilight for instance, the appearance of a given visual object was influenced by the shape or movement of other objects in the field of vision. In stereoscopic investigations with children the fact was brought out that the "before" and "behind" was not determined to such an extent by crossed disparation as in adults. It is concluded that a reliance on crossed disparation is a product of ontogenetic development.

Kranz (66), concerned with perceptual differences in personality types, used mostly "highly integrated" persons as subjects. The point of departure in his study was the distinction, recently propounded by the Marburg school, between the "integrated" and the "non-integrated" type. While in the integrated type there is "an interpenetration of functions," the psychic functions of the non-integrated type are characterized by relatively great independence and stability. Various forms of integration are distinguished. Kranz used very strong cases of the so-called I_1 - and I_s -type. He examined the reactions of his subjects to various visual stimuli and found among other things that the values for "co-variations" (in a study of Jaensch's Kovariantenphänomen) tended towards zero in non-integrated persons. Similar results were obtained in determining the deviations from the horopter (Hering-Hillebrandsche Horopterabweichung), and in studying depth-perception. In the integrated types the same depth impression could be elicited by different degrees of crossed disparation; in non-integrated persons the effect of depth was almost entirely dependent on crossed disparation. Whenever there was a rivalry of different depth criteria, the presence of "meaningful wholes" was, in the case of integrated persons, a factor of greater importance than crossed disparation. The study of the "abso-

lute " or " relative " localization of objects also showed the important rôle of central factors in integrated persons. In this group the so-called absolute depth localization was determined to a greater extent by the interests and the imaginal activity than by binocular parallax. The micropsia and macropsia experimentally induced by Rollett's plates (98) was far more pronounced for integrated than for non-integrated individuals. The difference between the position of an apparent vertical (or horizontal) line and the objective vertical (or horizontal) line (line presented on a pattern with oblique black-white stripes) was far greater in integrated than in non-integrated cases. Experiments with Helmholtz' telestereoscope and an investigation of the relation between visual and tactual space in which prismatic spectacles were employed also brought to light the dependence of perceptual phenomena on the personality type of the subject. Finally, the lability of the integrated type was demonstrated in repeating some of the experiments by Hoff and Schilder (24) on postural persistence.

The factors influencing depth-perceptions in adults are the subject of special study by Simon (95). It is shown that even in adults crossed disparation cannot always compete with central factors in determining the depth impression.

Kobusch (65) presents an analysis of the behavior of MI in adults and reaches the conclusion that "between the pure EI and the pure MI there is a continuum of steps" the height of which is exactly determined by the subject's attentional level; that is to say, the greater the attentional effort of the subject directed to the MI, the greater the similarity between MI and EI with respect to phenomenal appearance and behavior of the image. The MI were projected on various grounds and studied with techniques formerly employed in eidetic investigations. Even the exact size of the MI was determined under different conditions, *e.g.*, under the influence of Anhalonium Lewinii (mescal). Certain differences in the behavior of MI in near distances (up to about 140 cm.) and far distances are also explained by "attention." In a series of experiments performed by Bamberger (2) the conditions are defined under which eidetic children take an EI for a real object. The remainder of *Ergänzungsband 16* (40) consists of theoretical discussions by E. R. Jaensch in which stress is laid upon the value of research on perceptual and eidetic phenomena for philosophy (31-35). In this connection Jaensch's book on "reality and value" in philosophy and

culture (29) in which frequently reference is made to the Marburg psychological studies must be mentioned.

Although some of the experiments in *Ergänzungsband 16* are not well controlled some of the findings are of considerable importance. There seems to be no doubt that under certain experimental conditions the perceptions of adults are similar to those of children, and that any increase in our knowledge of such conditions is to be welcomed. Whether certain similarities between the perceptual responses of children and adults really demand a genetic interpretation is a question requiring further research. Another point is to be considered in evaluating *Ergänzungsband 16*. Even though one may not subscribe to Jaensch's distinction of an integrated and a non-integrated type the experiments so far performed seem to demonstrate conclusively the great variations in the perceptual responses of adults to identical stimulus situations. Undoubtedly, many of the "classical" experiments in the fields of physiological optics and sensory psychology have been performed only on certain "types"; that is to say, individuals with very unstable perceptual responses were often ruled out as undesirable because of the variability of their responses and the impossibility of interpreting their reactions in terms of certain "laws."

