A Study in the Aesthetics of Visual Form

by

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Appendix.
A Study in the Aesthetics of Visual Form.

I. Introduction.

Many of our total unanalyzed perceptions evince a quality, coloration, property or feeling tone that as an inherent characteristics of the perception can best be designated by such adjectives as good, bad, evaluative, preferential, fitting, pleasing, interesting, intriguing, captivating, absorbing and many other adjectives that up to the present time have never found a place in experimental psychology as kinds of experiences. This aesthetic feeling tone, as we shall call the diverse and manifold qualities of such a total experience, subtly changes around the objects and events of external perception in one of the ways described by the above adjectives, now making an experience indifferent, now changing to the opposite and weighting the commonplace events of every day life with the highest significance. Whether one is appreciating paintings, listening to a melody, or riding in a car, careful observation will show that the quality of the perception is constantly changing, and sweeping across the drama of the emotional life of the individual are the aesthetic feeling tones of experience, the evaluations, the preferences of perception, and many others of a like nature that up to the present time have never been completely classified. This type of experience with which every one is familiar belongs peculiarly to the realm of the aesthetic.
The problem of the aesthetic perception is one of the most elusively attractive, yet withal intangible phases of experimental psychology. Yet the evidence comes from several sources that interest in the aesthetic perception is increasing. Chief among these sources of interest in the aesthetic perception are the following:

1. The assumption in the physical sciences and psychology that all experiences are unitary. This principle of "unity in variety" has been long recognized as a cardinal principle of aesthetics since the time of Aristotle. In psychology, particularly, this assumption that all experiences are unitary has been built into an imposing edifice by the work of Kohler, Koffka, Kreuger, Hartman, Wertheimer, Spearman, Rignano, and Aveling to mention only a few of a long list.

2. The contention of the psychoanalytic school, Freud, Jung, Adler, and others, that the human being must be studied in the light of the whole personality. Wherever this type of investigation is carried out the emotional life assumes a place of fundamental importance, particularly the finding that the likes, dislikes, preferences and evaluations of the individual studies show in the most significant way the functional activity of the whole man.

3. The general revival of interest in the affective life exemplified by the Wittenberg Symposium; where psychologists from all over the world met to discuss the problems incident to the emotional life.
The fundamental problem of the aesthetic perception is, we maintain, the same as the problem of investigating any category in psychology, namely, that of finding conditions under which the event takes place. Therefore, when we make the statement that the aesthetic datum is a function of certain conditions of the real world, we believe that most psychologists will agree at least in theory.

However elementary and commonplace the above methods of approach to psychological problems may sound in theory, we must read carefully should we attempt to apply what has just been said to as highly a controversial subject as preference for geometrical and more meaningful forms such as pictures, landscapes or portraits. Yet we hazard the opinion that the difficulties are not greater in a study of aesthetic preference than in the investigation of figure and ground, apparent movement, or a problem in learning. The same kind of measurement and conditions must prevail the first as well as the others. The human organism cannot enter into another world whenever the instructions to judge the beauty of a picture are given. The light for the visual response must have a certain intensity or the observer cannot see the drawing. An optimal time for the emergence of the aesthetic preference may be found and in fact has been found in the experimental work of Wells (39) on affective reaction times. The phenomenal report or description is given in the same language as a description of figure and ground or any other experience to which a normal individual may attend.

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But how shall we begin? Needless to say, the psychologist may begin in this field of investigation in much the same way as in any other. Certain conditions stand out in direct perception as we observe pleasing optical shapes and patterns that lead us to infer that more refined procedures will yield functional concepts leading to an indirect analysis of the event under observation. Such a course was followed in the present experiment. The immediate suggestion for this study came to the writer in a seminar held under the direction of Dr. Squires on Perception during the fall semester of 1928. It occurred to the writer while in this seminar that if a good configuration as a function of the temporal interval, the aesthetic perception might likewise be conceived as a function of the intensity of illumination. Accordingly, an apparatus was devised to test this suggestion. The writer had previously noticed that on the stage and in the motion picture theatre the light effect added to or subtracted from the tout-ensemble and that a human figure seen on the screen looked better if not exposed under too bright illumination. Apropos of the above observations on the effect of the light in the theatre on preference is the pleasing effect of moonlight on the human face. This later observation, noticed by poets and writers the world over since time immemorial, is substantiated in part at least by the present experiment as being a function of a low degree of illumination. These somewhat random observations were, through the helpful criticism
and encouragement of Professor Beulah Morrison of the University of Kansas Psychology Department, evolved into the present investigation.

It became apparent after some preliminary investigation on observing forms, that the more apparent properties of objects, called aesthetic, were the following: (1) the perception of depth; (2) unity; (3) thing character or "thingliness"; (4) configurational completion. These properties of forms were found to be a direct function of the illumination, so that a given intensity of illumination could be correlated with the above phenomenal changes.

Evidently the problems of aesthetic perception are not foreign to the annals of experimental psychology. It requires little imagination to recognize that the degree of illumination of the stimulus is fundamental to any problem in visual perception, and that depth or perspective, unity, thing character and configurational completion or tied imagery are obvious properties of optical shapes and forms.

We have restricted our investigation to a study of the conditions given above for several reasons, but principally because the conditions for the emergence of the aesthetic perception must differentiate themselves, making a long enumeration and investigation of conditions depend upon a wider scope of investigation than was profitable for the purposes of this paper. Any one of the conditions mentioned above might easily form the central problem of many studies. The merits of this preliminary investigation will therefore rest upon an attempt
(1) to bring the aesthetic perception under more rigorous experimental conditions than those usually attained and (2) to point out that certain conditions discovered from a phenomenal treatment of the data form natural parts of the aesthetic perception under the conditions of this experiment.

II. Definition and Characteristics of the Aesthetic Perception.

For the purposes of this investigation let us define the aesthetic perception as the experience of an observer when evaluating or experiencing a preference for optical shapes and patterns such as geometrical figures, portraits or landscapes under certain specific conditions. The amount of illumination, distance of the observer from the stimulus, instructions, and the phenomenal properties of the perceptual object define these conditions and give the limits of the aesthetic perception.

Traditionally accepted criteria for the aesthetic perception are in general the same as the criteria for any other form of perception when a totalizing or unifying attitude is taken. Some of the more obvious characteristics of the aesthetic perception are: (1) the unifying character of the perception; (2) the characteristics of self-containedness, self-evidence, or enclosedness; (3) the rectifying, adjusting or self equalizing property or aspect of the part to the whole and the whole to the part; (4) the dependence of the perception upon the objective form of the stimulus.

Practically all writers have accepted the criterion of "wholeness" or unity for the aesthetic totality. Aristotle's
dictum that beauty is "unity in variety" finds confirmation in the views of many standard writers upon the subject of aesthetics. Despite the variety of interpretations upon the meaning of the term "unity in variety" in extension we find in intension enough uniformity to enable us to speak of "unity in variety" being the most outstanding property of the aesthetic totality. For Parker (26, p. 20) "The meaning of the whole is not something in addition to the elements of the work of art, but their cooperative deed. All principles serve it the first". All principles are subservient to the problem of the "one and many". Going through the list of writers whose names were famous when psychology was young we find that Kulpe (18, p. 251); Seldt (42, p. 32) anathema though they be to the configurationists because of the supposed atomistic and structuralistic tendencies of these writers, stress relations instead of elements in their psychological treatment of aesthetics. Going down the list we can notice specifically the names of Sully (34, p. 138) Bain (3, p. 241) Munsterberg (24, p. 165) Parker (26, p. 34) Croce (10, p. 34) Bosanquet (4, p. 8) Howes (15, p. 461) and Ogden (25, p. 91) as accepting the cardinal principle of "unity in variety" as the most outstanding aspect of the aesthetic experience, or we may say, after the manner of that school of psychologists who emphasize the unity of all perceptual experiences, the aesthetic perception is a configuration, a unit, self-contained with a minimum of reference beyond itself, a whole which is more than the sum of its parts. The aesthetic perception is the exemplification of a configuration par
excellence. As Campbell (8, p. 448) says, "There is in a beautiful object a convincing suitability, an inevitable fitness of part to part, which gives it the characteristics present in any true whole. For a beautiful object is one which is exhaustively within itself, its complete being is in the immediately given!"

The dynamic characteristics of enclosedness, self-containedness, self-evidence are invariably found in the aesthetic perception. The perception is complete within itself, its "self-contained" is in the immediately given, the internal form is adequately housed within the outer. As Kant (6, p. 30) observed, "The pleasure excited by a beautiful object as beautiful has within itself a causality to maintain the state of contemplation in the subject". His analysis of the aesthetic perception as free, disinterested, purposive without being bound by definite ends has been accepted by practically every writer on the subject, and his assumption, given above, finds verification in such concepts as freedom of the experience from utilitarian aims (Bosanquet (4, p. 56) its contemplative nature (Adams (1, p. 22) and its immediacy, first emphasized by Fechner (12, p. 15).

Another characteristic of the aesthetic perception is what we shall call its rectifying, or self-adjusting power. The rectifying power of the aesthetic experience refers to the fact that there is a sort of necessity for the relation of part to whole and whole to part. The aesthetic harmony is not a matter of arbitrary, fortuitous arrangement
but follows from internal laws exemplified in the formal rules of design. What else could proportion, harmony, balance, symmetry, and thematic variation mean except that a self-adjusting or equalizing activity takes place within the beautiful object? These formal rules of design are inherent in the beautiful object and are not principles that the observer supplies extraneous to the beauty of the object. That is, balance, symmetry, and proportion are in the beautiful object as we find it. The beautiful object is as figure and ground. No part changes without a dynamic adjustment of the whole. As Wever (40,p.197) says, "The distinction between figure and ground in visual perception is one of long standing. It has been recognized in portraiture, for example, that the field or setting in which the figure occurs is an important determinant of the artistic value of the whole". Campbell (8,p,449) seems to mean that a rectifying activity has taken place within the beautiful object when he writes, "That which is formed can have said of it what Pennell says of Whistler's etching, the Black Wharf, 'Every single line has a meaning and there is not one too many and if one were taken away there would be a break in the design'". Howes (15,p,461) translates the rectifying property of the aesthetic perception into terms of bodily equilibrium: "I found in this concept of equilibrium, of excursion from the center and return, a principle of explanation for the details of elements of pictures, poems, drama, symphony, which, each in its own way, leads us on an excursion and brings us back, stimulated to unity and self-completeness."
Another characteristic of the aesthetic experience is the dependence of the feeling of preference upon the form of the beautiful object. The feeling is externalized and thought to be a property of the form. All of the empathic theories stress the feeling of one's way into the very nature of the beautiful object. This "pathetic fallacy" as Ruskin \(33, p.168\) calls the externalization of the quality of the aesthetic experience, or as we say, the feeling tone, has been mentioned by a number of writers. Thus Santayana \(30, p.49\) regards beauty as, "pleasure regarded as the quality of a thing". Closely allied with the criterion of objectivity is Baine's \(3, p.215\) "shareableness" and Kant's \(33, p.55\) "universality". These objective characteristics imply that the peculiar quality, tone or coloration of the aesthetic totality is transferred to the object, inherent in the aesthetic experience. In the words of Bosanquet \(4, p.6\). "The aesthetic attitude is so embodied in an object that it will stand still to be looked at, and, in principle, to be looked at by everybody."

The feeling tone of the experience is considered by the observer to be a characteristic of the beautiful object in much the same way that the contents of visual perception, the forms and shapes of perception, are looked at as objects of a real world.

We find then that the aesthetic experience is the perception of a normal individual when observing the excellence of value of standard works of art under certain conditions. This aesthetic perception as we have chosen to call the aesthetic experience, consists of a "unity in variety" which has been recognized by most writers as the most patent characteristic property of the aesthetic experience. As we pointed out
"unity in variety" is a term applying to all perceptions under a unifying of synthetizing attitude. From the cardinal principle of "unity in variety" follows the self-evident, self-equalizing aspects of the perception. The aesthetic perception is "spread out" over the stimulus as any other visual perception.

Since the aesthetic perception has been considered as a "unity in variety" by many standard writers, one cannot help in this relation considering the work of the Gestalters with their emphasis on the unity of all experience. Moreover there seems to be a closer relationship between the aesthetic totality and the configuration than mere similarity. To the writer at least the disciplines are "brothers under the skin". This conclusion seems all the more probable when one finds that configurationism was founded for the express purpose of accounting for objects, meanings, and values. "But they (Gestalters) complain that ordinarily these terms (objects, meanings and values) find no place in scientific systems. The result has been that special disciplines, phenomenology and Gegenstandatheories have been founded to include them." (14, p. 330)
III. Systematic status of the aesthetic perception.

In this part of the paper we shall consider the systematic setting of the problem of the aesthetic totality. A later section of the paper will be devoted to the experimental attack upon the subject in the light of the systematic setting.

The aesthetic experience implies that one part or aspect of experience is more valuable, more to be preferred than another part of experience. No fact seems more "real", that is, capable of being reproduced under specific conditions, than the fact of the aesthetic perception. Titchener (36, p.1) admits that "We live in a world of values" and only his systematic bias prevented him from including values, in experimental psychology. As Urban (37, p.285) contends in his theory of values, "The term value judgment is one of those things which, if it did not exist, would have to be created. And indeed in a general and loose sense, judgments of value would be denied by no one." But aesthetic categories need not be excluded from experimental psychology, or theoretical psychology as Titchener affirmed.
The configurationists, as Helson (loc. cit.) observes, consider the inclusion of evaluative categories as one of their most signal contributions to experimental psychology. "Perhaps the most radical proposal of the configurationists is that objects, meanings, values, and aesthetic categories must be included in experimental psychology. If we begin with the assumption that objects and forms are immediately given in experience, it follows that affective and evaluative experiences preceded analytical and discriminatory responses and hence must be regarded as no less fundamental than red, sour, and intensity."