In the "Grundformen" (39) the experimental foundation of the new Marburg typology is presented. Jaensch (38) points out that in psychology we are in need of a classification or typology based on "natural systems" (Cuvier). Only such natural systems permit of an ever finer differentiation. Such natural systems are found in the "integrated" and the "non-integrated" type. They are believed to be not products of an arbitrary classification but are considered "basic forms." These types are not entirely unrelated to the types formerly proposed by Jaensch—the B- and the T-type. At present the term B-type is applied only to integrated persons with symptoms pointing to a basedoid constitution. A similar relation holds between the T-type and the non-integrated type (98). Various forms of integration are described. There is an integration "nach aussen" (I₁-type) and an integration "nach innen." In the first case there is intimate contact and "coherence" with the external world, in the second case this coherence is lacking. There exists a cleavage between thinking and perceiving, between *Vorstellungswelt* and *Wahrnehmungswelt*. But aside from this cleavage the "psychic functions display the characteristics of integration" (45). Between

these two types there is the I_2 -type which is only temporarily, in the presence of certain stimuli, integrated. In addition, a synesthetic integrated type, an I_s - or S-type is described. Representatives of these various types, in most cases adults, are studied by different methods.

In the investigation of Jaensch and Neuhaus (46) the extreme cases of the I_1 - and S-type were examined with respect to affectivity, AI, EI in different sense fields, hallucinations, pseudohallucinations, synesthesia, and various perceptual phenomena. Whenever possible experimental methods were employed. But since the "total personality," and not a single function, was of interest in the "Grundformen" other methods were also used. The investigation of Jaensch and Lucke (42) deals with the I_1 -type and the I_2 -type. Widely different phases of behavior such as reactions to Müller-Lyer's illusion, memory, dreams, and various bodily functions were analyzed. By way of summary it is pointed out that the I_1 - and the I_2 -type differ in twenty-six respects. The above mentioned integrated type with "inner" coherence, most frequently found among certain sportsmen, is studied by Jaensch and Möckelmann (45). No research is reported on the pure non-integrated type. Jaensch has not much hope of finding this type in Germany, at least not in German universities, but he is of the opinion that persons of this type abound in America. So far only individuals on the borderline between the integrated and the non-integrated type have been examined (49). The study by Wiedling and Jaensch represents at the same time an interesting experimental contribution to our knowledge of volitional functions. In an analysis of twenty synesthetic cases (44) the importance of "symbolic" thinking in integrated cases is stressed. In an examination of the pupillary reflex in strong eidetic children it was found that the EI of bright objects led to a contraction, and the EI of dark objects to a dilatation of the pupils. Jaensch and C. Köhler speak of an "eidetic pupillary reflex" (41).

The value of the "Grundformen," it seems to us, lies (1) in the fact that experimental methods have been utilized in a very ingenious way in the study of personality; (2) in a number of experimental findings which are of distinct value without reference to any typology; (3) in the formulation of a number of hypotheses which can be tested by experiment. It is, of course, to be regretted that the Marburg school, again and again, changes the terminology in

typological matters. Instead of the B-, T-, BT-, TB-, T_E-, B_H-type and other subtypes previously proposed we have now the integrated and the non-integrated type with various subtypes. Whether or not these types are really "basic" types seems to us an unsettled matter. Furthermore, the concept of "types" itself may be viewed as of questionable value. Still it does not seem more questionable to us than "abilities," "factors," etc., in the field of mental measurement. In fact, it is hard to believe that "abilities" and "factors" express more adequately differences in the psychophysical functioning of the organism than Jaensch's "types" or that the theory of factors should be of greater significance for biological psychology than the Marburg theory of types.

In connection with the volume just discussed attention should be called to the articles by Warnecke (98) and Schmülling (90). Warnecke made an analysis of certain perceptual reactions in eidetic and non-eidetic I-types. Some interesting experiments on the influence of *Einstellung* on the perception of such cases are reported. Schmülling (90) studied AI, EI and perceptual phenomena when observed under intermittent retinal stimulation. He considers the method of intermittent stimulation as an effective means for detecting "latent" eidetic phenomena.

We shall now turn to Beih. 43 of the Zsch. f. ang. Psychol. It is out of the question here to review in detail the results reported in this book. The findings of Bonte, Liefmann and Roessler have a bearing on almost all phases of eidetic research. In general, the Marburg procedure for determining EI was followed. Bonte (5) found 67 eidetic cases in a group of 209 boys, aged nine to fourteen years, and 29 cases in a group of 85 backward children. Most frequently eidetic phenomena occurred "before the beginning" of puberty. In the whole group of 294 children there were only 21 very strong cases of Jaensch's degrees IV and V. These 21 children were given a large number of tests, including intelligence tests. The author concludes that individuals of the B- and the T-type are found on all intelligence levels; that there is a high correlation between "suggestibility" and the eidetic disposition of the B-type; that EI on the whole do not interfere with abstract thinking; and that eidetic individuals are at an advantage in tasks dealing with sensory material of certain kinds. It is asserted that only intelligent individuals use their EI consciously.

The studies of Liefmann (71) and Roessler (84) supplement

each other to some extent. Liefmann examined individuals aged ten to nineteen years; Roessler, children between the ages of six and ten. Liefmann's subjects were girls attending different high schools in Freiburg. Out of 834 girls tested for EI in group examinations, 177 were tested individually. Liefmann states that the "acme" of the eidetic disposition, *i.e.*, the age at which EI are found most frequently in the highest "degree," is the age of twelve. Eidetic phenomena were only infrequently reported between the ages of fifteen and seventeen years; but in the years following this period there was an increase in frequency. Most subjects had fluctuating EI. The different "types" of EI were not in any way related to the constitution types of W. Jaensch. Liefmann, furthermore, could not confirm the results of W. Jaensch on the effects on EI of Anhalonium Lewinii and other drugs. Tetany experimentally induced did not change or bring about eidetic phenomena. An examination of the skin capillaries at the nail bed of 68 eidetic and non-eidetic children (method of capillaroscopy) did not reveal any correlation between the capillary picture and the eidetic disposition.

Roessler (84) examined 421 out of 726 boys and girls individually. His study is of considerable significance in view of the Marburg hypothesis of a "unitary type." Forty per cent of the group of 726 children possessed EI. The highest percentages and the strongest cases were found in the six-year-old group. Roessler believes that this fact supports Jaensch's view that the primordial form of our perceptual and imaginal responses must be sought in EI. Although there is no doubt that Roessler, on the whole, has been rather successful in modifying and adopting the methods of Jaensch for young children, his work can be viewed merely as a starting point for future research on young children.

In the following, a number of publications, mostly articles, dealing with different aspects of eidetic research will be shortly considered.

EI and Personality Types. E. R. Jaensch (26) in replying to some critical remarks by G. Heymans points out that the typological method is not antagonistic to the statistical method in personality studies. Weil (100, 101), using adults as subjects, tries to show that the tendency to integration and disintegration in the make-up of a person is even apparent in his AI. His results on spatial displacements in AI and the tendencies to movement in AI deserve special attention. We should note in addition various perceptual