Koffka (loc. cit.) assumes that primitive experiences (a friendly or unfriendly face, for instance) are real and cannot be divided into subjective and objective categories."

The conclusion may be made, then, that aesthetic perceptions are genuine, and real, and that the feeling tone is an integral part of the perception.

The perceptual content, that is, the object of perception, is the figure for the aesthetic totality. If we define the aesthetic feeling, tone or quality as the quality of a total particular kind of experience which follows as the result of specific conditions,
then the perceptual content, the "partial totality" becomes the figure for the complete experience of evaluating optical shapes. This concept of the feeling tone as the ground while the figure is the optical shape observed or the content of perception is an extension of the usually employed meaning attached to the figure-ground phenomenon which had its inception in visual perception. We have extended the usual use of the term, figure-ground, to include the aesthetic totality because the experience of observing pleasing optical shapes seems to be a significant unity related in much the same way as visual figure-ground perception. Krueger\(^{17}\) and Dunlap\(^{11}\) both imply that a similar use has been made of the concept of figure-ground. Objects stand or rise from a general affective level, and are chiefly differentiated from that level by the dominance or integration of the perceptual content.

The feeling tone or quality of the aesthetic totality forms the ground for the perceptual experience in much the same way that any experience rests on or rises above a general level or ground of affective experience. This is, of course, a
psychological commonplace as Dunlap (11) observes, but the concept has theoretical importance for the treatment of aesthetics. This view of the affective quality of experience forming the general ground against which external objects and events appear is not unique to the study of aesthetic experiences. Dunlap accepts the concept in a metaphorical sense, while Kreuger seems to consider the application of figure-ground to affective qualities fundamental to any study of the emotions and affective life. Dunlap points out that, "What I wish to emphasize by the use of this figure is that in normal life, the emotions are the general background against which external objects appear." For Kreuger (17) "The total whole of experience always has a specific, immediately observable quality which changes in a particular, continuous way. Such qualities of the total whole are the different kinds of pleasantness and unpleasantness, excitement, tension, and many other manifold tintings, shadings, and forms of flight of total experiences, cannot be limited by number and until some future time, cannot be completely classified.

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The perceptual content, that is, the object observed, must then be brought into the center of observation with the feeling tone or quality, or as Kreuger (17, p. 71) holds, "Only when we put the total as well as the partial totality into the center of observation is it possible to exceed the description of compared phenomena and "functionally" to understand living experience as necessary in the sense of full analysis of conditions."

The functional analysis of the aesthetic perception is an investigation of the necessary and sufficient conditions for the aesthetic experience. If evaluative, aesthetic, and affective, categories are no less fundamental than sweet, sour, and extensity, as the configurationists contend, and, if all perception is unitary and the result of certain specific conditions, then by the appropriate selection of determining conditions we should be able to make a functional analysis of the aesthetic perception. These conditions are, we should expect, the same sort of conditions that determine any visual perception. The intensity of illumination, and the size, distance, and nature of the stimulus give us the more obvious conditions for any perception.
The only difference between an aesthetic perception and any other perception, is that in an aesthetic perception, slightly different conditions are employed. We could not expect the observer of standard works of art to enter into another world whenever the instructions are given to evaluate optical forms.
IV. History of previous investigations and theories.

Previous experiments in aesthetics have been most successful in their treatment of preference for optical forms. We have restricted our investigation to this class of composition, keeping as closely as possible to psychological investigations, and purposely avoiding detailed reference to philosophical problems and viewpoints.

Experimental aesthetics is inseparably linked with the name of Theodore Fechner, the father of modern aesthetics. In his Vorschule der Aesthetik published in 1867, he gave the results of experimental work, which had originally been directed to the validity of Zeising's 'golden section'; namely, the division of a linear magnitude into two parts according to the formula $a:b;b:a-b$.

Fechner concluded that the golden section has a special value, though not the unique rank claimed for it be Zeising. The aesthetic, he defined as the pleasurable.

He prefaces the account of his own experiment by passing judgment upon previous inquirers: (1) Most of the
previous investigators attempted to find absolute standards; (2) all neglected to give association a place of sufficient importance. Among the forms of beauty suggested by previous writers he finds: (1) the circle; (2) the ellipse; (3) the spiral lines insisted on by Hogarth; (4) the square, and in general the relation 1 to 1, the simple rational rectangles generally (1 to 1, 1 to 2) and finally Zeising's golden section upon which the most extravagant claims were based.

Fechner then subjected all of the above forms to a statistical study. One set of Fechner's experiments dealt directly with the preference for rectangles and squares. He asked for judgments of distinct preference and rejection from a large number of subjects upon the pleasing effect of ten rectangles of white cardboard of equal area, laid unsorted on a black surface. The cards varied in shape from a square to a figure with sides as 2:5, the golden section rectangle with its sides as 21:34 being seventh in order of length counting from the square. The judgments of preference increased and the judgments of rejection diminished from the two extremes to the golden section which had 35% of the preferences and no rejections.

Fechner's general results with regard to these figures and to the division of straight lines into segments are that the square and the rectangle nearest to it on the one hand, and the longest rectangle on the other, are the least
pleasing. The golden section rectangles and its immediate neighbors have a real superiority in pleasantness to the other rectangles. A deviation from symmetry was much more unpleasant than a proportionally greater deviation from the golden section. In dividing a horizontal line, the golden section was found to be less pleasing than bisection. In dividing a vertical figure the golden section is less pleasant than the ratios 1:2.

From his study he formulated six leading principles: (1) that of the "aesthetic threshold", or the least stimulus that would give an aesthetic reaction; (2) aesthetic support or intensification, of lines or figures that taken by themselves gave no aesthetic effect upon the subject; (3) the unifying connection of the manifold, or the old principle of unity in variety; (4) truth; (5) clearness; and, (6) association. Of these principles association is the most important for later investigations and has been made the most of in the various theories.

Fechner also performed a service for later experimenters by pointing out the associational and direct factors. Direct factors were the effect produced upon the subjects by the form, color, outline, proportion or symmetry of the composition. The associational factors, he found to be those of use, purpose, rareness, and a host of other classifications of "conditioning."

Another investigation to test the validity of the
golden section as an object of preference was made by Witmer. (41) Cards in the shape of rectangles, triangles, squares, and simple linear figures were drawn on paper. Mathematical relationships were varied in all possible ways.

The subjects preferred the relation 3:5 which is not far from the golden section. The author concluded (1) symmetry and proportion are aesthetically unlike and due to different causes; (2) proportion and symmetry cannot be explained by association; (3) preference of the subject is to be explained by the most pleasing difference of parts.

Other experiments to investigate geometrical form were made by several writers.

Haines and Davies (13) used one apparatus consisting of a screen of black cardboard set up in a vertical position. In the center of the cardboard was an opening 10mm. square capable of being opened and shut by the subjects. The purpose of the experiment was to find the most pleasing divisions of square or rectangle when the subject himself made the division.

Another part of the experiment of Haines and Davies consisted in presenting series of cards, varying in width, the length remaining constant. The cards were presented one at a time, the subject giving his preference and
introspecting on the effect of the stimulus. They did not find any marked preference for a particular size of card by the whole group. The subjects showed marked individual difference by choosing types of cards corresponding to different motives or uses. The experimenter found five classes of motives: (1) motives found in the object; (2) suggestion; (3) association; (4) illusions; (5) a pure motor element.

The introspective notes were said to reveal: (1) that the preference for any particular group is, either (a) due to similarity of the proportions of the chosen figure to those met with previously, or (b) to the fact that the chosen figure fits in with a group of interests already developed in the case of the individual observer.

Another experiment of the same kind was made by Legowski (20). The object was to determine what psychic factors enter into judgments concerning the aesthetic value of simple geometrical figures, such as squares and triangles. The figures were presented in a pre-arranged order according to a physical series and required a recombination into an aesthetic series.

An attempt was made to determine the importance of direct factors, found by Fechner, upon preference and also associational factors. The subject was instructed to form his aesthetic series according to the immediate impression made on him directly by the drawings. In about half of
the judgments, relational or associational factors could be eliminated.

A constant agreement was found as to what constituted the most pleasing figure, though different parts of the triangle gave rise to a specific viewpoint, thus affecting judgment. The author then compared the results obtained by his serial method with those presenting the figure in pairs, and found substantial agreement between the two methods.

The experimenter formulated the laws derived from these experiments in the words, "In general, simplicity and ease of perception, symmetry and regularity are the most important characteristics that influence the judgment of simple geometrical figures."

Martin (21) made an experimental study of Fechner's principles of aesthetics, using the same method as did Fechner. She interpreted her results to substantiate the earlier experiment.

An experiment that led to Bullough's theory of adaptation of outer and inner factors was made by Segal (31). The purpose of the experiment was to discover what goes on in consciousness when something pleases. The serial method was used, for ease of comparison. The experimental material was composed of series of lines, rectangles, and zigzags and triangles on white cards of equal size, laid on a black
cardboard background. Each series was repeatedly placed before the same subject to determine if the aesthetic reaction remained constant. The interval between observations varied from three days to eight months. Eight persons served as subjects, all of whom had had considerable psychological training. Associations were discouraged. Memory was found to hold a small place in successive judgments. The results were so variable that no statistical treatment was possible.

Segal (31) found four constituents of the experience may be discriminated; (1) apperception of the meaning; (2) empathy; (3) organic feelings; (4) formal fed feelings.

The equal-eye-movement received its death blow at the hands of Stratton (32), who concluded from a photographic study of eye movements that symmetry must be explained in another way. After conducting an experiment very much like that of Pierce, (27) Stratton (32) concluded aesthetic form is a matter of general interpretation involving all phases of mental life. Along with criticism directed against the eye-movement theory of symmetry and proportion also appears criticism directed against attention and association as an explanation. Segal (31) in writing of Puffer's (28) theory thought that according to this theory all that was needed was an equal distribution of attention to make any line symmetrical. Association was disclaimed as an explanation by Witmer (41), who claimed that prefer-
ence for geometrical forms could not be explained either by associations in the race or individual. He further said any other explanation than the most pleasing relation or proportion of parts of the geometrical form must await further investigations to unravel the multiplicity of facts, psychological and physiological, relating to this problem.

The empathy theory came in for its share of experimentation and criticism. Since most of the psychological investigations were of an introspective nature, quotations will serve to make clear the method and nature of the theory. A typical empathic theory is given by Lee and Thompson (19 ). The explanation is based on the James Lange theory of the emotions and purports to show that the perception of form takes place by organic processes connected with respiration and equilibrium, and that those forms are aesthetic which further these processes.

To determine the cause of the pleasure or dissatisfaction experienced in looking at certain kinds of forms, subjects were placed before different objects and asked to introspect upon their experiences. In general, the subjects looking at a blank wall found the wall seemed to come forward, looking at a confusion of objects the eye focusses and there is a sense of one's profile being flattened. In looking at the works of art, such as pictures, beautiful jars, vases, and statuary our kinaesthetic and organic sensations as they occur explains our affective reactions to such objects. "In
looking at a jar, our sensations are composed, balanced and co-related in their diversity. Looking at this jar one has a specific sense of a whole. To begin with, the feet press the ground while the eyes fix the base of the jar. Then one accompanies the "lift-up" of the body of the jar with a lift-up of one's body; and one accompanies by a slight sense of downward pressure the widened rim of the jar's top. From the simplest pattern up to the most complicated work of art, the movement of eye and breath are made deliberately and rhythmically and reinforced by feelings of balance.

Other writers were not long in pointing out that empathic reactions did not distinguish between good art and poor, and often such bodily reactions were entirely absent from experience when looking at the best words of art. The theory seems inadequate as an explanation for geometrical form, especially symmetry, where according to this theory we would have to move in two directions at the same time. Furthermore, to recognize equality in division of a line, introspections reveal a minimum of bodily reactions to geometrical forms.

Another type of experiment was made by Calkins. ( 7 ) A comparison was made of the liking of school children and adults for pictures. Three hundred school children, equally divided among kindergarten, fourth, and eighth grade, and one hundred fifty Freshmen and Senior college girls were used as subjects. Each subject was then tested by
being shown three pictures, two by two, in the same order and these two pairs were so arranged that the picture best liked of the first two pictures was again compared with the third. The first picture was tinted in life colors, the second had beauty of form and outline, and the third expressed religious concepts and symbolized spiritual experiences.

In the first choice, between pictures one and two, emphasizing color and form respectively, the children preferred the brighter colored picture. More than one-half of the Freshmen and nearly two-fifths of the seniors made the same choice. The second choice, between pictures preferred in the first arrangement choice and picture three showed the picture symbolizing spiritual experiences to be the general favorite.

An introspective study was made of the judgments for preference and the reasons classified according to form, outline, color, and what Calkins (7) calls suggestion, or meaningful associations. Her introspections bore out the conclusions suggested by the quantitative data, namely, that suggestion was the common factor in the enjoyment of pictures. The difference between the children's evaluation of pictures and the more mature college women was chiefly of whole or part judgment. Children were inclined to evaluate a picture on the basis of some unrelated detail of the picture, while adults considered the total situation in the picture. The value of such a study, she says, is to stress
the importance of teaching children to see parts in their relation to the whole drawing.

An experiment to test the efficacy of a particular theory was made by Weber. Accepting Moore's theory of aesthetic pleasure, i.e. that aesthetic involves the difficult but not too difficult synthesis for the individual, Weber assumed two factors in the aesthetic enjoyment of geometrical forms, the complexity of the stimulus and the perceptual or synthesizing powers of the individual. Complexity of the stimulus means to Weber nothing more nor less than adding lines to a design until the form of the drawing is obscured, and is unpleasant for most observers.