problems investigated from the typological angle. Experiments with Heckmann's color test and experiments on apparent size and apparent movement were performed. The conclusion is drawn that the greater the integration, the easier it is to modify the perceptually given content imaginally. J. Gross (18) is concerned with the "degree of integration" in six to eleven-year-old children. AI, EI and perceptions were studied in 240 cases. As of special interest we consider some of the findings on AI in children. Gross states for instance that the AI-methods for detecting an eidetic disposition cannot be used below the age of nine years, and that intermittence (90) doubles the duration of AI in nine-year-old children. O. Müller (79) exposed figures, permitting of various interpretations, tachistoscopically. The integrated cases manifested the tendency to see meaningful, interrelated wholes. The reactions of non-integrated individuals were far more objective and analytical. The answers of children often showed a high degree of originality; on the whole the behavior of children was similar to that of the integrated adults. Persons at the age of puberty assumed a highly critical attitude. In a series of experiments in which "incomplete" and ambiguous objects were exposed without any time limit the typological results of the tachistoscopic tests could be confirmed. The Rorschach test did not bring out very clearly the differences between the "synthetic" attitude of the integrated and the "analytical" attitude of the non-integrated type. Oeser (80) made the attempt to throw light on the psychology of the integrated and the non-integrated type by tachistoscopic reading experiments. Some of the conflicting results on tachistoscopic reading reported in the literature seem to be due to typological differences. Weber's study (99) purports to be a contribution to the psychology of thinking. The "affective-symbolic" thinking of the I_s -type and the "affective-realistic" thinking of the I_1 -type are contrasted on the basis of experiments in which acoustically presented words and texts read to the subject were used as stimuli. Thomas (96) points out the forensic importance of Jaensch's study of personality types. According to him it is especially the I_1 -type who is predestined to get into conflict with the existing laws. In experiments on color- and form-preference Ritter (83) found a greater integration of psychic functions in the "color-type" than in the "form-type." There was an "affinity to form" in the children with a lesser degree of integration. Dambach (11) assumes that color-type and B-type, and

form-type and T-type are intimately related to each other. Pfahler (81) is interested in the relation between the types of Kretschmer and of Jaensch. Jaensch himself points out some differences between the Marburg typology and Kretschmer's system of body form types (37, 38).

EI and Intelligence. In correlating the results of tests for EI, with the results of intelligence ratings or with intelligence test scores, most investigators failed to find a positive correlation. As indicated above, Bonte (5) maintains that eidetic cases in general as well as B- and T-types are found on all intelligence levels. Schmitz (89) reaches the conclusion that although eidetic disposition and general intelligence do not correlate, representatives of the "unitary type" are above normal in intelligence if their EI are of the B-type, and below normal if they are of the T-type. She considers intelligence tests as not suitable for determining the intelligence of strong eidetic cases, and especially not of the B-type. In an analysis of 109 answers given in a Binet test about 25 per cent of the answers were based on EI of past events and another 30 per cent on the description of MI of concrete situations. Schumacher (93) thinks that strong eidetic cases with non-fluctuating EI tend to be intellectually somewhat inferior. Liefmann (71) finds that school achievements of eidetic high school girls are neither markedly superior nor inferior. She believes, however, that strong eidetic cases are likely to be inferior in school subjects demanding abstract thinking. Roessler (84) agrees on the whole with Bonte in that general intelligence does not correlate with the eidetic disposition. It may be said, then, that the evidence available at present suggests that there is a positive correlation, not between EI and "general" intelligence, but between EI and some of the functions involved in an intelligence performance. Probably more light will be thrown on the "thinking" of eidetic persons by investigations similar to those by Jaensch and Schweicher (47) than by intelligence measurements. Jaensch and Schweicher present experimental data on the development of "concepts" on the basis of sensory material.

EI and Art. The problems centered around the relation between EI and drawing ability are dealt with in the monograph by Metz (74). On the one hand, EI are successfully utilized in the teaching of art by such men as E. Heckmann; he resorts to colored spots produced with a brush on wet paper, meaningless configurations of lines, or scraps of colored paper to stimulate the color sense and the imagina-