Two groups of 62 and 43 young college women compared the pleasantness of figures of varying degrees of complexity, but built on the same design. Their perceptual powers were tested by means of Heilbronner completion cards, and correlations of +.35 and +.41 were found between the degree of complexity preferred and success in completing the Heilbronner designs by the two groups of subjects respectively. A very low correlation was found between college grades and complexity preference.

The subjects were 200 Junior college women. Forms of rectangles, triangles, crosses and lettered devices were presented for judgment and ranked in order of aesthetic merit. The most liked rectangles had the ratio of altitude to base, 1.83:1; the triangle, 1.6:1; and 1.7:1. The most
liked of the crosses had a bar half the length of the upright and such a bar, Thorndyke (35) found, is best liked when it cuts the upright so as to leave one-fourth above and three-fourths below. In the lettered designs the space relations may vary widely so long as the design is obvious, and so long as bareness and crowdedness are not suggested. He gave no explanation for the choices of his subjects.

On the feeling of symmetry we have the experiments of Pierce (27), Angier (2) and Puffer (28). Pierce (27) sought to answer the question: Can a feeling of symmetry remain when the two sides are geometrically equal, and if so what are the conditions under which this may result? A uniform background on which various forms and lines of various colors could be moved by the subjects was provided. The lines were different colored at the extremities of the lines and the subject divided the various colored lines so as to produce a feeling of symmetry. We found variations in the size of the forms and brightnesses of the colors were compensated for by variations in the distance from the center. Eye movements of like energy give our feelings of symmetry is his explanation.

The same subjects and apparatus were used in an experiment to throw light on the question of the function of the eye-movements in relation to the aesthetic consciousness.
The conditions were varied from the previous experiment by having the subjects assume various bodily conditions in relation to the stimulus. The experimenter gave his results as supporting the theory that the desire to make the objective conditions correspond to the subjective ones necessitates unity in our forms and is the one essential condition for the emergence of the aesthetic consciousness.

Angier (2) in the same kind of an experiment used the eye-movement explanation, while Puffer, (28) thought symmetry was the result of the equal distribution of attention.

More recent experiments emphasize the investigation of certain objective conditions for the aesthetic perception. Wells (39) compared the reaction time for affective processes with that for cognitive processes. Two men and three women served as observers. The procedure consisted in having the observers make a cognitive judgment and an affective judgment on the same picture. The results indicate that the affective processes do not take more than 0.8 seconds while the cognitive processes required a slightly longer time.

Meirs (22) and Christensen and Karwaski (9) have attempted to develop an achievement test for aesthetic sensitivity. Meirs used the work of recognized artists. He assumed the constant in art to be the general principles or qualities of balance, harmony, rhythm and their variation. The art work was copied in two variations, one like the original, the other with some significant feature destroyed. The
distribution of scores showed some overlapping in all classes and an upward trend toward the art faculty. Christensen and Karwaski (9) tried three methods. The most satisfactory required a comparison of two examples of art. In addition one of five reasons was chosen in which only one was right, the other four being wrong, not applying, or failing to bring out the most significant point. The second method consisted in judging a single picture as good or not good and checking the reason. (five suggested) The third method required a selection of the best from four examples of similar subjects. The materials were from paintings, architecture, industrial art, color or abstract design. The observers were divided among trained, untrained, general art students, advanced art students and art instructors. The results show some overlapping in all groups but distinct separation of modal points in the direction of most training.
Summary of Experimental Literature

The experiments on geometrical form followed the course set by Fechner in large part and tried to find the most pleasing square, rectangle, or other geometrical figure. When this most pleasing figure had been isolated attempts were made to explain its superior preference. The explanations, took the form of formulating principles, like Fechner's whose emphasis on association is his most important contribution; or phenomenological studies like that of Witmer (41), who defined the aesthetic response of judging geometrical forms as made to the most pleasing proportion of parts. Division of lines in a particular way was attributed to equal-eye movements, or when this did not suffice, recourse was had to the equal distribution of attention.

The second kind of experiments dealt with the energy manifested in lines and forms of various kinds. Empathetic reactions were found to be an integral part of the aesthetic reaction to such forms. The theories of Vernon Lee and Thompson (19) were of this kind.

The third or last stage in the experimental literature deals with the presentation of works of art of various kinds, and the subject gives an account in experimental terms of the cause of his preference, or the experimenter combines
this method with a purely statistical treatment. The aim is to find forms so subjects may be rated for their aesthetic sensitivity or graded on the basis of their achievement in this kind of a test. A modification of this type of an experiment was that of Weber (38), who sought to find the relation between the complexity of the stimulus and the perceptual powers of the subjects.

Wells (39) sought to find the difference on the reaction time for affective and cognitive processes. Meier (22) and Christensen (9) have attempted to develop an achievement test for art appreciation.

The trend of the experimental investigation on the subject of aesthetics is toward the control of certain specific conditions that determine the nature of the aesthetic perception.
V. Conditions of experimentation.

1. Apparatus.

The purpose of the illumination apparatus devised for this experiment was to control and measure the intensity of the illumination on pictorial and geometrical stimulus forms so that detailed description of the perceptual changes of these forms could be made and correlated with light intensity.

Figures I, II, III, and IV give the plan and dimensions of the apparatus. The apparatus consisted of two light boxes enclosing two 150 Mazda daylight blue bulbs with two Aubert diaphragms operated from the control lever C. The working parts of the apparatus were made by the writer from machined brass. The two Aubert diaphragms synchronized in their operation. Each Aubert diaphragm was 66 mm. on a side.

The writer is indebted to Howard S. Bartley instructor in the Psychology Department of Kansas University for many suggestions regarding the mechanical construction of the illumination apparatus.

2. The measurement of the illumination.

The illumination was measured at the position of the observer's eyes by setting a Macbeth illuminometer at this distance from the light source and
Fig. 1

Illumination Apparatus

For binocular vision

For monocular vision

pitch = 20 per inch
Illumination Apparatus Top View

Fig. 4
taking the measurement of illumination for every five mm. on the control lever. Table I on page 36 and Fig. 5 on page 36 show the relation of the number of foot-candles to the position of the pointer on the control lever. Thus to find the intensity of the illumination for 70 mm. on the control lever read across on Table I on page 36 a 177.78 which gives the control lever reading in F. C. Fig. 5 shows the graphic relation of control lever readings in mm. to F. C.
The relation of control lever readings in mm. and foot candles

Abscissa: Control Lever Readings
Ordinate: Foot Candles

Fig. 5
Table I.

Showing the relation of millimeters readings on the control lever to the intensity of illumination measured in F.C. at the position of the eyes of the observer.

<table>
<thead>
<tr>
<th>Control lever scale</th>
<th>Reference</th>
<th>Clearness</th>
<th>F.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td></td>
<td></td>
<td>177.78</td>
</tr>
<tr>
<td>65</td>
<td>1</td>
<td></td>
<td>145.905</td>
</tr>
<tr>
<td>60</td>
<td>9</td>
<td></td>
<td>124.04</td>
</tr>
<tr>
<td>55</td>
<td>4</td>
<td></td>
<td>112.6</td>
</tr>
<tr>
<td>50</td>
<td>32</td>
<td></td>
<td>101.17</td>
</tr>
<tr>
<td>45</td>
<td>23</td>
<td></td>
<td>80.9</td>
</tr>
<tr>
<td>40</td>
<td>1</td>
<td>6</td>
<td>60.7</td>
</tr>
<tr>
<td>35</td>
<td>1</td>
<td>40</td>
<td>43.55</td>
</tr>
<tr>
<td>30</td>
<td>2</td>
<td></td>
<td>26.2</td>
</tr>
<tr>
<td>25</td>
<td>2</td>
<td></td>
<td>13.65</td>
</tr>
<tr>
<td>20</td>
<td>72</td>
<td></td>
<td>6.88</td>
</tr>
<tr>
<td>15</td>
<td>124</td>
<td></td>
<td>2.275</td>
</tr>
<tr>
<td>10</td>
<td>168</td>
<td></td>
<td>.286</td>
</tr>
<tr>
<td>5</td>
<td>86</td>
<td></td>
<td>.143*</td>
</tr>
</tbody>
</table>

* Theoretical value. N. 456

Mean 1.82 F. C. 87.48
A. D. 1.00 F. C. 10

- 36 -
3. Observers.

Fifteen observers were used during the course of this experiment. The following gives the names of the observers and the abbreviations used in referring to the introspections of the observers given in the Appendix. In the Appendix the observers initials are given followed by the figure number of the geometrical or stimulus form.

<table>
<thead>
<tr>
<th>Observers</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miss Erma Barkley</td>
<td>E. B.</td>
</tr>
<tr>
<td>Mr. Raymond Barkley</td>
<td>Ray B.</td>
</tr>
<tr>
<td>Mr. Russell Barkley</td>
<td>R. B.</td>
</tr>
<tr>
<td>Mr. Howard Bartley</td>
<td>H. B.</td>
</tr>
<tr>
<td>Prof. Harry R. DeSilva</td>
<td>H. D. S.</td>
</tr>
<tr>
<td>Miss Irma Enyart</td>
<td>I. E.</td>
</tr>
<tr>
<td>Mr. M. Howell Lewis</td>
<td>M. H. L.</td>
</tr>
<tr>
<td>Prof. Baulah Morrison</td>
<td>B. M. M.</td>
</tr>
<tr>
<td>Mr. Edwin D. Newman</td>
<td>E. N.</td>
</tr>
<tr>
<td>Mr. Theodore F. Perkins</td>
<td>T. P.</td>
</tr>
<tr>
<td>Prof. P. C. Squires</td>
<td>P. C. S.</td>
</tr>
<tr>
<td>Mr. W. Wilcox</td>
<td>W. W.</td>
</tr>
<tr>
<td>Miss Gertrude Way</td>
<td>G. W.</td>
</tr>
<tr>
<td>Mrs. Ruth Yomen</td>
<td>R. Y.</td>
</tr>
<tr>
<td>Miss Erma Zeeks</td>
<td>E. Z.</td>
</tr>
</tbody>
</table>
Mr. Howard Bartley, Prof. Harry R. DeSilva, Mr. M. Howell Lewis, Prof. B. M. Morrison, Mr. Edward Newman, Mr. Theodore F. Perkins, Prof. P. C. Squires, and Mr. Warren Wilcox were the only observers that had had special psychological training. Mr. Raymond Barkley, and Miss Gertrude Way had taken several courses in psychology, while Miss Erma Barkley, Mr. Russell Barkley, Miss Irma Enyart were high school students. Mrs. Ruth Yomen was a college graduate, with no special training in psychology.

So far as the experimenter knew, all the observers had normal vision.

The material for this study consisted of two kinds: (1) 29 geometrical stimulus forms which were in part adopted from the figures used for stereoscopic slides and in part devised by the writer; (2) 12 pictorial stimulus forms reproduced from the work of recognized painters. The geometrical and pictorial stimulus forms used in this experiment are reproduced on the next 5 pages, of the stimulus forms.
Geometrical Forms

1.

2.

3.

4.

5.

6.
Picture Forms

No. 15—The Blue Boy
Gainsborough (1727-1788) Priv. Col.
English School
Artext Junior Art Extension Society New York

No. 8—Mad. of the Chair
Raphael (1483-1520) Fitti Gal. Florence
Italian School
No. 75—Saskia
Rembrandt (1606-1669)
Kassel Gallery
Dutch School

No. 66—Mrs. Siddons
Sir. Thos. Lawrence (1769-1830)
Natl. Gal.
English School
No. 146—The Top Hat
Sully (1783-1872)
Museum of Fine Arts, Boston
American School
Artext Junior Art Extension Society
New York—Westport, Conn.

No. 60—View of Delft
Vermeer (1632-1675)
Hague Gallery
Dutch School
Artext Junior Art Extension Society
New York—Westport, Conn.
No. 105—The Calmady Children
Sir Thomas Lawrence (1769-1830)
Art Extension Society

No. 57—Belgian Farm
Eugén Kampf (1861-)
Art Extension Society
Priv. Col. German School
New York—Westport, Conn.
Reproduced by permission of the owners of the copyright
No. 96—Northern Sunrise
Bruno A. Liljefors (1860–)

No. 7—Children of the Shell
Murillo (1616-1682)

Stockholm
Swedish School

Prado, Madrid
Spanish School
5. Instructions given to the observer.

The instructions took three forms: (1) descriptive preference instructions; (2) preference instructions; (3) clearness instructions. Descriptive preference instructions were the following: "Describe as carefully and exhaustively as possible the changes that take place in the forms before you and at the same time give the feeling tone or quality that goes along with these changes." These instructions were given verbally and elaborated further if not understood by the observers. Preference instructions were: "Indicate the optimal place of preference for the figures as these are successively presented for observation." If the observer did not understand the preference instructions he was asked to pick out the place "you like the figure the best" or "Where you think the figure is the prettiest." Clearness instructions were: "Tell where the forms are the clearest for you."

No attempt was made to explain further the meaning of the word clear. The descriptive instructions gave the only introspections in this investigation.

We have no apology to make for our somewhat general instructions. We did not know what to "set" the observer to look for; the most we could do was to ask for
a complete description of experience with the hope that the "natural" parts of the aesthetic perception would differentiate themselves. The observers were as ignorant of what to look for as the experimenter was in telling them what to look for. Gradually, however, the descriptions became clearer and more complete. Certain properties of the aesthetic perception "stood out" and were repeatedly described as the most obvious characteristics of the aesthetic experience. The most striking of the properties of the aesthetic perception were found to be: depth, thing character, configurational completion, and unity.


Five minutes were allowed for each observer to become dark adapted. The observer was seated before the apparatus. The experimenter then turned on the exposure light, starting with about 0.14 F.C. The observer described the stimulus form at this stage of illumination. The observations were written down by the experimenter as the observer gave them by the light of a small lamp behind the apparatus. After the observer had described the appearance of the stimulus form at this stage of illumination, the light intensity was increased until
the observer saw some change in the appearance of the form under observation. Then further introspections were taken. The intensity of the illumination was recorded by the experimenter opposite the written description given by observer. For preference and clearness, the observer indicated the place of preference or clearness, in terms of the phenomenal appearance of the stimulus form under observation.
VI. Quantitative Treatment of the Data.

The range of illumination for aesthetic preference.

The range of illumination for aesthetic preference is a rather narrow range of light intensity. 99% of the observations on geometrical and pictorial stimulus forms fell between 0.14 and 13. F. C. with an average of 1.8 F. C. and an A. D. of 1 F. C. Table I on page 36 and Fig. 5. on page 36 show the range of illumination for aesthetic preference for all observations. 19 observations were on monocular observation. No significant difference was found between the intensity for monocular and binocular observation.

The range of illumination for clearness.

With the instructions to judge clearness we find that the range of illumination is much higher and wider than the illumination for preference. Table I on page 36 and Fig 5 on page 36 show the range of illumination for clearness. 99% of the observations for clearness fell between the light intensities of 43-124 F. C. with an average illumination of 87.48 F. C. and an A. D. of 10 F. C.
Aesthetic preference is not a matter of clearness. The quantitative data lends support to the conclusion reached in the qualitative data, namely that aesthetic preference is not entirely a matter of clearness. Table II on page 44 and Fig. 7 on Page 44 show the relation between the light intensity for the aesthetic perception and clearness.

Table II.

The relation between clearness and preference of all observations.

<table>
<thead>
<tr>
<th>No. Obs.</th>
<th>Range F. C.</th>
<th>Average F. C.</th>
<th>A. D. F. C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearness</td>
<td>115</td>
<td>43-123</td>
<td>87.48</td>
</tr>
<tr>
<td>Preference</td>
<td>456</td>
<td>0.14-13.65</td>
<td>1.8</td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td></td>
<td>85.66</td>
</tr>
</tbody>
</table>

A second conclusion is that the range for aesthetic preference is much narrower and lower than the range of light intensity for clearness.
The Relation of Preference and Clearness

Abscissa: Illumination in Foot Candles
Ordinate: Frequency

Preference

Frequency

2.275
13.65
43.55
80.937
112.6

Foot Candles

Clearness
The individual differences among observers.

The treatment of individual differences among observers, in this study will rest on the variations of illumination required for the different observers for aesthetic preference. The introspections fail to reveal any reason for indifferences in illumination among observers. Either our instructions were inadequate for the task of picking out reasons for individual differences or the observers were unable to describe changes in the physiological mechanism of the eye responsible for the choice of different intensities of illumination.

It seems evident from a consideration of Table III on page 47 and Table IV on page 48 and Fig. 8 on page 46 showing the range of individual observers that there are marked individual differences and that furthermore, grouping of frequencies at the intensities 0.28625, 2.275, and 6.875 F.C. are largely a result of individual differences. We just point out, however, that 9% of the entire aggregate of observerations was made on pictorial forms which required more illumination than did the geometrical forms thus limiting the value of any conclusions made about individual differences.

The observations of R. B., totaling 177 in all, contribute to the heaping of frequencies at the 0.28625 F.C.
This observer had the lowest average illumination for preference of any of the observers. The 2.275 F.C. mark is composed of the combined observations of H. B., B. M. M., H. D. S., T. P., while the peak of frequencies at the 6.875 foot candle mark, was contributed by such high intensities as A. S., 6 F.C., by R. Y. whose observations were taken exclusively on pictorial forms, H. B., also on the same kind of subject matter and M. H. L., with an average of 5 F.C. for preference observations.
<table>
<thead>
<tr>
<th>Observer</th>
<th>No.</th>
<th>No. Observations</th>
<th>F. C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. B.</td>
<td>1</td>
<td>12</td>
<td>5.0</td>
</tr>
<tr>
<td>Ray B.</td>
<td>2</td>
<td>177</td>
<td>0.3</td>
</tr>
<tr>
<td>R. B.</td>
<td>3</td>
<td>10</td>
<td>2.2</td>
</tr>
<tr>
<td>H. B.</td>
<td>4</td>
<td>41</td>
<td>2.21</td>
</tr>
<tr>
<td>H. D. S.</td>
<td>5</td>
<td>10</td>
<td>1.8</td>
</tr>
<tr>
<td>I. E.</td>
<td>6</td>
<td>12</td>
<td>6.7</td>
</tr>
<tr>
<td>M. H. L.</td>
<td>7</td>
<td>32</td>
<td>4.0</td>
</tr>
<tr>
<td>B. M. M.</td>
<td>8</td>
<td>4</td>
<td>2.3</td>
</tr>
<tr>
<td>E. N.</td>
<td>9</td>
<td>63</td>
<td>3.2</td>
</tr>
<tr>
<td>T. P.</td>
<td>10</td>
<td>11</td>
<td>2.2</td>
</tr>
<tr>
<td>P. C. S.</td>
<td>11</td>
<td>6</td>
<td>2.3</td>
</tr>
<tr>
<td>W. W.</td>
<td>12</td>
<td>68</td>
<td>2.1</td>
</tr>
<tr>
<td>G. W.</td>
<td>13</td>
<td>8</td>
<td>2.1</td>
</tr>
<tr>
<td>R. Y.</td>
<td>14</td>
<td>3</td>
<td>6.0</td>
</tr>
<tr>
<td>E. Z.</td>
<td>15</td>
<td>2</td>
<td>0.4</td>
</tr>
</tbody>
</table>

| N. 456   | Mean | A.D. 2 F. C. |

*These measurements are based on the control lever readings.*
Fig. 6

Preference Illumination for Observers

Abscissa Observers
Ordinate Illumination

Average

Preference

Deviation

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

3 4 5 6 7 8 9 10 11 12 13 14 15 16
The range of illumination for geometrical and pictorial stimulus forms.

The pictorial stimulus forms required a greater degree of illumination that did the geometrical stimulus forms. This fact is evident from Table III on page 47 and Table IV on page 48 and Fig. 9 on page 49 showing the illumination for all of the stimulus forms. The forms numbered above 50 are pictorial stimulus forms. The difference in light intensity was found to be on the average 1.5 F. C. when the two kinds of forms were equated for brightness. We interpret this difference in the illumination required for these two kinds of material to show that one criterion of a good form is resistance to distortion by light.

Table IV.
The range of illumination for geometrical and pictorial stimulus forms based on frequency of choice.

<table>
<thead>
<tr>
<th>Range F. C.</th>
<th>Average F. C.</th>
<th>A. D. F. C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. S. F.</td>
<td>1.9-60.7</td>
<td>6.5</td>
</tr>
<tr>
<td>G. S. F.</td>
<td>0.14-26.2</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Difference 5.0
Table V.

The illumination for geometrical and pictorial stimulus forms.

<table>
<thead>
<tr>
<th>Fig. No.</th>
<th>F. C.</th>
<th>Fig. No.</th>
<th>F. C.</th>
<th>Fig. No.</th>
<th>F. C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.7</td>
<td>21</td>
<td>1.7</td>
<td>41</td>
<td>5.5</td>
</tr>
<tr>
<td>2</td>
<td>1.3</td>
<td>22</td>
<td>1.2</td>
<td>Mean</td>
<td>3.10</td>
</tr>
<tr>
<td>3</td>
<td>1.2</td>
<td>23</td>
<td>1.3</td>
<td>A. D.</td>
<td>2.1</td>
</tr>
<tr>
<td>4</td>
<td>1.7</td>
<td>24</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1.4</td>
<td>25</td>
<td>1.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1.5</td>
<td>26</td>
<td>1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1.1</td>
<td>27</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1.8</td>
<td>28</td>
<td>1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1.7</td>
<td>29</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1.9</td>
<td>30</td>
<td>6.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1.8</td>
<td>31</td>
<td>4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1.7</td>
<td>32</td>
<td>3.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1.4</td>
<td>33</td>
<td>2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1.7</td>
<td>34</td>
<td>13.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1.2</td>
<td>35</td>
<td>7.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>1.8</td>
<td>36</td>
<td>6.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>1.6</td>
<td>37</td>
<td>5.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>1.8</td>
<td>38</td>
<td>6.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>1.5</td>
<td>39</td>
<td>8.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>1.7</td>
<td>40</td>
<td>9.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From 1 to 29 are geometrical stimulus forms. From 30 to 41 are pictorial stimulus forms.
Average Optimal Illumination for Geometrical and Pictorial Form in Foot Candles

Average Illumination

Average Deviation

Geometrical Form Numbers

Pictorial Form Numbers
Summary of quantitative results.

1. The quantitative results indicate that a relatively narrow range of light intensity is a condition for the aesthetic perception. 99% of all observations for all observers fell between 0.14 and 13.6 F. C. with an average of 1.8 and an average deviation of 1 F. C.

The range of illumination for aceress is from 43-123 F. C. with an average of 87.48 F. C. and an average deviation of 10 F. C. We made the conclusion that aesthetic preference is not entirely a matter of clearness.

3. Individual differences were found among observers. The average intensity of illumination for all observers was 3 F. C. with an A. D. of 2 F. C. for preference.

4. The range of illumination for geometrical and pictorial stimulus forms was from 0.8 to 13.2 F. C. with an average of 3 F. C. and an A. D. of 2 F. C. for preference.
VII. The Qualitative Treatment of the Data.

The dynamic nature of the aesthetic perception.

The dynamic nature of the aesthetic perception is shown by the fact that the objective contents of perception, the depth, unifying and configurational properties of the experience of evaluating visual shapes and forms constantly changed and shifted under various intensities of illumination. So susceptible to changes in the light intensity was the aesthetic perception that even changes in adaptation would bring forth experiential reports. At one time the experimenter seriously contemplated using this mode of procedure. The experience of evaluating visual forms under varying light intensities is not a process of getting a better form, primarily, but that of perceiving certain rather specific changes in the properties of the aesthetic object. Adjectives like good and better do not do justice to the range of phenomenal changes that follow slight changes in light intensity, or come into perception without any change in the objective conditions. We hope that we may indicate beyond question that aesthetic perceptions do not get better, but change in certain describable ways that follow closely on the changes in the intensity of the light. The perception seems to be in a state of dynamic unstable equilibrium, now shifting in this direction, now in that, now bringing a sudden rush of feeling quality, now slowly

- 51 -
changing to indifference, but always changing. A glance at the introspection in the Appendix will show how easily the contents of perception changes. The experimenter regrets that he could not describe adequately, nor take down exactly, the sudden rushes of feeling indicated by some of the observers; the quick changes in the perception that left a feeling suspended, as it were, in the air. Often the changes in the visual perception was directed and changed by the feeling tone of the previous experience, now causing the objects of external perception to fluctuate in a sort of dynamic equilibrium with the feeling qualities of experiences. The properties of the whole experience possesses an extremely fine, just noticeable difference for slight changes in the intensity of the illumination and for psychological and physiological changes in the observer. By the total experience we mean the feeling quality as well as the objects of the perception, that is the form used in this experiment. Krueger (17,p.75) has stated this observation in the form of a law: "The variation of total-complexes is more certainly observed and more exactly perceived than the variations of their so called parts.............It depends whether the compared "parts" mean little or much for the whole. It has been observed a thousand times in laboratories, though mostly as a by-product, that the smallest variation in
in any part of the field of experience come into consciousness emotionally long before one can say "where" something changed and what really happened."

It was a fact repeatedly observed in the course of this experiment that the parts of the aesthetic perception were constantly changing. As the light increased and the naturalness of the parts broke down, no further changes were observable except greater clearness, or increasing unpleasantness because of the increase in the light intensity. The feeling quality of the perception then broke down completely and only persisted in such negative forms as poor, bad, don't like it there.

Introspections like the following abound and lend support to the view that after the feeling tone of the experience has disappeared or become indifferent, or unpleasant the environmental changes, in this case light intensity, must reach a higher level of intensity before any further change is noticed. "Stop increasing the light. The figure as you increase the illumination begins to look like a jumble of lines." (G.W.Fig.5.) "I do not like the figure so well there. It seems just a geometrical figure and not very interesting." (E.N.Fig.5.)

Taking an example from the observation of pictorial forms we find that increasing the illumination may produce only a change in the coloration of the form. (H.B.Fig.30) (All the forms numbered above 30 are pictorial forms). We
find that increasing the illumination may produce only a change in the coloration of the form." (H.B. Fig. 30).
(All the forms numbered above 30 are pictorial forms). We even find a certain finality in the opinion that the particular form under observation will not change.
"Too bright. I see the imperfections in the painting."
(B.M.M. Fig. 35). "No good there. Just a big splash of red. I can't tell what the picture is. No depth. It looks like nothing. I don't like it very well." (M.H.L. Fig. 36).
"The figure is getting worse. It looks too much like a picture." (H.B. Fig. 37).

The introspections bear out the conclusion that the aesthetic perception is constantly changing while in our quantitative treatment of the data we found that the range of intensity for clearness was five times as large as that for preference.

. The stages in the development of the aesthetic perception.

The aesthetic perception under the conditions of changing illumination readily divides into three steps or stages, each stage correlated with definite phenomenal changes that depend upon the light intensity.

The stages of the aesthetic perception were so apparent that all of the observers agreed upon their presence. The introspections show so clearly the divisions of
the stages that all we shall do is to give the phenomenal correlates of each stage.