tion of his pupils. On the other hand, it is a fact that even the drawings of children with extremely vivid and very detailed EI have the schematic character typical of the drawings of most children. The question arises as to why eidetic children do not directly rely on EI. Metz agrees with Politt (74, p. 53) that the tracing of contours of EI projected on a surface is impossible, even in cases with very rigid and non-fluctuating EI. The tracing of contours distorts and displaces the EI. From various experiments Metz draws the conclusion that the act of drawing has not a visual but a motor basis. The drawing of a child is essentially a form of language; it simply denotes objects but does not portray their phenomenal appearance. While EI are only of very slight importance for the act of drawing itself they produce, if "cultivated" by teachers of art, an *Einstellung* towards the phenomenal characteristics of visual objects. Here some other facts are pertinent. Subjects verbally instructed to produce at will an EI of a tiger or a flower (without a presentation of such objects) were more successful when a homogeneously colored object was looked at before the instruction than without such stimulation. At the same time, persons were found who at the beginning of the experiments could get EI only from colored objects. The conclusion is drawn that "the color of the EI of visually presented objects has, as contrasted with its shape, a more physiological character." A similar conclusion is reached in Metz' study of "abstraction" (75). Here, too, the reactions to "color" are considered more primitive and, so far as children are concerned, more natural than the reactions to "form." In the light of the studies of Metz and Politt, Schubert's interpretation (91) that the Orotchen drawings "must obviously be interpreted as the outlining with a pencil of eidetic forms which are projected onto paper" does not seem to be justified. In examining 20 artists, painters and sculptors, Joesten (56) discovered only "latent eidetic traces" in the majority of cases; the AI showed a great instability and a remarkable lack of periodicity. Leinweber (69) subjected eight writers and poets to various tests: Rollett's test, the Rorschach test, and tests for determining EI, synesthesia, and symbolic thinking. The results are presented in terms of the Marburg typology (I_1 - and I_2 -type). K. Gross (19) considers it, on the basis of an analysis of Jack London's novel "Martin Eden," highly probable that the author had pronounced eidetic imagery. Some problems of great interest to the student of aesthetics arise out of the attempt of an eidetic writer

to use EI for the creation of certain effects in his, mostly non-eidetic, readers.

EI and Education. Many educators consider the results of eidetic research of great importance in the analysis of behavior cases in school, in the understanding of markedly inferior or superior school achievements, and in developing didactic methods. Other writers on educational matters believe that the findings on EI are of no consequence for education in general. Whether or not the ability to produce EI can be improved or evoked by training seems to be a further point not yet agreed upon. The value of EI for education and class room instruction has been considered in a number of theoretical discussions, *e.g.*, by Jaensch (27), Kroh (68), Wilhelm (102), Schumacher (92), and Zillig (104). As an experimental study we may cite Schumacher's work (93) on the relation between EI and certain linguistic abilities such as the writing of compositions. It is found that on all intelligence levels the possession of EI, and especially of EI of the B-type, is of great advantage to the child. The study of EI in backward children by Garfunkel (14) and the investigation of feeble-minded children by Götz (17) are undoubtedly significant from an educational point of view. Schmähle (88) examined persons with congenital or acquired deafness and those hard of hearing, aged eleven to seventeen years. Only one in the 27 congenitally deaf persons was eidetic. The percentages were higher in the two other groups. Brunswik and Kindermann (10) could not confirm these results.

The Nature of EI. Their Relation to AI, MI and Related Phenomena. Many of the hypotheses underlying the work of the Marburg school are critically considered by Kiesow (57). The one-sided treatment of *visual* EI by Jaensch is criticized. Without taking into account EI in other sense fields and without studying "mixed" cases with EI of different sensory origin, Kiesow believes a true understanding of eidetic phenomena cannot be arrived at. He also believes that EI in childhood are individual peculiarities rather than "normal" phenomena. His comments on Emmert's law based partly on his own research are to the point: "We are still in need of many exact measurements performed under different conditions to settle once and for all the question as to the extent to which deviations from Emmert's law may be regarded as a reliable criterion for the presence of an eidetic disposition." In describing strong eidetic cases Kiesow points out the value of the method of