For ease of reference we shall call these three stages the sub-optimal, the optimal and the clearness stage. The sub-optimal stage is characterized by vague inferred structurization of the phenomenal field. The figure is just an elaboration of the ground... The figure is just lines and inferred surface. (E.N. Fig. 4.) "Not much to say about the figure. I can see various parts and they do not seem particularly related." (G.W. Fig. 4.) The figure is just visible. I can see first one part and then another. (E.Z. Fig. 5) "I can see sections of the figure." (Ray B. Fig. 5.) "The figure looked like a fuzzy wuzzy thing." (E.N. Fig. 6.) or "Can't see much to the figure. That is all I can say for it. Of course it is not very pleasant."

At this stage of the aesthetic perception parts emerge as such without being related in any significant way. "Same as the rest. Can't see anything except parts here. Not very pleasant." (H.B. Fig. 30). "I can get a few cues of what the figure is. I can also see a few light spots. I know now it is a figure with some sort of a hat on". (B.M.M. Fig. 34.)

The sub-optimal stage is further characterized by the absence of depth as a striking enough phenomenal ex-
perience to describe more than a small proportion of the time. Absence of thing character, tied imagery, at least pertaining to the figure seen at the optimal stage, are further criterion of this stage. We shall make a more intensive reference to depth, thing character, unity, configurational completion in the next stage of the aesthetic perception. In the division of this section of the paper under 5 of the outline for the "qualitative treatment of the data" we shall show that the optimal stage is characterized by depth, unity, configurational completion, and thing character.

The feeling tone of the aesthetic perception is indifferent or almost absent at the sub-optimal stage. This absence of feeling tone was so evident to the observers or rather inconspicuous that the feeling tone was not mentioned unless the experimenter specifically asked for a report upon the feeling quality of this stage.

The optimal stage is characterized by unity, thing character, configurational completion and depth. These properties of the optimal stage are so apparent that one might call them natural parts of the aesthetic perception. In section 5 we elaborate this conclusion, we need not do more than mention the conclusion here. The feeling tone is at its height. All of the observers agreed upon this
as an almost self-evident fact.

The clearness stage corresponds more closely to the first stage than to optimal stage. Parts emerge as such. "Everything is blotched. Boys clothes do not look like clothes. No depth at all. No good." (T. P. Fig. 30) is a characteristic observation at this stage. In fact this stage can be described as the opposite of the optimal stage. As we shall point out later depth is present as a phenomenal experience only a small proportion of the time, and likewise unity, thing character, and configuration al completion at this stage. Such observations as the following are the rule rather than the exception. "Here this thing is getting toward the picture stage again. It is flat and the only change is an increase in coloration" (H. B. Fig. 30)

The chief difference between the clearness stage and the sub-optimal stage is the fact that whereas in the first stage structurization is often inferred, in the clearness stage the structurization is too obvious, as shown by the following descriptions: "Increasing the illumination splits up the figure into parts again which is not very pleasant." (P. C. S. Fig. 22); or again we find the same motive: "The figure becomes lines again. Just a drawing. Too much light. The figure breaks up" (E. N. Fig. 23).
We have named this last stage the clearness stage because the observers have no illusions about the figures. If the form is a geometrical drawing the observer sees a drawing; if the form is a picture, the thing character disappears and only a picture remains.

It seems apparent from a consideration of the introspections that the aesthetic perception may be divided into three stages, the sub-optimal, the optimal, and the clearness stage. These names are applied to the stages of the aesthetic preference for convenience only. Such a process is arbitrary but so is any division. Actually structure and function are one, and nowhere is the fact more apparent than in the aesthetic perception.

The comparison of the phenomenal changes in the aesthetic perception with the figure ground experience.

We pointed out in the section of the paper devoted to the systematic status of the aesthetic perception that the configurationists were dealing with total unanalyzed experiences. Now when ever a description is given of this type, of experience adjectives denoting an evaluation or preference for some part of experience that are sure to appear. Such terms as good, bad, dynamic, and natural abound in the configurational literature and are applied to the following
categories at least: psychology, biology, physics, and logic, (14, p.368) depending on the writer and the subject at hand. We have considered such terminology to indicate that the aesthetic perception and the configurational changes whose abound in the psychological literature at this time have in common the criterion of evaluation or preference. "What is to be singled out in perception or memory will depend upon the position of the part within the whole, whether or not is is a natural part and will lend itself to membership in a new configuration, and upon a number of factors like coherence, persistence and impressiveness." (14, p.369) These and others of a like nature seem to imply an evaluation of experience.

In our next section we shall endeavor to show that the aesthetic preference is directly proportional to depth, unity, thing character, and configurational completion. These properties of total experience are found in the figure ground experience investigated by Rubin, Zigler, and Wever, as well as in aesthetic perception. All of these terms denoting figure ground experience appear in the phraseology of the configurationists and take a place of importance in the Gestalt psychology.

In general, depth perception is fundamental to the ground. "Qualities emerge from a general level and hence must be considered with reference to their background if
their properties are fully to be accounted for in perception." (14, p.496)

Unity in variety was the most generally accepted criterion for the aesthetic perception. A configuration can only be understood in terms of the relation between the figure and ground.

Thing character or thingliness is another property of the configural field, emphasized by Rubin. Thing character does not depend, for the configurationists, upon association, but is the result of immediate perception of the properties of the figure. "A thing is stuff plus form" and is a different experimental object than ground.

Configurational completion, or what the structuralists call tied imagery, is also another property of configurational perception. The configuration tends to complete itself according to the laws of pragnanz; for example, and in other ways depending upon the conditions operative at the time;

Other parallels between the aesthetic perception and the configuration is the affirmation of the Gestalters that configurational changes cannot be explained in terms of clearness. Our results indicate that whatever that term may mean, aesthetic perception is not a matter of clearness. This conclusion is rendered plausible by the difference in the
intensity of illumination and by the fact that a high degree of structurization does not make a better configuration as Wever maintains.

Our conclusion follows from these considerations of the close relationship between the aesthetic perception and the configuration that the aesthetic perception is one of the ways in which figure ground experience develops.

Wever classified configurations as simple, good and perfect; we have classified aesthetic perceptual changes as sub-optimal, optimal and as clear. If any comparison were to be made between these classifications we should say that simple figure ground experience conforms to our sub-optimal stage, while good figure ground experience is a half way step between sub-optimal and optimal. Perfect figure ground experience means for Wever the maximal of structurization, a condition we found to be unpleasant for most observers. It would seem that Wever would have no parallel division for our optimal stage except perhaps good figure ground experience.

We conclude from our comparison of the figure-ground experience and the aesthetic perception that the two types of experience, if we can speak of them as such, even for the sake of comparison, have in common: (1) both the aesthetic perception and the figure-ground ex-
periences, if we can speak of them as such, even for the sake of comparison, have in common: (1) both the aesthetic perception and the figure-ground experience have in common the criterion of evaluation or preference as one of the most outstanding properties of such experiences; (2) other phenomenal properties that are characteristics of these two types of experiences are unity, thing character, configurational completion, and depth. Of course we do not mean to say that there is no difference. The instructions were quite different for the two types of experiences for one thing. Nevertheless there is enough similarity for us to hold with some degree of assurance that (1) both types of experiences are phenomenological, yet nevertheless measurable; (3) the two types of experiences are parallel at least in the ways we have pointed out above.
The direct relation of the optimal aesthetic preference to; depth or perspective; (2) "thingliness" or object character; (3) unity; (4) configurational completion or tied imagery.

These terms were considered in relation to the emergency of figure ground experience in the well known experiments of Rubin, (29) Zigler, (43) and Wever, (40) in our comparison of the aesthetic perception and figure ground experience. The experiences covered by these terms seemed to us to be the most striking phenomenal correlates of the process of evaluating geometrical and pictorial forms under the conditions of changing illumination and with the instructions to judge preference. At the higher stages of illumination, these properties of total perceptions were found to disappear, though not in a regular sequence, nor entirely. By these properties being phenomenal experience of depth, say on such and such a drawing. The only exception to these properties being phenomenal experiences for the aesthetic experiences was the case of configurational completion in the pictorial forms. We could find little support for the view that configurational completion entered or did not enter into the process of evaluating pictorial forms.

In the preparation of the following tables, we have divided the introspections among the categories given
above in the following manner: (1) present; (2) absent; (3) inferred as being present; (4) not mentioned. The introspections are treated by stages, sub-optimal; (2) optimal; (3) clearness.

Configurational completion was perhaps the most ambiguous of the categories used. If a geometrical form seemed darker in the center to the observer, or if an arc of a circle tended to complete itself, or if groups of lines as in figure 12 grouped themselves off in tied imagery or configurational completion was reported. The table give the total number of times that the experience was present, absent, inferred or not mentioned. Thus under the part of the table designated as unity as a phenomenal experience, we find that unity was mentioned as being present once or 2% of the time at the sub-optimal stage, 33% at the optimal and only 3% at the clearness stage.

We drew the conclusions from our treatment of the aesthetic perception that depth or perspective, object character, unity, and configurational completion were the most striking phenomenal characteristics or parts of the aesthetic perception.
Table No. VII

Unity as a phenomenal experience in the aesthetic perception.

Sub-optimal----Optimal----Clearness

<table>
<thead>
<tr>
<th>Material</th>
<th>P. A. I. N.M.</th>
<th>P. A. I. N.M.</th>
<th>P. A. I. N.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G. F. M. O.</td>
<td>0 10 3 6 2 0 13 4 0 7 8 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. F. B. O.</td>
<td>1 19 10 10 22 0 18 2 3 21 8 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P. F. B. O.</td>
<td>0 10 3 6 2 0 13 4 0 7 8 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1 39 16 22 26 0 44 10 3 35 24 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>2 50 20 28 33 0 56 11 3 45 31 21</td>
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</tr>
</tbody>
</table>

* 78

Configurational completion as a phenomenal experience in the aesthetic perception.

<table>
<thead>
<tr>
<th>Material</th>
<th>P. A. I. N.M.</th>
<th>P. A. I. N.M.</th>
<th>P. A. I. N.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G. F. M. O.</td>
<td>2 3 0 14 4 0 0 15 1 1 0 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. F. B. O.</td>
<td>15 7 2 16 25 0 13 2 3 21 1 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P. F. B. O.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17 10 2 30 29 0 13 17 4 22 1 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>29 17 3 51 49 0 22 29 7 37 2 54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 59 Configurational completion was not evident in the case of the pictorial stimulus forms.
Table No. VII

Thing character as a phenomenal experience in aesthetic perception.

Sub-optimal——Optimal———Clearness

<table>
<thead>
<tr>
<th>Material</th>
<th>P. A. I.</th>
<th>N.M.</th>
<th>P. A. I.</th>
<th>N.M.</th>
<th>P. A. I.</th>
<th>N.M.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0 11 0</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. F. B.</td>
<td>0.7 26 4 3 25 0</td>
<td>13 2</td>
<td>1 32 2 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P. F. B.</td>
<td>0.2 16 1 0 16 0</td>
<td>3 0</td>
<td>6 12 0 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10 55 5</td>
<td>10 51</td>
<td>11 7</td>
<td>9 7 55 2 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>13 68 6</td>
<td>13 65</td>
<td>1 22</td>
<td>12 9 71 2 18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 78

Depth as a property of the aesthetic perception.

Sub-optimal——Optimal———Clearness

<table>
<thead>
<tr>
<th>Material</th>
<th>P. A. I.</th>
<th>N.M.</th>
<th>P. A. I.</th>
<th>N.M.</th>
<th>P. A. I.</th>
<th>N.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G. F. M.</td>
<td>0.0 11 6 2 15 0 2 2</td>
<td>0 13 1 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. F. B.</td>
<td>0.5 7 10 18 24 1 10 5</td>
<td>2 26 0 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P. F. B.</td>
<td>0.0 1 6 5 7 11 0 4 4</td>
<td>0 9 3 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6 24 21 27 50 1 16</td>
<td>11 2 48 4 24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>7 31 27 34 64 1 20</td>
<td>15 2 61 6 31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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= 66 =
VIII. Summary and Conclusion.

1. The aesthetic perception is a function of the illumination. The optimal preference illumination is a rather narrow range for most observers. 99% of the preferences under the conditions of this experiment fell between 0.14 and 13 F. C. with an A. D. of 1 F. C.

2. From an objective and phenomenal treatment of the data we conclude that aesthetic preference is not entirely a matter of clearness. The aesthetic perception is more susceptible to slight changes in the intensity of the light than is clearness. Clearness fell between 43 and 124 F. C. with an A. D. of 10 F. C.

3. Phenomenally, the aesthetic perception may be divided into three steps or stages, the sub-optimal, the optimal and the clearness stage. The optimal stage differs from the other two stages in that depth, unity, thing character, and configurational completion are the most obvious properties of this stage. The sub-optimal and the clearness stage are characterized by the absence of the phenomenal properties of the optimal stage. The feeling tone of the sub-optimal and the clearness stage is indifference or unpleasantness while at the optimal stage the feeling quality of the aesthetic perception is at its height.
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Appendix.
Monocular Observation
Geometrical Form
Descriptive Observations

Fig. 3. Obs. W. W. Opt. 8.

0-4. I see two horizontal lines. The center is darker than the outside.

5-10. As the light increases the figure becomes square.

11-18. It is just a square now, no depth in it. Don't like it there. Below the optimal stage the figure was also unpleasant.

Fig. 4. Obs. W. W. Opt. 15.

0-7. I saw two squares when I first saw the figure. Now the form is a bunch of flat lines with dots in them.

8-16. As the light increased the figure stood out. I could look into it. The depth which was absent at first as a part of the figure, as it is now, increases my preference. It is best there.