"graphic reproduction." Recently, we have summarized the facts concerning the "eidetic child" as they appear to us on the basis of our own work and an analysis of the literature (64). Jelliffe (55) is interested in the relation between "eidetic psychology and psychiatric problems." Siebert (94) presenting some experimental data advances the view that everybody may have pseudo- or hemi-eidetic images. Scharnke (86, 87) considers the present findings on EI as of no use to the psychiatrist in dealing with hallucinations; he thinks it is not even clear whether there is any relation between EI and pseudohallucinations. Scharnke also states that he has not succeeded so far in proving beyond doubt the existence of EI in psychotic individuals. Memory-feats, even in feeble-minded persons, have been explained quite often by reference to EI (13, 43). Gengerelli (16) advocates the method of constant stimuli in eidetic research. In the majority of cases, it seems to us, the possibility of employing such a method would indicate that the phenomena dealt with are not eidetic. Allport (1) holds a view similar to that of Kiesow in stating that EI are a special variety of MI. Baruch (3) believes that the Marburg results on the corporeity of AI and EI are not clear-cut. He describes a method by means of which it is possible not only to obtain tri-dimensional AI, but also to measure the dimensions of such AI. Trendelenburg (97) presents some data to demonstrate that such measurements are comparatively exact. Gatti (15) also obtained tri-dimensional AI in experiments with 21 adults and 6 children. In Brunswik's study (9) of the development of albedo perception the conclusion is reached that "good" perception of albedo and strong EI are correlated. G. E. Müller (77) offers an explanation of the phenomenon of simultaneous contrast in EI described by different investigators. The lack of simultaneous contrast in post-hypnotic modifications of visual objects is discussed in this connection. The effects of Anhalonium Lewinii on eidetic and non-eidetic persons are dealt with by several writers (60, 65, 71). We have presented some data on "fragmentary" EI (62, 63). The facts on fragmentary imagery and on the fragmentary perception of certain pathological cases has led us to assume the importance of "*Gestalt quanta*" in fragmentary reproduction. Bibring-Lehner (4) examined the influence of labyrinthic stimulation on the behavior of EI in 29 adults and 5 children. The Bárány test was used. The subjects had to observe the EI before, during and after the rotation. In some experiments

the EI were produced during the nystagmic phase. The changes in the EI taking place under the conditions of this experiment are interpreted in terms of Freudian theories. Bibring-Lehner believes it is especially labyrinthic stimulation which throws "primitive" psychic mechanisms into gear.

EI and the Purkinje Phenomenon. The researches in which the Purkinje phenomenon has been studied must be considered as extremely significant from the theoretical point of view. The investigation of the Purkinje phenomenon in AI and EI by Jaensch and Broer (6, 7, 8, 28) has not only thrown new light on the phenomenon itself but also given support to certain genetic views concerning AI and EI. If the effects of photic stimulation on plants and animals are analyzed, it appears that the influence of the longer wave lengths increases as we go from unicellular organisms to man. The hypothesis is evolved that the Purkinje phenomenon represents a revival of a more primitive functioning of the visual apparatus (8). The data of Jaensch and Stallmann (48) show that the brightness distribution of the Purkinje Phenomenon appears also when the subject is in a state of bodily fatigue. Under these conditions, however, the Purkinje phenomenon is less pronounced when complex visual objects are introduced into the colored areas under observation. The hypothesis, then, is presented that form vision activates higher and less primitive functions than are dominant in fatigue, and that the appearance of the Purkinje phenomenon in fatigue is due to an activation of primordial functions. In discussing the relation between the Purkinje phenomenon and Rayleigh's law, Jaensch (25) considers the Purkinje phenomenon as a phenomenon of adaptation. In the course of phylogenetic development there was on the one hand an adaptation to sunlight and, therefore, to the longer wave lengths; and on the other hand to skylight and twilight conditions, that is to say, to the shorter wave lengths. In the first case there was a brightness distribution predisposing the eye for form vision, in the second case (Purkinje phenomenon) the visual apparatus was set for "optimal" light reception. Heinemann (20, 21) presents new quantitative methods for the study of dark adaptation and the Purkinje phenomenon. Children and integrated adults are more easily dark adapted than non-integrated individuals. This does, however, not hold for *Momentadaptation*.

EI and Capillaroscopy. Very extensive investigations on the skin capillaries at the nail bed by means of O. Müller's method of

capillaroscopy (67, 78) have been carried out during the last years by W. Jaensch (50, 51, 52, 53, 54). Wittneben (103), and Hoepfner (22, 23), especially in connection with the diagnosis and therapy of goiter, feeble-mindedness, and certain neuroses. Hoepfner (23) agrees with W. Jaensch that the capillaries of the nail bed go through different phases of development in the first six months of life. The time of six months applies only to "endocrinologically normal conditions" and to districts free of goiter. Hoepfner's study is based on more than 6,000 cases. In the capillary development archi-, meso-, and neo-capillaries are distinguished (53). It is asserted that in goitrous regions the population is "biologically" somewhat inferior, a fact to be easily established not by examining goiter but by investigating the capillaries of the children of this population (52). The capillary examination is supposed to be part of an all-around medical and psychological examination (53). The "optical investigation" suggested by W. Jaensch consists chiefly of tests for the determination of EI. The therapy of cases with retarded capillaries is discussed at length (103). It is said that in many cases treatment with glandular extracts has changed not only the form of the capillaries but also the I.Q. Although most investigators agree as to the possibility of identifying the different capillary pictures in terms of Hoepfner's "morphogenetic scheme," they hold widely divergent views as to the nature of the somatic and psychic defects correlated with "retarded" capillaries. To us it seems rather difficult to prove that in the last analysis the methods of capillaroscopy detect "ectodermal weaklings," so much the more since the "weakness" of such individuals is supposed to manifest itself in organic as well as in psychic symptoms. In such a way a retardation in capillary development may be easily linked up with any defect for the sake of proving an hypothesis. Furthermore, in the present stage of eidetic research the assumption that the eidetic tests permit of diagnosing "optical infantilism" must be seriously questioned. In most of the above studies the form of the capillaries as seen through the microscope was not photographically reproduced. W. Jaensch (52) states that the "total structure" of the capillaries is more important than the details. C. v. Leupoldt (70) presents the capillary pictures of 60 schizophrenics and 50 normal persons. There appear to be marked differences between the two groups. It is assumed that "capillary infantilism" is one of the many infantilisms in schizophrenic indi-

viduals. In this connection the study by Miskolczy and Schultz (76) who found 25 eidetics among 50 schizophrenic patients should be mentioned. Again, it is difficult to understand how the eidetic basis of many hallucinations as observed in the clinic could be proved "beyond doubt." Powdermaker (82) reports a marked tendency for a retarded or abnormal development of the capillaries in constitutional idiots and low grade imbeciles in whom there existed a high proportion of physical abnormality. Relatively few primitive forms were found in the moron and high grade imbecile group. W. Jaensch's contention of an intimate relation between eidetic phenomena and certain constitutional types has not found much support in recent investigations (12, 72).

Concluding Remarks. In closing we should like to call attention to some general points bearing on eidetic research.

1. So far as the research of the Marburg school is concerned the emphasis has shifted from the investigation of eidetic imagery to a genetic study of different psychological functions. These recent studies are not primarily concerned with EI, but with the various psychological manifestations of the "total personality." Unfortunately, this shift in emphasis does not mean that the far-reaching conclusions presented in the first researches on the eidetic disposition have been shown to be fully justified in the light of the evidence now available. There is no question that more experimental studies on eidetic phenomena themselves are a desideratum. Instead of new hypotheses concerning the function of EI we need new facts on EI.

2. Such new facts, it seems to us, cannot be arrived at by increasing the number of group investigations. The present writer who has probably, to judge by the studies published so far, examined more cases individually than any other investigator, is well aware of the fact that these individual examinations, especially of strong cases, are very time-consuming. But he is unable to see how group tests for EI, frequently given even to abnormal or very young children, can ever lead to any definite conclusions concerning eidetic phenomena.

3. G. E. Müller (77) in discussing the AI of eidetic or integrated persons points out that the laws for AI can be determined only by paying attention, first of all, to the behavior of AI in non-integrated individuals. If integrated persons report the color of a negative AI to be a color different from the one ordinarily seen we cannot,

according to Müller, attribute any "scientific value" to such a report. In other words: there are some reports which are judged by Müller to be "scientific" and which are utilized—the reports of non-integrated individuals; there are other reports which are judged to be "unscientific"—the reports of integrated persons.

We know of no stronger plea for a complete revaluation of some of the "classical" experiments in the field of physiological optics than this inference of Müller. In investigating visual phenomena of various kinds we frequently find, to be sure, one group of adults whose responses display a certain uniformity and consistency, and another group whose responses are, to use Müller's term, "phantastic." From this we cannot deduce as Müller does that the first group represents the "normal type of adults," but can conclude merely that it is necessary to find out why the difference between the two groups exists and what it means. As a matter of fact, the analysis of the many "abnormal" integrated responses as detected in certain adults and children may be (after a period of research based chiefly on non-integrated adults) of more importance than the analysis of "uniform" responses, not only to psychology in general but also to the investigation of visual phenomena.

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