17-25. As the light increases the figure loses in depth effect and becomes thin. Unpleasant. At the optimal stage I was conscious of trying to make the center part go back to a point in the cube adjacent to the upper part. It seems a solid there.

Fig. 4. Obs. P. C. S. Opt. 23

0-19. This figure is more complicated than previous one(X) figure. It is almost impossible to describe unless I give an association. At this stage the figure is unpleasant. It appears as fragments rather than as a whole. There are
changes in structure that causes the figure to fall to pieces. 
20-25. I like the figure there the best. There is a sort of 
interlocking depth effect that is pleasant. 
26-30. The figure tends to break up into fragments again. 
Fig. 5. Obs. M. H. L. Opt. 20. 
0-10. I can't see much of the figure yet. The experience is 
rather unpleasant just there. 
11-14. This is the first time I have seen the drawing that 
way. I can see it as a pyramid, a hexagon or any other way I 
wish. However a sort of pyramid figure persists in percep-
tion. 
15-20. The figure takes on thing character. It becomes a 
solid figure having more depth than before. At low illumina-
tion the figure was a plane facing toward me. The figure is 
at its best there. 
21-30. As the illumination increases the lines begin to ap-
pear as lines. The figure looks like a poor kind of square 
rather than a nice pyramid. The figure is not so good as be-
fore. 
Fig. 5. Obs. W. W. Opt. 10. 
0-8. I recognize the figure. It all seems in the same plane. 
No particular unity to the figure. No part is darker than 
any other. Just blots of color or something. 
9-11. The figure seems to "hang out". It forms a good unit. 
It is a better design than before. 
25-40. The figure is disorganized and does not stand out as 
it did before. The figure is too highly structured. I see
two figures instead of one. A cross and a square.

Fig. 5. Obs. T. P. Opt. 15.

3-6. Three planes are vertical, horizontal and oblique, respectively. I get the effect of the vertical and horizontal lines being curved. Part of the figure disappears but not in any regular order.

7-15. I get the effect of a double pyramid with points to the right and left. I seem to be looking at the inside of a pyramid. The points of the pyramid shift back and forth but keep the double pyramid effect. I get a depth effect that is pleasant.

16-24. The figure jumps back and forth. The double pyramid effect has disappeared.

25-35. I get the effect of a square with a star in the middle. The vertical lines are out of line because of the square in the center. At this stage no fluctuations are present.

36-50. The figure is in only one plane now and has no depth to it at all.

51-90. The square disappears from the center. As the square recedes, it goes into the background and disappears entirely.

Fig. 5. Obs. P. C. S. Opt. 10-20.

0-8. I recognize the stereoscopic figure as it emerges from the background.

9-15. The figure comes out with an extreme depth effect. At the same time I felt a kinaesthetic pattern. At the same time I felt that I could get hold of the figure and really do something. This ability to do something with the picture increased my pleasure in observing the figure. The figure is clear
16-19. This figure has rather a bimodal aspect. Between these two illuminations (10-20) there is absolutely no change in feeling tone. 20-The figure has a depth and solidity that is pleasing. The depth effect is only slightly less pleasing than at the lower stage of illumination, as I mentioned before. The two places of illumination are clear cut in their relation to the optimal effect. I am completely indifferent between these two modes of illumination.

21-40. The figure doesn't change at all for me and I am indifferent toward the whole thing.

Fig. 7. W. W. Opt. 8.

0-4. All I can see are two dots one-half an inch apart. No relation between unless I voluntary put it there.

5-13. The four parts make a unitary structure. It is darker in the center. The figure stands out from the background. The lower dot looms ahead.

14-30. Rather unpleasant. The figure breaks down. Loses its unity. The depth has gone also. The form is more highly structured than ever before.

Fig. 8. Obs. P. C. S. Opt. 10.

0-10. As the light increases the figural field changes into thing character. The greatest appreciation comes when the areal character of the figure changes to thing character.

Fig. 16. Obs. W. W. Opt. 15.

0-7. Not much to see to the figure. Just flat and uninteresting. No apparent depth to the figure.

8-15. The figure now has perspective where before there was
none. It forms a cross now with the lines bent toward the center.

16-22. The figure becomes flat again. It breaks up into parts which do not fuse without an effort.

Fig. 18. Obs. P. C. S. Opt. 15.

0-14. There seems to be a hemisphere in the second figure that remains dominant in perception.

Fig. 18. Obs. P. C. S. Opt. 18. 2B.

0-10. I am only judging the place of least unpleasantness. The figure is not a good one and I don't like it. There is a difference between judging the least unpleasantness of a series of figures and the most pleasant of a series of figures. This figure is almost altogether unpleasant.

11-18. There are no depth factors, unless I choose to put them in. My feeling of unpleasantness seems to be based on the un-systemmetrical nature of the figure. The decrease of illumination seems to render the figure more symmetrical and hence I like it at this low illumination.

19-30. The figure is unpleasant for me. I see too many flaws in it.

Fig. 19. Obs. W. W. Opt. 13.

0-15. As the light increased the figure took on thing character. The center stood out. It appears somewhat as a diamond. At first the figure seemed just lines. Now it seems to be a thing.

16-20. The figure is flat and only by effort can depth be given to the figure.
21-30. The figure is flat and gets worse as the light increases. The feeling tone was present only at the optimal stage. Otherwise I was indifferent to the drawing.

Fig. 19. Obs. H. D. S. Opt. 20.

0-8. Not very much to see. There the figure doesn't look very solid. As I continue to look, I get a triangle superimposed on an octagon.

9-14. The figure becomes better. As the illumination increases the figure becomes more solid.

15-20. The figure now becomes a very definite solid. The small octagon stands out closer to me. The figure has a slight cut stone effect.

21-29. The figure loses its solidity. The pyramid effect now comes back. The figure is not as good as it was at first.

30-35. The figure is rather nice at this stage of the illumination. The contours are rather definite. I see a double effect star shaped figure, which has no depth. The figure is not so pleasant as before, though it is rather nice.

Fig. 21. Obs. R y B. Opt. 18.

1-8. Starting somewhere in there, the lines seem to pair off markedly. The lines look wavy. It seems almost like some kind of a color scheme. The colors are half way between pink and purple. There does not seem to be any depth perspective. Now the color disappears. The lines seem just as wavy as before.

9-15. The size of the figures change. There does not seem to be such a marked contrast. Each part is related to every
other part. I like the figure best there. A depth effect appears.

Fig. 26. Obs. H. D. Opt. 15.

0-4. The figure stands out between me and the lighted background. The figure is in front of the background, something I didn't notice at first. Illumination will increase my appreciation for the figure.

5-8. The figure is better now, although not as good as it could be. The depth is increasing, and the figure is becoming more of a unit.

8-15. The figure is now a homogenous unit. It seems rather solid. The inside of the figure looks a little greyer than the outside. As I look at the figure it seems to group itself off. Certain squares stand out.

16-30. The figure is too bright to be pleasant. I still see a figure ground effect. I find myself trying to see sections rather than a unit. The vertical columns of the figure tend to break up faster than the horizontal.

31-40. The figure now definitely lacks unity. It is rather unpleasant. I see the individual parts rather than the entire figure.

Fig. 27. Obs. W. W. Opt. 15.

0-5. I can barely see the figure. It is just a vague outline

6-10. The center of the line is darker than the rest. The inside of the arc is darker than the surrounding area.

11-15. At first I saw a complete circle. Only under the more intense illumination did I see the figure as an arc with the cen-
ter. darker than the outside. The black lines seem the boundary of a concave ball. I can see right into the ball.

16-30. The figure is too bright. It doesn't hang together well. Don't like the figure at all. The square is the best when the wavy effect changes into cones. After seeing the cones I do not see the right angles. I can make a choice between the cones and the paired lines and I prefer the cones. All the colors are clear and change with the light illumination. The figure is best there.

16-50. The lines stand out as lines right there, and I do not like it so well. That is about all I can say for it.

Fig. 24. Obs. W. W. Opt. 12.

0-6. I can see black masses that, to give as association as a description, look like rose blossoms. They are poorly structured and really seem like dark masses. As I watch them they seem to bulge out in space with the larger mass nearer than the smaller.

7-13. I still see large solid black masses, but not roses as I did before. As I watch, the masses take on the characteristics of faces. They seem to have depth. They just hang in space.

14-35. No good. Depth goes away which was the redeeming property of this form.

Fig. 25. Obs. W. W. Opt. 12.

0-10. All I can see is just parts. Not very pleasant.

11-13. The figure is a sphere. It is darker in the center than the outside. It stands out more like a sphere. Now I see figures on the surface.

14-23. The figure changes from a sphere with holes in the surface to a circle with holes in the surface.
24-35. Getting worse. It is just a circle now. Looks flat.
Binocular Observation  
Geometrical Form  
Descriptive Observations

Fig. 4. Obs. E. N. Opt. 10.

1-8. The figure is just an elaboration of ground. There isn't much to see. As the light increases I get fluctuations of perspective. The figure has a kind of light airiness to it. The figure is just lines and inferred surfaces. It is quite distinctly pleasant. The points of the thing change and give an air of illusion to the entire figure.

9-11. The figure lost its tridimensionality effect. The character of this experience is found by the front part of the design becoming a parallelogram. Part as such begin to emerge. The parallelograms intercept and the effect is not very pleasant.

12-15. I voluntarily change the figure to a star. I rather like it there. The star figure seems to bend the lines. A lack of uniformity proceeded the star effect. The star was built on the wreck of the old figure so to say. When I see the star the undirected lines tend to drop out. With this brighter light I like the figure best. The brighter lines fluctuate allowing me to get a depth effect. When I get a depth effect, the feeling is rather pleasant. All stages come in. First I get heterogonous lines and then out flashes various other figures. Oh Boy! Absolutely all edges go out. The lines all conform to the star. The four outside lines left and only the star remains. The star comes out. Whang! Here
is what happened. I winked when the star was a figure. The star came back first.

Fig. 4. Obs. G. W. Opt. 14.
1-10. Not much to say about figures. I can see various parts and they do not seem related particularly.

11-15. The figure makes a nice complicated design. I can see two triangles over each other. The figure takes on depth in the center. The figure is back of ground. It now seems to be a sort of wheel affair. I like the figure best there.

16-20. The figure is still back of ground. The star changes shape at different times. Too many lines come in the figure until I cannot tell what I do see. (Illumination moved back to 15) I can see fans, houses, and all kinds of green designs. The whole thing looks like a snow flake. I can also see a tent in the center. The figure seems to change with changes in fixation. I can see little windmills. When one thing stays in the center of attention the other things do not seem to hurt the figure I see.

Fig. 5. Obs. E. Z. Opt. 12.

0-6. The figure is just visible. I can see first one part than another. It now looks like two figures instead of one. I cannot describe the figures that I see. I guess I just imagine them.

6-12. The figure looks entirely different. It now looks like a bread basket. The lines are part of this figure. There is some depth in the figure at this illumination, which was not present before.
13-30. The figure looks different than before. The lines are waving back and forth. The figure has lost its depth effect. It is not a very good figure now.
Fig. 5. Obs. G. W. Opt. 13.

0-10. The figure looks like an ill-defined square with one edge turned toward me. The top and bottom lines are farther away than the other lines.

11-15. All the lines seem more related now. The figure has more unity than it did before. I can see right through and around the figure. It reminds me of a street lamp from above.

16-30. Stop turning on the light. The figure as you increase the illumination begins to look like a jumble of lines.
Fig. 5. Obs. E. N. Opt. 9.

0-5. The figure emerges with the parts standing out cold and stiff on the background.

6-10. As the light increases the lines take on a richer quality. I do not know how to describe the change except to say that the richness of the lines made me prefer them. There is a certain thickness and breadth to the lines. They have richness. The star has depth to it. I like the figure best there. However, the third dimension is not very stable and rather hard to hold. The depth requires more effort.

11-40. I do not like the figure so well there. It seems just a geometrical figure and not very interesting.
Fig. 5. Obs. H. B. Opt. 11.

0-7. I have no comment to make on the figure. The changes under illumination are not very sharp.
8-11 The figure looks best there. There is a good bit of depth effect. The figure is a good substantial solid.

12-13. The depth effect is lessening. I see two pyramids base to base. It does not become darker in the center than before, but rather lighter. The lines do not stand out as lines but as boundaries of areas.

14-16. The lines are too sharp there. Is unpleasant.

Fig. 5. Obs. G. W. Opt. 13.

0-9. The figure is not very pleasant. That is all.

10-14. The figure takes more shape. Association becomes clearer. I can see circles, squares, and other figures. In the center is a tent affair. The figure changes but always keeps unity. Now I can see snow flakes. The central parts change.

15-20. The figure now has little of unity. More different shapes and they are not related. Too many things are in the figure. The center still stands out in front of the figure. I do not like it very well.

21-40. Not very pleasant. Only half of the figure stands out. The figure now stands behind the ground in three different levels. As I watch the figure it becomes only a plain white surface.

Fig. 5. Obs. R y B. Opt. 14.

0-10. I can see sections of the figure. It looks like a steel grain bin with a top on both ends. As I look another
figure comes in that is more like a rectangle. When the rectangle is "in", the other lines do not seem of place, but are rather disregarded. Right here is where I like the figure best. There is marked depth effect here. I can look right into the figure. The figure that I see now is like the steel grain bin with a top on both ends. The inside of the figure is a darker shade than the surroundings or the area around the figure.

11-60. The figure has lost the color in the center now. The lines seem to conflict with each other. The perspective shifts and I do not know just what I am looking at. The lines are not coordinate now.

Fig. 5. Obs. H. D. S. Opt. 10.

0-9. Not much to the figure. Not particularly interesting.

10-14. The figure has more solidity as it changes in illumination. The central part swings back and forth from right to left. I seem to look down on the horizontal.

15-34. The figure is rather too bright, to be pleasant. I still seem to see the figure from the top. It seems darker in the center than before. It is almost too dark. I get another four winged figure. Now I get a double pyramid effect.

35-40. The figure is unpleasant. The depth effect has disappeared. One part of the figure is as bright as another
now. I get the pyramid effect but it does not persist. I find myself voluntarily trying to break the figure up into several parts. Not very pleasant.

Fig. 5. Obs. E. N. Opt. 10.

0-9. I liked the change from the low illumination. The first impression I had was of recognition. I recognized the figure.

10-12. Two or three times since I recognized the figure it has had bulk. It is a good substantial figure. The thing character determined preference. The black lines are thing characters in themselves. They are things.

13-15. I get a star effect now. Do not like the figure quite as well. It is getting worse as you increase the illumination. It has only two dimensions instead of three as it has where I liked it best.

Fig. 5. Obs. H. B. Opt. 13.

0-6. At first I just saw the figure as lighter than the surrounding field. I could almost make out the figure as solid of some type but I wasn't sure just what it was.

10-13. The vertical lines open up in the center for me. The center of the figure is darker than the outside. There seems to be a more pronounced depth effect than before. The figure is still a solid.
20-30. The coloration in the center fades.

31-50. The lines have little more irregularity.

(Illumination decreased for the observer) The chief thing in decreasing illumination is change of shading. When at a more reduced illumination, the figure appears more clear cut. The figure appears to change from one form to another at lower level of illumination. I can see triangles, and all sorts of figures. The lines appear to be related to almost any figure appearing in the stimulus. The perspective changes the strength of the lines.

Fig. 6. Obs. E. N. Opt. 15.

0-5. The figure looked like a fuzzy wuzzy thing. Reminded me a little of a lion.

6-10. Stop a minute. The thing hasn't changed any though.

11-15. The predominating thing is the characteristic of domes. Then cross lines come in but do not change very much. Then I saw a cross. In addition to the cross I see four squares connected in the center by middle lines. The figure fluctuates a little. The line connecting the squares seem darker. I do not like the whole figure very much, but that is as good as it will get.

10-40. Too bright. The figure breaks up into circles of brightness.

Fig. 9. Obs. H. B. Opt. 15.
0-5. All I see is a white spiral background. Indifferent.

6-10. I see a circular form in the center of the figure. It reminds me of a leather cushion. The figure stands out a little.

11-15. The form is better now. It has the thing character of a leather cushion. At the same time it appears as a sphere with bands around it. The spot in the figure stands out from the figure as does the background. There is a decided depth effect.

16-20. The figure has lost all depth now. I see a flat circle out of proportion. Depth is all gone. Don't like it so well there.

Fig. 11. Obs. H. D. S. Opt. 15.

0-5. I can see a cogwheel. It apparently has an opening or hole in it. It reminds me of figures on a card.

6-10. No change seems to take place in the figure there.

11-15. The five little spots predominate in the figure. The experience of seeing background through the holes in the wheel is the secondary effect. The circle seems to stand out as figure now and less as background.

16-30. The figure loses some of its thing character. It seems flat and is less interesting.

Fig. 13. Obs. G. W. Opt. 13.

0-9. All I can see is some kind of an ill defined figure. Not much to it.
9-14. I see four depth effects right there. It is an eight sided figure. The little dot in the figure is uncertain. The figure is symmetrical. The little dot doesn't seem to belong any place, though I am conscious of trying to put it somewhere. I finally found a place for it. Before the dot was in the road. Once in a while the figure loses all of its levels and a new figure emerges. It becomes a figure with crosses in it. The depth effect changes the figure. The figure when changes come about, is really not flat. The little dot has become part of the figure.

15-40. The figure becomes flat and looks like some kind of a drawing rather than a thing as it did before. It is becoming unpleasant because it breaks up sometimes. It is hard to look at and see anything in it.

Fig. 14. Obs. R. B. Opt. 11.

0-10. Hard to describe the figure. The inside of the circle has the effect of being deeper color. However, the circles have the same degree of shade.

11-15. At this place I can see the circle as a basket, with the rim toward me. The difference in color is more distinct. The inside of the bucket is very much deeper in color than the outside. The rim has no color at all.

16-20. Stop. Not a good figure now. I can see the defects in the drawing now. Looks flat and of an even shade.
Fig. 14. Obs. H. B. Opt. 15.

0-5. I can see a circle. It is darker in the center than the outside. The figure fluctuates, now going out entirely and now coming in as it were. The whole effect is not very pleasant.

6-15. The inner part of the figure looks like a convex button. It also reminds me of a man's sailor hat. The inside is a trifle darker than the outside. I should say that is the optimal stage. The figure has thing character.

16-60. The figure seems to resist the effect of the light. And so does not get as unpleasant as some other figures.

31-60. The figure breaks up into parts. One part is as clear as another or as I should say is unshaded. The general effect is rather unpleasant. It was better back there than here.

Do not increase the light any more; it will hurt my eyes.

Fig. 14. Obs. G. W. Opt. 15.

0-10. As the figure comes out the center begins to look darker than the surroundings.

11-15. The smallest part in the center looked eight sided. There is a gradual shading from the center to the outside. Around the outer edge I see an orange circle. It first looks closer and then farther away. I like the figure best when the outside is a little lighter than the inside.

16-40. The figure doesn't seem to change much only I don't like it so well.

Fig. 16. Obs. H. D. S. Opt. 10.

0-4. The figure does not have very much meaning in it. I
can seem to see after a time pitchforks connected in the middle. There is no unity to the figure. The parts do not have much coordination with the rest of the figure. Nothing much seems to happen in the figure. The figure is not symmetrical. All I get is a pitchfork and four other circles.

5-10. The parts are not so apparent. It makes a pretty good figure now.

11-16. There does not seem to be much change in this figure. It is only a collection of partial figures. There is no depth to the figure.

Fig. 17. Obs. R. B. Opt. 16.

0-5. I can't see much of the figure and don't like it very well. All I can see is a part here and there. As I watch, the parts that I can see shift here and there.

6-13. The figure is rather cute there. It seems to have a dynamic quality that it lacked before. I find myself making a wheel out of the entire figural field.

13-15. The ends of the arm of the figure are becoming round. The figure now definitely suggests rotation. The whole figure looks as if it might be a tire with a darker center hub. The lines are good texture and weight. The striking thing is, that the figure seems to be a part of a larger figure. The figure though not bad, is not so pleasant as before.

Fig. 17. Obs. T. P. Opt. 14.
0-8. The crossed lines in the center suggest crossed figures. The meaning I can weave into the figure is rather fleeting and fragmentary.

9-15. Lines are nice here. The lines are darker than before. The lines are more warm and black than before and seem to be part of the figure, rather than lines. The center of the figure is darker than the outside of the figure.

16-20. The figure seems like a smear there. I don't like it as well as before. I can see all the details there. The figural effect is poor. The center is just the same color as before. The figure is all the same color now.

Fig. 17. Obs. H. D. Opt. 12.

0-6. I immediately see a windmill affair. It looks like an aerometer. At one time I seen a circle, and a cog-wheel. I should prefer to see a cogwheel.

7-12. The cogwheel figure is becoming more substantial. It has thing character and persists more than any other figure. The windmill figure that I can make myself see, is a little out of balance.

13-40. The light is too bright for my eyes. All I can see now is a stark figure. Not much depth to it or thing character, except as a mere drawing.

Fig. 19. Obs. B. M. M. Opt. 12.

0-5. All I can see is a dim grayish haze. No clear cut forms.
6-10. Clearer. I can see all the lines. However, the picture is a little too dim. There is some depth effect when compared with the preceding step.

11-15. The figure is just as flat as a pancake. I know there should be some depth effect and maybe I'll see it later. There is some depth effect. I see two triangles superimposed. Part of the time it looks like a cut diamond. It seems to be a whole figure. Hangs together better. It looks like a stone set in a ring. I can see depth in the figure some of the time.

16-20. I get more jumping around than before. The figure is mostly flat. Less depth than before.

21-30. No depth at all. Perhaps there is some. I get an amiguous figure. I don't like the figure so well. I have difficulty in seeing the whole figure. The pieces stand out, as pieces.

Fig. 19. Obs. H. B. Opt. 12.

0-5. At the lower stages of illumination I cannot see anything to the figure. It seems just made of parts and these parts are not related in any significant way.

6-11. Not much change in the figure though it is becoming better as the light increases.

12-15. The internal hexagon stands out. The other lines form a general ring around hexagon. The internal figure
is a hexagon. In general the figure part, the hexagon, is
darker than the ground. The lines as I see them are sharp,
well cut, and do not appear as such but as parts of a
"thing".
16-30. The lines do not stand out now. The figure is homog-
onous. The lines tend to appear as lines now instead of
bounding areas.
31-40. The figure is becoming unpleasant.
Fig. Obs. G. W. Opt. 15.
0-7. The lines as I begin to see them are grouped in twos
from the center out. The figure is not very pleasant. The
lines alternate in blue and yellow. Part of the time I see
a top effect.
8-15. A depth effect comes in here. I believe I like the
figure better there. The figure is in back of the ground.
I recognize the same top affair. The figure stands out
clearer there and is more clear cut.
16-50. The figure is in back of the ground. The figure
seems wider at the corners than it did before.
Fig. 21. Obs. T. P. Opt. 15.
0-14. At first the lines in the center seem farther apart.
Every now and then a change comes over the figure and hides
all the lines. All that is left is a hazy undifferentiated
background. There does not seem to be any element of depth
to the figure.
15-20. A depth effect appears. The lines stand out from
the ground. There is a greater element of depth to the figure than before. The figure instead of just standing out from the ground curves into the ground especially at the corners. At the same time as I watch certain segments of the figure sort of stand out more than the others. There are pseudo-lines that fluctuate back and forth.

21-30. The lines seem to have little groupings in them or rather ripples that go across from left to right. The figure is rather unpleasant.

Fig. 21- Obs. T. P. Opt. 18. 2B.

0-5. I see white on a black background. The circle stands out a little from the ground. It reminds me of a sphere.

6-10. I see a square in the center of a circle which has some sort of lines in it. These lines fluctuate.

10-16. The lines now appear to bend. Certain sections drop out and then come back. The square stands out about the same as it did before.

17-23. The figure is clearer. The long lines bend and wave. The lines bend and arrange themselves in groups. The short lines appear more stable. I like it better there. I now get a definite fluctuation. The lines are arranged in series. There is an element of depth present. The figures are clear enough to see all details. The background is homogeneous. The lines have roundness and depth. The figure looks
real and has thing character.
24-30. I don't like the figure there so well. It has lost depth and some of its thing character.
31-37. The figure is more clear cut than before. The depth is all gone. The thing character has disappeared. The figure now is flat. I like the figure less here than place before.
Fig. 22. Obs. T. P. Opt. 15.
0-5. I see an eclipse. It is hazy. Not very homogenous. Rather dim.
6-10. I see two half circle arcs. Two arcs stand out. They have thickness and tend to complete themselves.
11-15. The figure has now lost some depth effect. I identify them as new moons. There is, however, some depth to the figure and thinking about it now I think there may have been more depth here than before. However I am not sure. The figure seems like a thing. The semi-circle complete themselves. The background is homogenous and farther back than when I first looked at the figure.
16-25. The lines are now flat. No thickness or depth to the experience. The background is clear.
Fig. 22. Obs. B. M. M. Opt. 12.
0-5 I see two little colored forms though they tend to go together.
6-10. Nothing changes.
11-15. The form looks like a rubber ring. The two sides represent the two sides or extremities of the thing. The middle part curves toward me.

16-20. Two marks again, only too glary.

Fig. 22. Obs. F. C. S. Opt. 15.

0-14. The goodness of this figure depends upon tied imaginary. One can think of the figure as tied together.

15-20. There seems to be closure of a sort. It is fairly pleasant.

21-25. Increasing the ill. Splits up the figure into parts again which is not very pleasant. The figure becomes unpleasant.

Fig. 23. Obs. E. N. Opt. 14.

0-9. All I see is a circle with the lower side down. No feeling tone connected with the figure at all to speak of. The parts are so dim that attentions are created that are unpleasant. The semi-circle fluctuates back and forth and now and then comes out black.

10-14. Now the figure changes to a good circle. It is rather pleasant. Now I see the difficulty. The figure looks like a circle rather than a semi-circle. There is a richness to the lines that is hard to describe.

15-40. The figure becomes lines again. Just a drawing. Too much light. The figure breaks up.

Fig. 23. Obs. R. B. Opt. 13.
1-9. As the figure comes on I can see wheels or geographical poles. Of the two figures I prefer the globe to the wheel. The figure gives me no depth perception. Any color seems to be lacking.

10-15. The illumination brings the future toward me. I can see the figure as a whole. Now I can get a baseball out of the figure. It is one of those rubber balls. I can also see wagon wheels. I like the figure best right there. No matter how I look at the figure the parallel lines in the center appear parallel. It is best right there.

16-18. It is harder to see wagon wheels now or anything else. Any connection disappears. The lines seem to change for me and appear as lines rather than anything else. I do not like the figure so well there as I did before. Yet, it is a little better figure than it was before, as I look at it.

19-35. The figure now breaks up into parts and I don't like it.

Fig. 24. Obs. G. W. Opt. 15.

0-10. I can see some ink blots. They have taken on no associations. They seem to be in back of the ground and are not connected with the ground in any way. Now the blots change and are on the ground.
10-14. The figures decrease in size. The top figure looks like an Indian head. The figure takes on the depth effect. The depth effect in the figure is the background.

15-20. There are five figures, each in back of the other now. All of these figures are faces. The heads are Indians and a little blot, which I couldn't find a place for is now a squirrel. These figures look quite life like and real. Now the face becomes an owl.

21-30. The figures gradually fade into ink blots again. The association disappears and the figure becomes flat. I do not like it so well there as where I told you I did back there a ways.

Fig. 24. Obs. E. Z. Opt. 10.

0-5. The figure looks like a group of ink blots. These ink blots are nothing more nor less than just round blobs of black. They are not exactly round though.

6-10. The ink blots now remind me of heads. One head is farther back than another. Each head seems to have a circular shadow around it. I like the shape of the figure now.

11-40. The figure is becoming too bright. The head disappears and all I see are Ink blots again. The figure is unpleasant.

Fig. 25. Obs. T. P. Opt. 13.
0-5. I see a series of circles one inside of the other.
There is quite an element of depth to the figure.
6-10. There is some slight dropping back of circle. They
appear at times to have a dished in effect. I definitely
see a dish or bowl now. The center figure stands out. The
background is homogenous. There are few shadows. The cen-
ter circle turns. The main element of my preference seems
to be the thing character of this bowl. Best right there.
11-20. The depth is gone now. No thickness to the lines.
The background is clear. No thickness to the lines.
Fig. 27. Obs. B. M. M. Opt. 12.
0-6. I can barely see the outline of the figure. Very dim.
7-8. Clearer. Don't see anything. It is just a little cur-
ved line.
9-15. Looks like the bottom of a sphere. It is not just a
line but the bottom of something.
16-20. Nothing. The figure flattens out again. Only once
in a while do I see parts of something. There is too much
white surface.
Fig. 27. Obs. T. F. Opt. 13.
0-12. Can't see much to the figure. That is about all I
can say for it. Of course, it is not very pleasant.
13-15. The lines in front of the ground has thickness.
The figure seems more interesting. Shadows play across
the figure at times. The whiteness of the ground is dim enough to see the figure plainly. It seems to stand out from the ground.

16-50. The figure becomes less pleasant as you increase illumination. It seems to sort of split up and I can’t see much to it. The figure is not pleasant, to look at.

Fig. 27. Obs. M. H. L. Opt. 15.

0-5. The figure is a semi-circle. I see the lower half of the circle. The figure appears like a moon. It is rather darker in the upper part than the lower.

6-10. The moon appears now. The figure is just a moon nothing else.

11-16. The figure is getting still darker in the center than before. Around the edge of the figure is a pattern of brightness with the inside curve of the moon darker than the surroundings. The shadows leave the figure. There is a sort of clearing effect. The figure with the darker part to the inside of the curve stands out clear and bright.

17-20. The lines seem to get thinner and remind me of another sort of a figure. The figure is of equal brightness now and seems to lie in one plane now. The figure is now so pleasant as before.

Fig. 27. Obs. G. W. Opt. 12.

0-6 I see a crooked line that is crescent shaped. It
tends to complete itself and make an oval. The oval is darker than the surroundings, particularly the inner part.

7-12. The lines seems to curve still more making a complete circle. I can pick out the figure easier there. It is best there. Has depth.

13-15. The background becomes a ball.

16-25. The background stands in the same plane as the figure. It is not so pleasant.
Binocular Observation

Pictorial Forms

Descriptive Observations

Optimal Preference In Control Lever Reading

Fig. 30. Obs. T. P. Opt. 20.

0-5. I see the figure of a boy or man. The background is dark.

6-10. I see now that the picture is of a young boy with long hair. I don't like it very well right there.

11-15. His feet are together. One foot is in front of another.

16-25. The feet go away. I see only blotches. The colors are unnatural and in the same plane. Everything but the face of the boy is blotched. This is the redeeming features.


Fig. 30. Obs. H. B. Opt. 15.

0-10. Same as the rest. Can't see anything except parts here and there. Not very pleasant.

11-15. This picture will never be like I want it to be. However this picture I know will not be any more pleasant. He is a real Boy Blue alright.

16-20. Here this thing is getting toward the picture
stage again. It is apparent now and the picture is flat.

Fig. 32. Obs. Ray B. Opt 15.

0-14. I would describe this picture at this stage of illumination the same as No. 30. Parts, are all that I can see.

15-18. I see a fair young lady with the color of youth. She has very light complexion. She has rather an unpleasant expression on her face. But not so much as at a lower stage of illumination. I want to mention that at a lower stage of illumination, come to think about it, the lady seems about ten years older than she does now. I can make her face look two different ways if I wish.

19-60. The face is not so pleasant now. I see all the imperfections in the picture and the lady looks stern and hard. This is the effect of the light it seems to me. The experience is not so pleasant as before.

Fig. 33. Obs T. P. 15.

0-5. I see a rather mature woman with something in her hair. She is dressed in white.

6-10. I can see it is a young girl now. She still has dark hair. She has some kind of a sash on. Her hair is curly. Her expression is rather sweet. Her eyes are obscured and I can't see much of them. I don't like it very well.
11-16. I can see color in the face. She has red lips. Here her eyes are blue. She has a very delicate complexion. I like the figure quite well.

17-24. I don't like the figure so well there. She has taken on a hard expression. Her eyes are piercing. She gives one the impression of haughtiness. She is not so beautiful as before. Her garments look stiff and hard. I can see wrinkles in her neck. The shadows come out of clothes making them appear hard and stiff, unreal. Her expression is hard and blase, worldly.

Fig. 33. Obs. H. B. Opt. 15.

0-6. It doesn't look like a girl. It is not bright enough to satisfy.

7-15. A good figure emerges now. Depth is present. This picture won't become as clear as the others.

16-40. It becomes only a picture again. No good.

Fig. 34. Obs. R. Y. Opt. 25.

0-14. I can see the outline of the picture with the area filled in. The picture appears flat. The face that I can see now, under this illumination, looks sad and wistful. I know I would like brighter color for that race.

15-20. I can see depth in the picture. I like the picture a little better than I did before.

21-26. I like the figure there the best, because I can see color to the eyes. There seems more depth to the face and
the figure appears more life like than before.

27-35. There is discord in the balance of the shadows. The face is becoming flat and uninteresting. The picture looks over exposed there.

Fig. 34. Obs. B. M. M. Opt. 20.

0-5. I can get a few cues of what the figure is. I am also aware of a few light spots. I know how it is a figure with some kind of a hat on.

6-10. There I like it better. I can see a straw hat and an open shirt. The figure is more definite.

10-11. I can see the light and shade on the face. I can get the colors clearly. The picture seems more life like than before.

12-16. I like it better than before. I can see the expression about the eyes. The figure is still life like and I can see the colors clearly.

17-25. I don't like the figure there so well. The shadows are too sharp. The white in the eyes are too bright. Some of the details stand out too clearly. The picture is still unified, however.

Fig. 34. Obs. Ray B. Opt. 30.

0-12. Just outline with blank filled in. I can see faint color.

13-15. I can see all of the picture. Funny the picture has changed a little. Very subdued. Don't like it there.
No life to the picture.

16-20. I can see some depth. Part of the picture appears in the shadows. I like it there, but it can be better.

21-34. The picture is better there because color comes into his eyes.

35-40. Don't like it so well. There is a discord in the balance of the shadows. No good.

Fig. 35. Obs. B. M. M. Opt. 20.

0-5. Didn't recognize the figure at first. There seems to be dark splotches in it. I can see it is a scene near water. I can see no details of the buildings.

6-10. I get the cloud effects. Now I can see a bank. It is evidently a stream of water of some kind.

11-15. No change. A little brighter is all.

15-21. The clouds seem like clouds and the water like water.

22-30. Too bright. I can see all the imperfections in the painting.

Fig. 36. Obs. M. H. I. Opt. 25.

0-6. I see a fallen tree and sloping roof of a shed. Not very sure though. Don't like it very well. I infer just what I have told you.
7-24. I can see trees and clouds that I didn't see before.

25-39. That is best there. I get more harmony between the colors there. The figures stand out better.

40-50. No good there. Just a big splash of red. I can't tell what the picture is. No depth. It looks like nothing. I don't like it very well.

Fig. 36. Obs. H. B. Opt. 15.

0-7. The picture looks like that of a big fat man now. Not very pleasant.

8-12. All I say is, that the picture is just there. The color comes with the meaning. I can see what it is now.

13-20. Only toward the last stages can I see the other girl.

22-40. The picture is too bright to be real. It looks like a picture instead of a human being.

Note: When the experimenter placed the figure under the optimal stage of illumination, the O gave the following: The picture is a little distant there, but has the quality of reality. As the illumination increases the picture becomes artificial.

Fig. 36. Obs. R. Y. Opt. 20.

0-8. The figure is very dim. I can't make out the figure. I would cast it aside if that were all that I could see.

9-14. The figure in the picture seems to stand out
more. I can see her hand. The picture seems defective since the background is absent. All dark.

15-22. The light helped her face. The face rounds out. She is more life like and looks healthier. The face, however, is not entirely life like.

23-30. The features of the children seem to sharp and pinched. The picture is not so pleasant as before.

Fig. 36. Obs. T. P. Opt. 14.

0-5. I can see a white indefinite figure. The background is black and there are hard dark spots on the figure.

6-10. I can now see more of the figure of the little girl. She appears dressed in a light dress. Her skin seems delicate. She seems to be sitting beside something white. The background is shadowed.

11-16. One of the girls has a hand behind her head. The background is dark brown at the top. Both of the children look life like. Pretty good! The expression of the babys' face is sweet and wholesome. There seems to be something wrong with her eyes. They look like mere slits. The older girl seems to be admiring the little girl. The figure seems realistic and life like, although one of the children has something wrong with her eyes.

17-24. The expression on the babys' face is better than it was. The eyes appear as normal. However the older girls' face has taken on an incipient expression which effects
the normality of the eyes in the face of the other. I do not like the face as well as before. Everything seems to look stiff and lifeless. It is flat and uninteresting.

Fig. 37. Obs. H. B. Opt. 15.

0-5. The picture looks like a prairie now, or like Niagara Falls, now I am not sure which.

6-9. I can see no change in the figure here.

9-16. Good. Same characteristics as other pictures. Don't like to repeat them all again. It looks real dynamic.

17-20. The figure is getting worse. It looks too much like a picture.

Fig. 38. Obs. T. P. 15.

0-5. I see a man with the arms folded. The face is hazy. The background is light blue. He has on a light shirt and vest. The edges of the picture are darker than the center. The figure is too dim, I don't like it. The figure is so dim that I can't differentiate the details. I had a vague suggestion of details that we subject to suggestion. I have to guess at these details.

6-10. I begin to see more of the face. The man has a striking face. I can see his ear on his left side. I can see more of the color of the skin. I don't like it there.

11-16. The arms are bare and muscled. I can see his red shirt and overalls. His cheek bones are high and sharp.
His hat is brown. The background is homogenous. He seems to have coarse features. He seems to exemplify strength and character. I like it best there. The man has a serious far away look. Now that the illumination has reached that stage, he impresses one as having a better character than before. He is a better sort of a man than before.

17-20. I can see the cords in his neck. His face has hardened and he looks mean. I wouldn't trust him. The figure is unpleasant, and getting more so. His gross features appear unpleasant. The expression of his face seems hard and distrustful.

Fig. 38. Obs. H. B. 15.

0-13. The figure isn't so good there. Does not stand out good enough.

14-15. The figure has a dynamic quality to it, depth effect and everything.

16-40. The figure looks now just like it did at a lower illumination. The picture loses reality. It doesn't look real.

Fig. 39. Obs. H. B. Opt. 15.

0-5. Doesn't mean much. Looks like a vague black figure grouping in the alley way.

6-16. Reality is a function of the third dimension.
When the picture doesn't have depth, the woman just seems part of the house. The picture has a dynamic quality right there. It is pleasant to look at.

17-25. The picture has lost its dynamic quality. It is no good. It is also flat and uninteresting.

Fig. 39. Obs. Ray B. Opt. 15.

0-9. All I can see is dark places or blobs in the picture. I can make out at times the window and door of the background. I can also see the dress of the woman. These parts are not connected in any way. They just seem there.

10-14. I can distinguish the characters of the picture. It reminds me of a neighbors house at dawn in Baldwin. Here the picture at first was just a mass, now the picture is taking on form. I can see the door, and most of the other details of the picture. I can't see the expression on the woman's face as yet.

15-21. I can see the faces of the characters of the picture. The picture is becoming more pleasant than before. I can almost see the expression of the middle characters in the picture. I can also see the face of the child farther back. The house has changed in color also. It looks more like a house. Depth is present in the picture now, where before it was flat. The depth seems to make
the sense in the picture.

22-64. A cap came on one of the children just then and took color.

65-70. The depth effect is still there though not so noticeable as before. The figure is less pleasant. The house appears as a wall instead of a house and more of the details of the picture do not seem related but exist in the picture without any place for them.

Note: The O commented without being asked that the depth effect was the organizing factor in the picture. "It makes the drawings seem more natural and makes the faces seem more realistic."

Fig. 39. Obs. R. Y. Opt. 20.

5-14. Can't see much to the picture. It seems unrelated to anything. The parts are just there.

15. I like the picture pretty good there. I get an evening effect. The figures do not stand out enough. There is not much contrast. The parts are still indistinct. The figure is flat.

19-20. The figure has more depth than before. The shadows look like parts of the room instead of mere shadows. I get the appearance of sunlight. The features are more distinct. The figure is best right there.

21-40. I see the woman is feeding the middle child now.
I am interested in the details. The picture seems over developed. Don't care much for it. There is a certain amount of eye strain present.